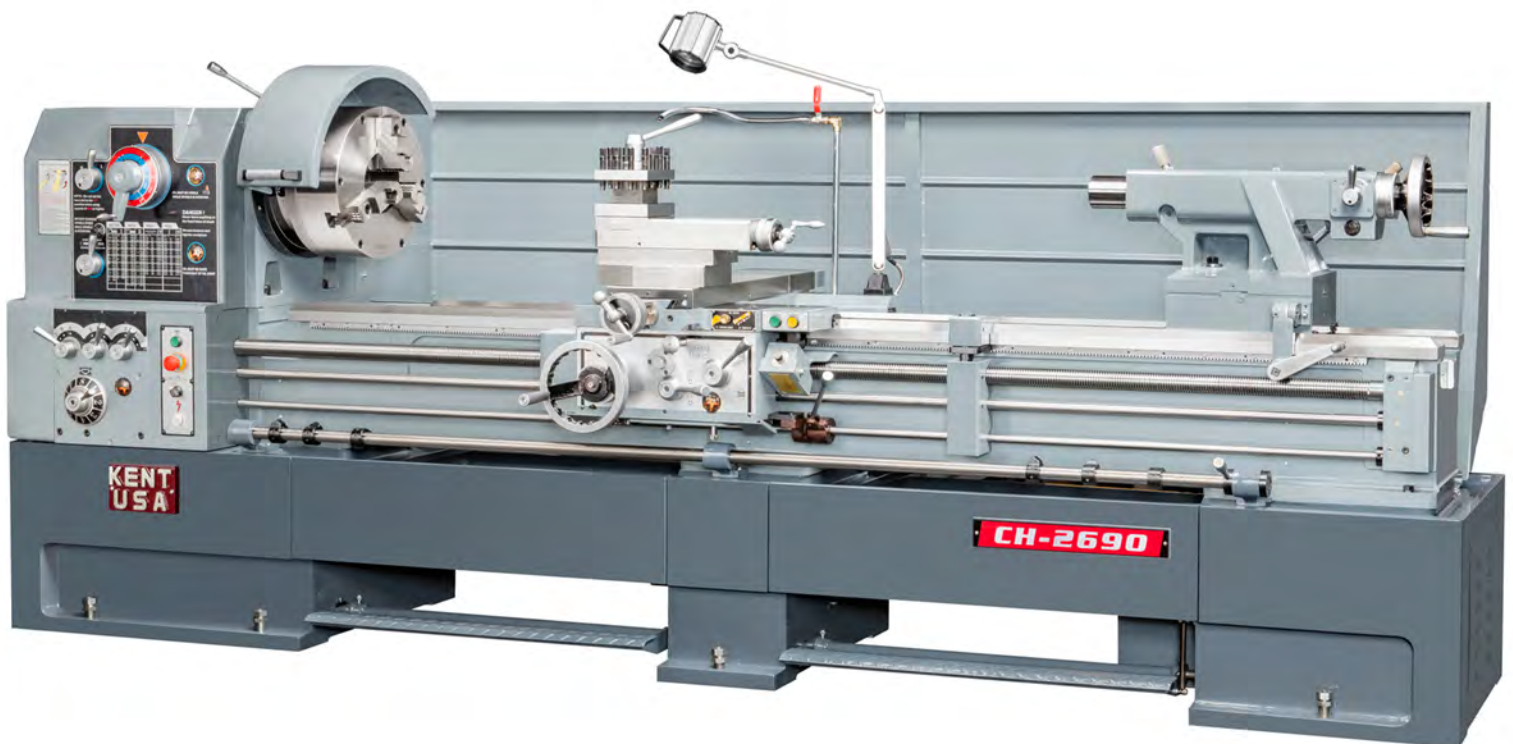




Since 1979

CH Series Manual Precision Lathe *Operation Manual*



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HIGH SPEED PRECISION LATHE

22 : 60 / 90 / 120 / 160 / 200

MODEL: 26 : 60 / 90 / 120 / 160 / 200

30 : 60 / 90 / 120 / 160 / 200

INSTRUCTION AND SPARE PARTS MANUAL

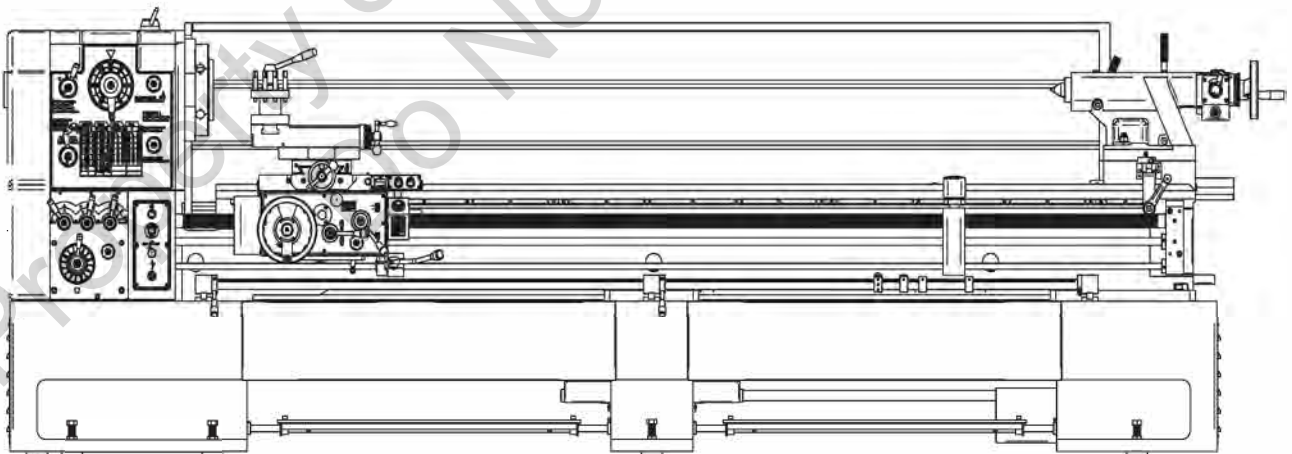


Photo shown model : -26120

CH Series

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Safety Instructions

ATTENTION

It is essential to read this operation manual and understand the program instructions and maintenance instructions before operating the machine.

This operation manual should be attached to the machine at all time where it is readily available to the operator for reference.

1. **Owner's Manual** : All machinery and machining equipment presents serious injury hazards to untrained users. To reduce the risk of injury, anyone who uses this item must read and understand this entire manual before starting.
2. **Safe Environment** : Operating electrically powered equipment in a wet environment may result in electrocution; operating near highly flammable materials may result in a fire or explosion. Only operate this item in a dry location that is free from flammable materials.
3. **Trained / Supervised Operators Only** : Untrained users can seriously injure themselves. Only allow trained and properly supervised personnel to operate this item. Make sure safe operation instructions are clearly understood. If electrically powered, use padlocks and master switches, and remove start switch keys to prevent unauthorized use or accidental starting.
4. **Work Area** : Clutter and dark shadows increase the risks of accidental injury. Only operate this item in a clean, non-glaring, and well-lighted work area.
5. **Personal Protective Equipment** : Operating or servicing this item may expose the user to flying debris, dust, smoke, dangerous chemicals, or loud noises. These hazards can result in eye injury, blindness, long-term respiratory damage, poisoning, cancer, reproductive harm or hearing loss. Reduce your risks from these hazards by wearing approved eye protection, respirator, gloves, or hearing protection.
6. **Guards / Covers** : Accidental contact with moving parts during operation may cause severe entanglement, impact, cutting, or crushing injuries. Reduce this risk by keeping any included guards/covers/doors installed, fully functional, and positioned for maximum protection.
7. **Entanglement** : Loose clothing, gloves, neckties, jewelry or long hair may get caught in moving parts, causing entanglement, amputation, crushing, or strangulation. Reduce this risk by removing / securing these items so they cannot contact moving parts.
8. **Mental Alertness** : Operating this item with reduced mental alertness increases the risk of accidental injury. Do not let a temporary influence or distraction lead to a permanent disability! Never operate when under the influence of drugs/ alcohol, when tired, or otherwise distracted.
9. **Electrical Connection** : With electrically powered equipment, improper connections to the power source may result in electrocution or fire. Always adhere to all electrical requirements and applicable codes when connecting to the power source. Have all work inspected by a qualified electrician to minimize risk.
10. **Disconnect Power** : Adjusting or servicing electrically powered equipment while it is connected to the power source greatly increases the risk of injury from accidental startup. Always disconnect power before any service or adjustments, including changing blades or other tooling.
11. **Secure Workpiece / Tooling** : Loose workpieces, cutting tools, or rotating spindles can become dangerous projectiles if not secured or if they hit another object during operation. Reduce the risk of this hazard by verifying that all fastening devices are properly secured and items attached to spindles have enough clearance to safely rotate.

Lathe Safety

1. **Clearing Chips** : Metal chips can easily cut bare skin—even through a piece of cloth. Avoid clearing chips by hand or with a rag. Use a brush or vacuum to clear metal chips.
2. **Chuck Key Safety** : A chuck key left in the chuck can become a deadly projectile when the spindle is started. Always remove the chuck key after using it. Develop a habit of not taking your hand off of a chuck key unless it is away from the machine.
3. **Tool Selection** : Cutting with an incorrect or dull tool increases the risk of accidental injury because extra force is required for the operation, which increases risk of breaking or dislodging components, which can cause small shards of metal to become dangerous projectiles. Always select the right cutter for the job and make sure it is sharp. A correct, sharp tool decreases strain and provides a better finish.
4. **Securing Workpiece** : An improperly secured workpiece can fly off of the lathe spindle with deadly force, which can result in a severe impact injury. Make sure the workpiece is properly secured in the chuck or faceplate before starting the lathe.
5. **Large Chucks** : Large chucks are very heavy and difficult to grasp, which can lead to crushed fingers or hands if mishandled. Get assistance when installing or removing large chucks to reduce this risk. Protect your hands and the precision-ground ways by using a chuck cradle or piece of plywood over the ways of the lathe when servicing chucks.
6. **Safe Clearances** : Workpieces that crash into other components on the lathe may throw dangerous projectiles in all directions, leading to impact injury and damaged equipment. Before starting the spindle, make sure the workpiece has adequate clearance by hand-rotating it through its entire range of motion. Also, check the tool and tool post clearance, chuck clearance, and saddle clearance.
7. **Speed Rates** : Operating the lathe at the wrong speed can cause nearby parts to break or the workpiece to come loose, which will result in dangerous projectiles that could cause severe impact injury. Large workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.
8. **Stopping Spindle by Hand** : Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own or use the brake (if equipped).
9. **Crashes** : Driving the cutting tool or other lathe components into the chuck may cause an explosion of metal fragments, which can result in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use, not leaving lathe unattended, and checking clearances before starting the lathe. Make sure no part of the tool, tool holder, compound slide, cross slide, or carriage will contact the chuck during operation.
10. **Long Stock Safety** : Long stock can whip violently if not properly supported, causing serious impact injury and damage to the lathe. Reduce this risk by supporting any stock that extends from the chuck/headstock more than three times its own diameter. Always turn long stock at slow speeds.
11. **Coolant Safety** : Contaminated cutting fluid is a very poisonous biohazard that can cause personal injury from skin contact alone. Incorrectly positioned cutting fluid nozzles can splash on the operator or the floor, resulting in an exposure or slipping hazard. To decrease your risk, change cutting fluid regularly and position the cutting fluid nozzle where it will not splash or end up on the floor.

Section 1 : Controls & Components

Identification

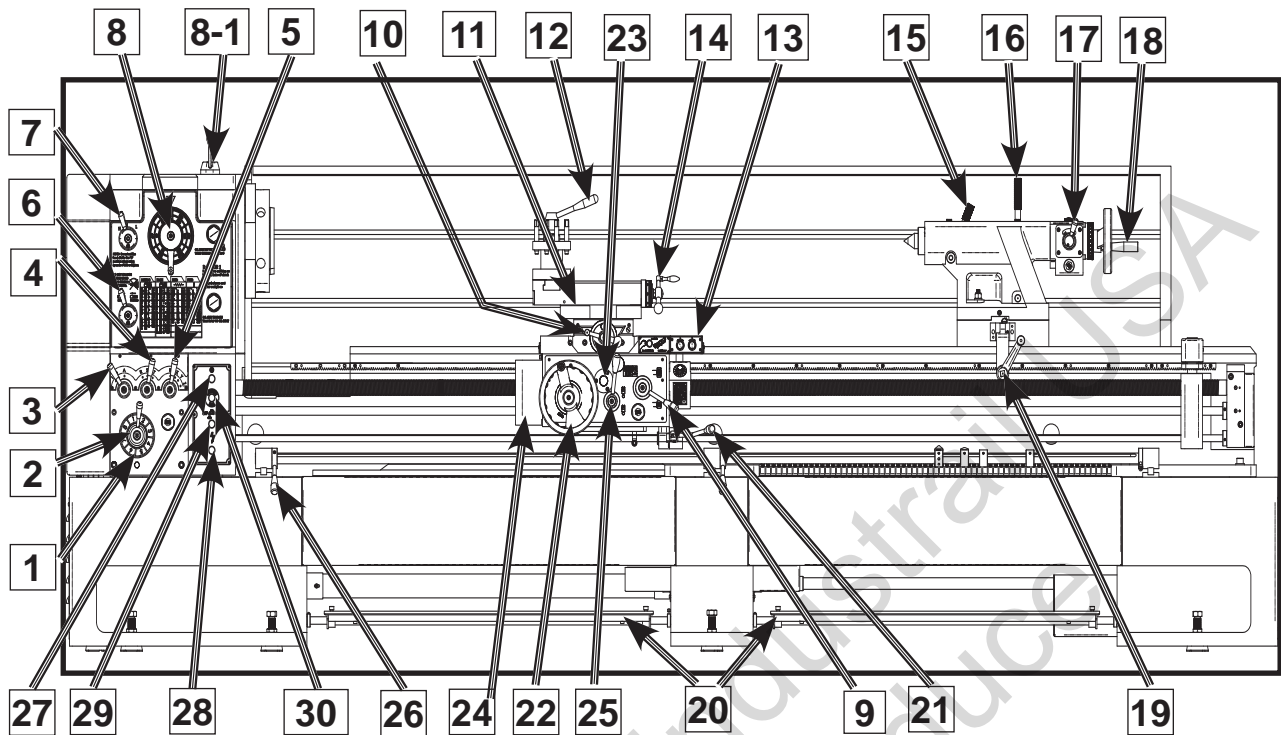
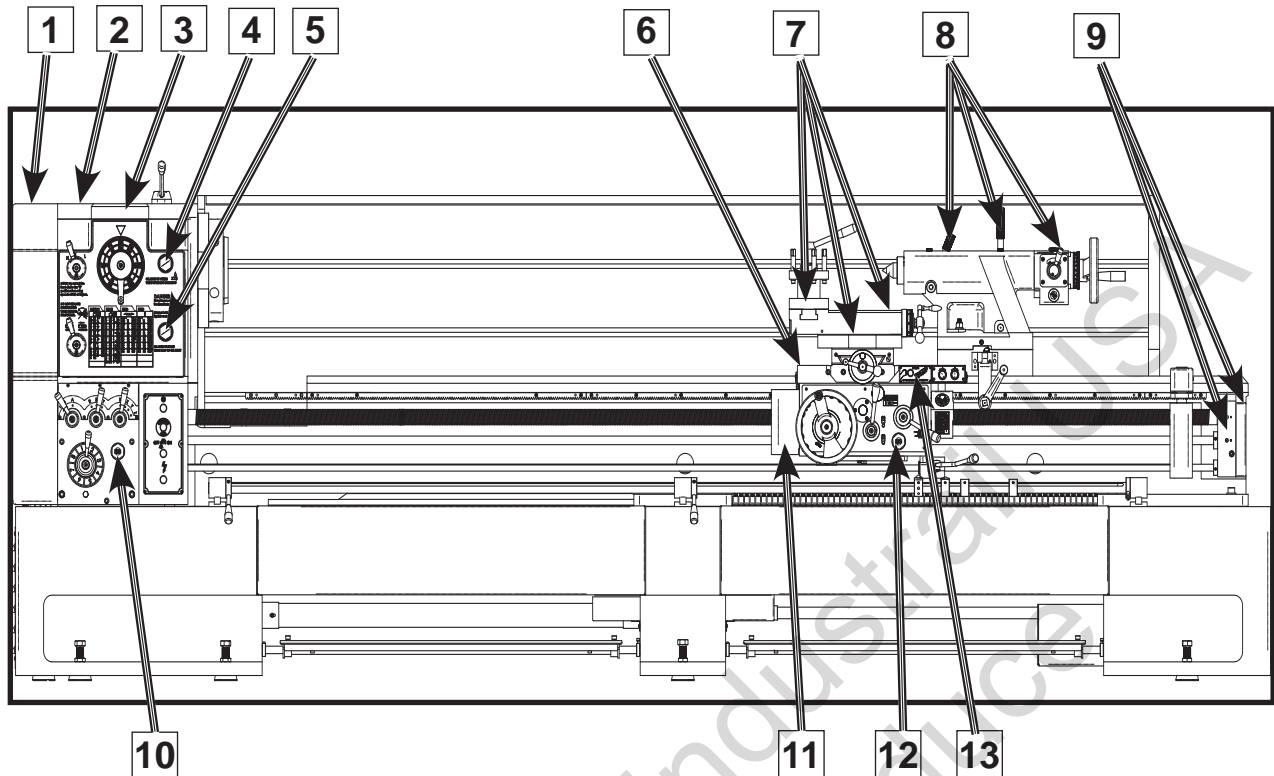


Figure 1. The CH-26120 Lathe.

- | | |
|--|---|
| 1. 8 steps feed select lever. | 17. The lever for tailstock gearbox speed change. (H.L) |
| 2. 8 steps feed select indicator. | 18. Handwheel for tailstock. |
| 3. Thread & feed selector lever. | 19. Tailstock lever. |
| 4. Thread & feed selector lever. | 20. Foot brake pedal. |
| 5. Thread & feed selector lever. | 21. Spindle start / stop control lever. |
| 6. Rotation selector lever. | 22. Apron handwheel. |
| 7. High / low feed change lever. | 23. Long. / cross auto-infeed lever. |
| 8. &(8-1)Spindle speed change lever. | 24. Rapid feed motor. |
| 9. Screw cutting lever. | 25. Auto-infeed engagement lever. |
| 10. Cross slide handle & dial. | 26. Automatic stop selector lever. |
| 11. Top slide lock screw. | 27. Jog push button (JOG). |
| 12. Square turret clamping lever. | 28. Power indicator. |
| 13. Cross slide lock screw. | 29. Pump switch. |
| 14. Top slide handle & dial. | 30. Power switch. |
| 15. Sleeve lock lever for tailstock. | |
| 16. Clamping lever for tailstock body. | |

Lubricating points chart



1. Oil inlet of feed gear box (inside of the gear box cover).

2. Drain plug of headstock (rear side of the headstock).

3. Oil inlet of headstock.

4. Oil sight glass.

5. Oil sight glass. Keep 1/2 quantity.

6. Oil inlet of apron.

7. Oil inlet of slideway & lead screw.

8. Oil inlet of tailstock. Lub every day.

9. Oil inlet of lead screw. Lub every day.

10. Oil gauge of gear box. Keep 1/2 quantity.

11. Rapid feed motor.

12. Oil gauge of apron.

13. Longitudinal lubrication interchange.

PREPARATION

1. Move the spindle **ON/OFF** lever to the **OFF** (center) position, as shown in **Figure 2**.

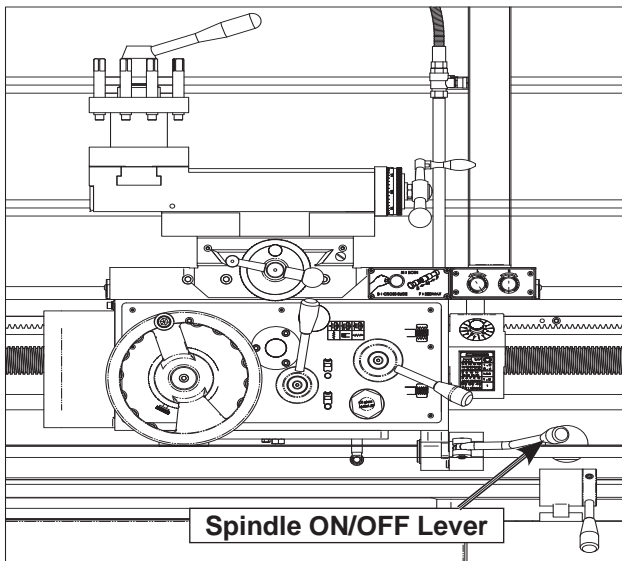


Figure 2. Spindle ON/OFF lever-setup.

2. Rotate the stop button (**Figure 5** on **Page 7**) clockwise until it pops out. The pump will turn **ON**. Observe the oil pump tube sight glass (**Figure 3**). Verify that you see oil flowing out of the tube and against the sight glass.

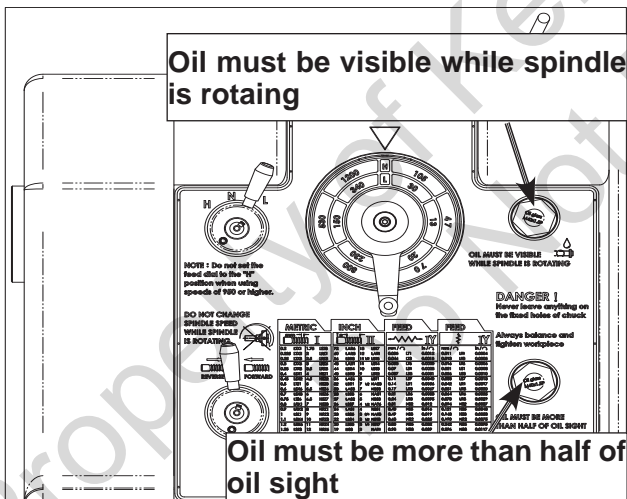


Figure 3. Oil pump sight glass and oil tube.

Note : This headstock has a pressurized oil system that is equipped with an oil pressure safety switch. If oil stops flowing or does not flow to start with, the lathe will not operate until the oil is properly flowing.

NOTICE

Never bypass the oil pressure safety switch!

If you do, you will void the warranty, and headstock damage may occur.

3. Make sure that all bystanders are out of the way, tools are cleared away, and the chuck key is removed from the chuck.
4. Move the spindle **ON/OFF** lever (**Figure 4**) down and the chuck will rotate counter-clockwise (down and toward you, as you face the front of the lathe).

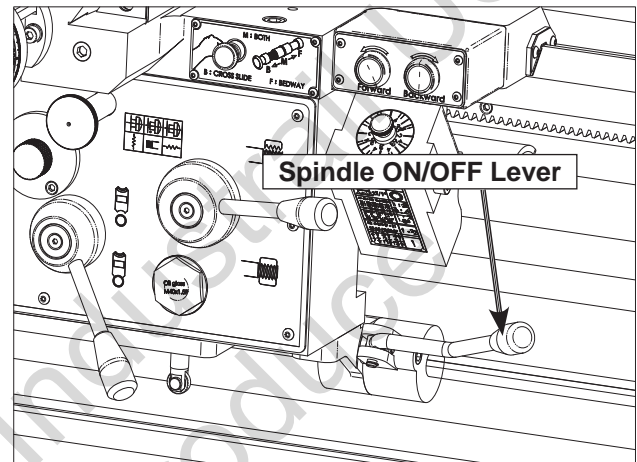


Figure 4. Spindle Lever in ON position.

5. Observe the lathe and listen for any abnormal noises or vibration. The lathe should run smoothly with little or no vibration or rubbing noises.
6. Push the stop button The lathe should stop.

Control Panel

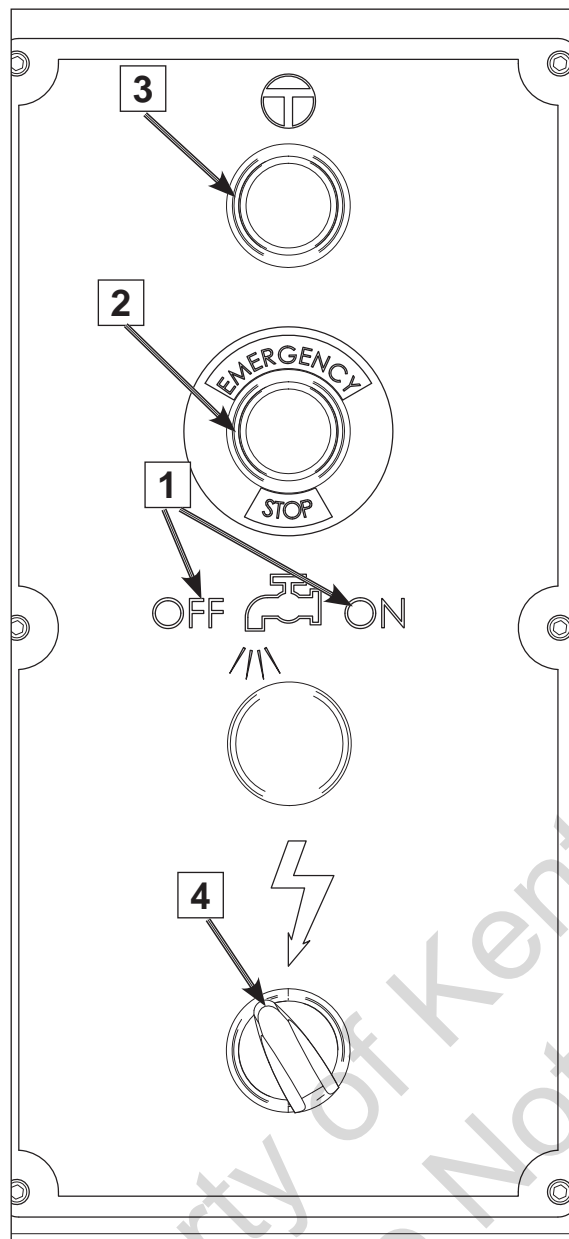


Figure 5. Control Panel.

1. **Cutting Fluid Pump Switch** : Turns cutting fluid delivery ON / OFF.
2. **Emergency Stop Button** : Stops all machine functions. Twist clockwise to reset.
3. **Jog Button** : Turns the spindle motor ON while being pressed and held.
4. **Power Light** : Illuminates when lathe is receiving power.

Headstock Controls

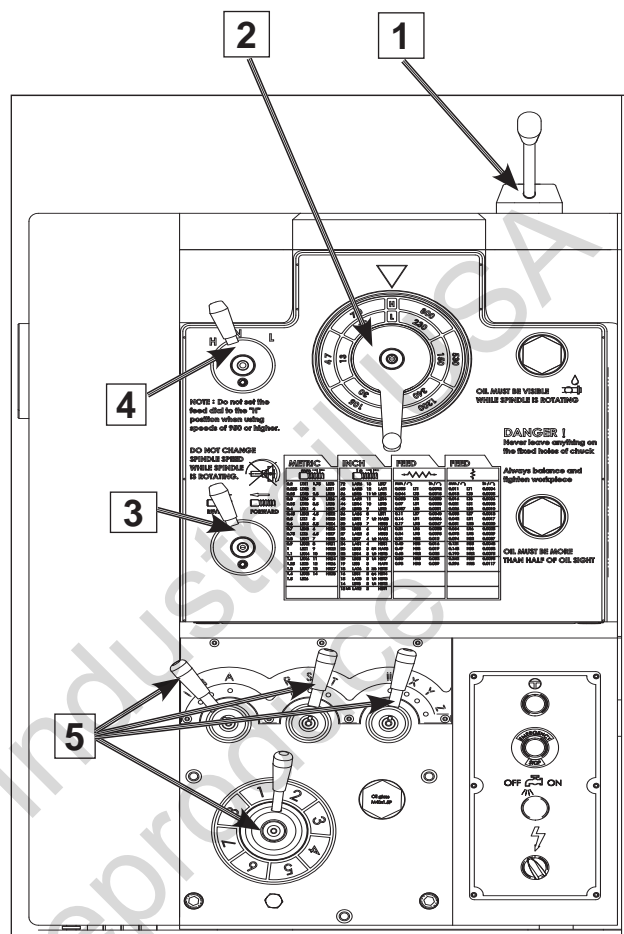


Figure 6. Headstock Panel.

1. **Spindle Speed Range Lever** : Selects H(High) or L(Low) Speed range for spindle.
2. **Spindle Speed Lever** : Performs the specified speed shown on the speed panel.
3. **Feed Direction Lever** : This lever changes the direction that the gearbox is turning at, and as a result the leadscrew and feed rod change direction.
4. **Gearbox Range Lever** : This lever puts the gearbox in high or low range and has no effect on spindle RPM.
5. **Gearbox Levers** : Moves the gearbox gears into particular ratios, which then turn the leadscrew and feed rod for threading and power feed operations.

Carriage Controls

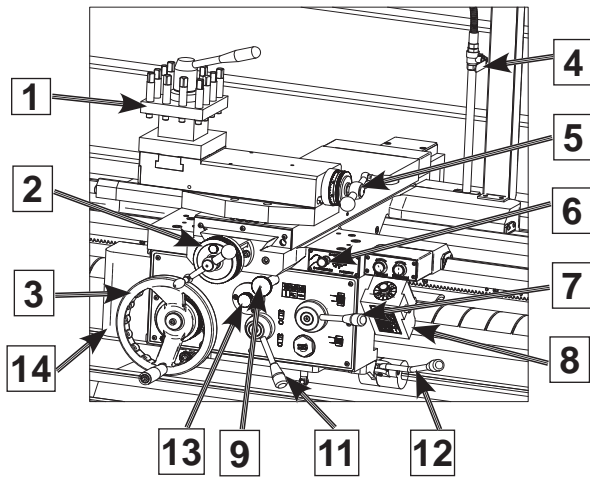


Figure 7. Carriage Controls.

1. **4-Way Tool Post Lever** : Used for locking the rotary tool post in eight possible detents.
2. **Cross Slide Handwheel** : Positions the cross slide in or out.
3. **Carriage Handwheel** : Allows for manual movement of the carriage from left to right along the bed.
4. **Cutting Fluid Flow Control Lever** : Used to vary the flow of cutting fluid out of the nozzle.
5. **Compound Hand Crank** : Used to position the compound along the compound slide.
6. **Manual Carriage Oil Pump** : Draws oil from the apron case and lubricates the carriage and ways through various oil ports.
7. **Halfnut Lever** : Engages and disengages the apron with the leadscrew for threading operations.
8. **Thread Dial** : Indicates when to engage the half nut during threading operations.
9. **Feed Selection Knob** : Selects the carriage or cross slide for power feed.
10. **Apron Feed Direction Knob** : Changes direction of carriage or the cross slide feed without having to stop the lathe and move the headstock feed direction lever.
11. **Feed ON / OFF Lever** : Engages / disengages power feed.
12. **Spindle ON / OFF Lever** : Used to start and stop the lathe during normal operation.
13. **Tension adjusting screw protection cover**, In case the tension need to be adjusted, removed the cover then adjustment the screw till you got the preferred tension, re-cover it back.

14. **Rapid Feed motor**: To Help the operator to move the carriage faster on the longitudinal ways forward and backward.

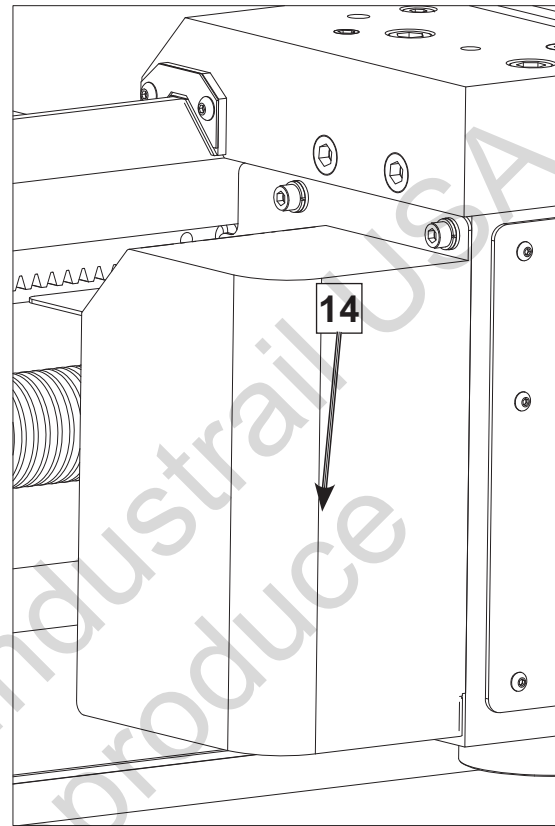


Figure 8. Rapid feed motor for longitudinal ways.

Tailstock Controls

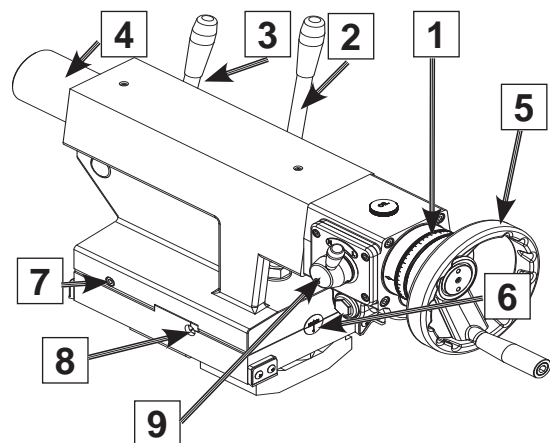


Figure 9. Tailstock Controls.

1. **Graduated scale** : Indicates quill movement in increments of 0.001" or 0.02mm.
2. **Tailstock Lock Lever** : Secures the tailstock in place along the bedway.
3. **Quill Lock Lever** : Locks the quill in position.
4. **Quill** : Moves toward and away from the spindle and holds centers and tooling.
5. **Quill Handwheel** : Moves the quill toward or away from the spindle.
6. **Offset Scale** : Indicates the distance of tailstock offset from the spindle center line.
7. **Tailstock Offset Screw** : Adjusts and secures the tailstock offset (1 of 2).
8. **Tailstock Gib Screw** : Adjust the tapered gib to control tailstock offset accuracy.
9. **Two speed selection** : Quill travel reduction selector.

Foot Brake

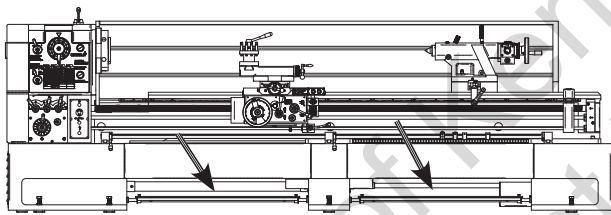


Figure 10. Foot Brake.

This lathe is equipped with a foot brake (Figure 10) to quickly stop the spindle. Pushing the foot brake while the spindle is ON cuts power to the motor and stops the spindle. Once stopped, the spindle lever **MUST** be returned to the neutral position before the spindle can be restarted.

Section 2 : Setup

Physical Environment

The physical environment where your machine is operated is important for safe operation and longevity of parts. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous or flammable chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature is outside the range of 9° ~ 72°C(48.2° ~ 161.6°F); the relative humidity is outside the range of 20–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

Electrical Installation

Place this machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave access to a means of disconnecting the power source or engaging a lockout / tagout device.

Lighting

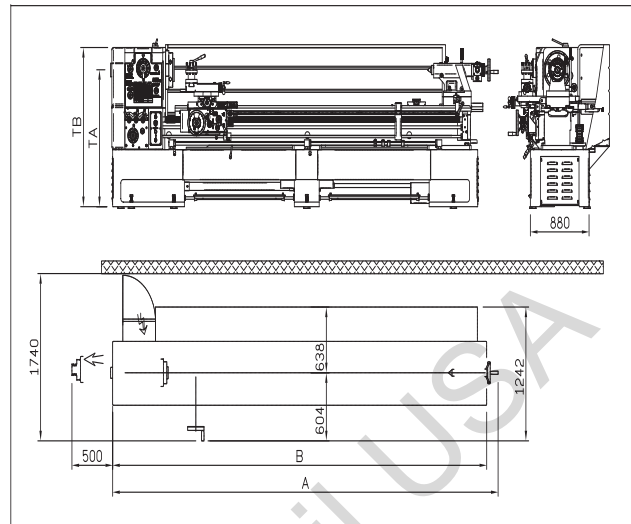
Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

Weight Load

Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

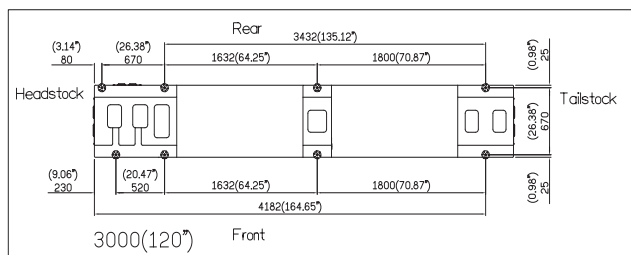
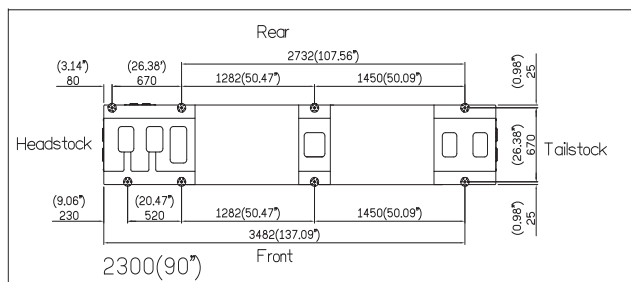
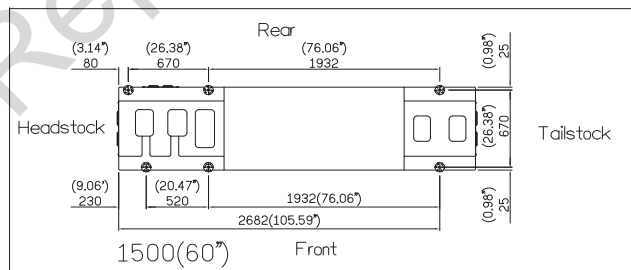
Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual.



Model	TA	TB
CH22-60°/90°/120°/160°/200°	1135 mm	1330 mm
CH26-60°/90°/120°/160°/200°	1185 mm	1380 mm
CH30-60°/90°/120°/160°/200°	1230 mm	1430 mm

Model	A	B
CH22/26/30-60°	3230 mm	2980 mm
CH22/26/30-90°	4030 mm	3780 mm
CH22/26/30-120°	4730 mm	4480 mm
CH22/26/30-160°	5730 mm	5480 mm
CH22/26/30-200°	6730 mm	6480 mm



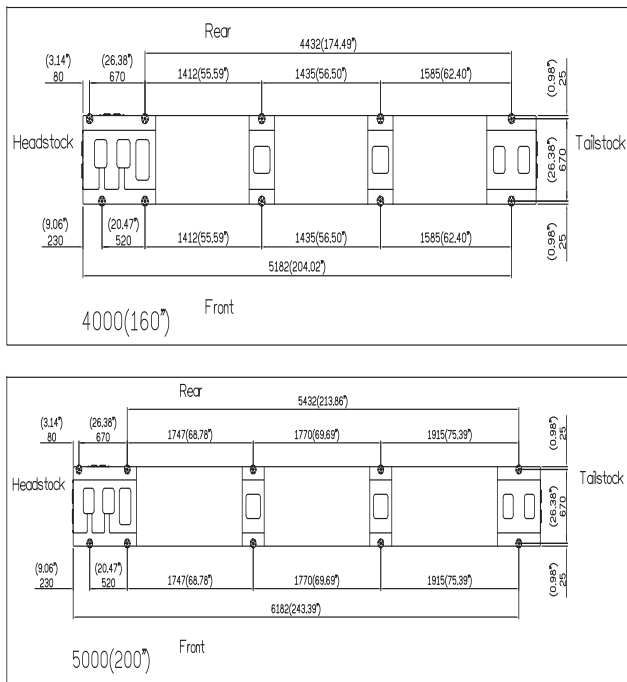


Figure 11. Space required for full range of movement.

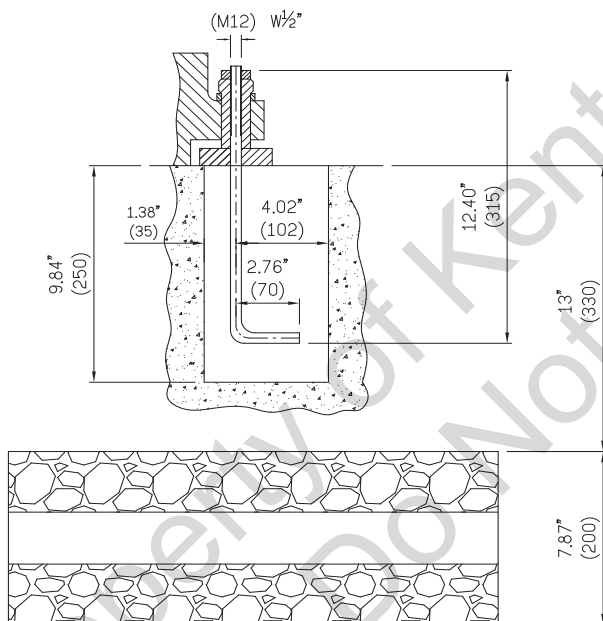


Figure 12. Detailed view of foundation.

please set up the foundation according the detailed view of foundation (Figure 12.)

Lifting & Moving

This lathe is an extremely heavy machine. Serious personal injury or death may occur if safe lifting and moving methods are not followed. Get assistance from a professional rigger if you are unsure about your abilities or maximum load ratings of your lifting equipment.

To lift and move your lathe :

1. Prepare the permanent location for the lathe.
2. Remove the shipping crate top and sides, then remove the small components from the shipping pallet.
3. To balance the lifting load, loosen the tailstock lock lever (Figure 13), move the tailstock to the end of the bedway, then lock it in place.

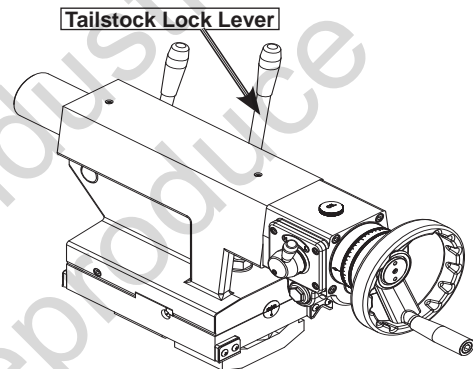


Figure 13. Tailstock lock lever.

4. To further balance the load, loosen the carriage lock bolt, disengage the half nut lever, then use the carriage handwheel to move the carriage next to the tailstock. (Figure 14)

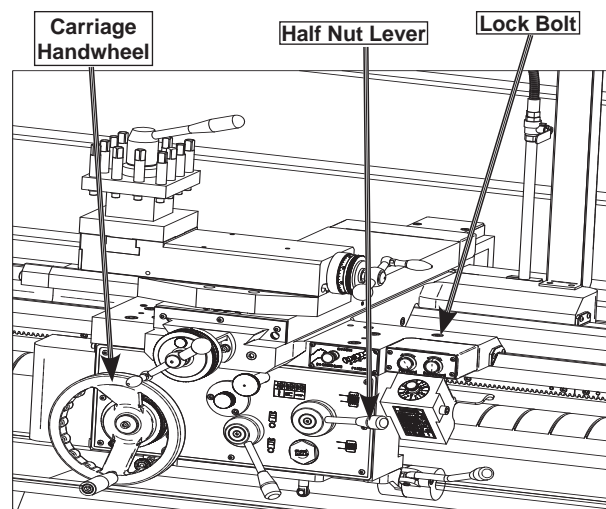


Figure 14. Carriage controls set for moving the carriage.

5. Locking the carriage lock bolt and tailstock lock lever.

6. Lifting the machine with crane.

- Make sure the loading capacity of the crane is much more than the overall weight of the lathe.
- Only an authorized crane operator should use the lift machine.
- Crane work should be cooperatively done by two persons, that is, an operator and a watchman, not to damage projecting on the machine perimeter.
- To put in the jig with wire set inserting to bed way.
- Make sure that two hexagon nuts is fixed.
- Keep the machine's center of gravity at the center of the crane.

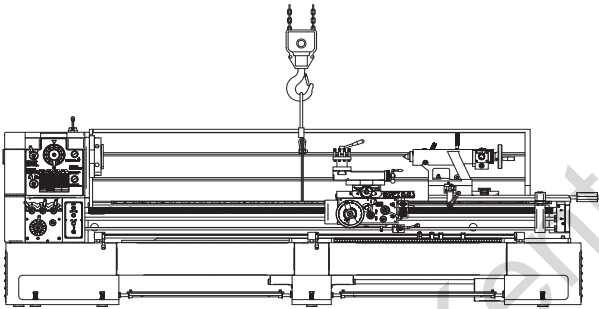


Figure 15. Lifting the machine with crane.

Leveling

This lathe must be placed on the included leveling studs and cast-iron feet. Complete support at each of the six to ten leveling stud locations is mandatory. The bed cannot be twisted or bent, and the ways must be perfectly level with the floor. If a misalignment condition arises, adjust the leveling studs, or shim the cast iron feet where they touch the floor until the bed and ways are in alignment.

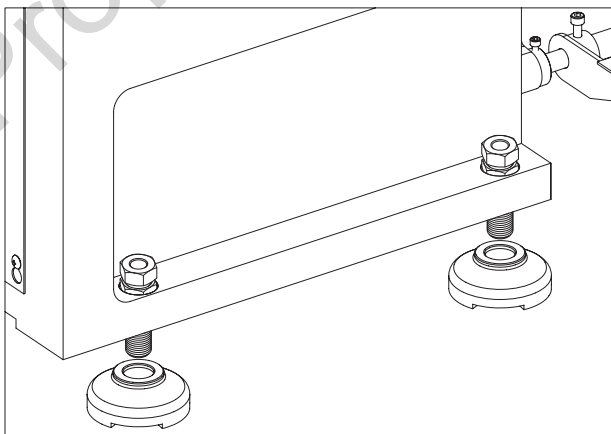


Figure 16. Leveling pads and screws.

To level the machine, use a precision level to make sure the bedways are level from side-to-side and from front-to-back.

Leveling machinery helps precision components, such as bedways, remain straight and flat during the lifespan of the machine. Components on an unlevelled machine may slowly twist due to the dynamic loads placed on the machine during operation.



Figure 17. Example of a precision level.

Test Run

After all preparation steps have been completed, the machine and its safety features must be tested to ensure correct operation. If you discover a problem with the operation of the machine or its safety components, shut the machine down, disconnect it from power, and do not operate it further until you have resolved the problem.

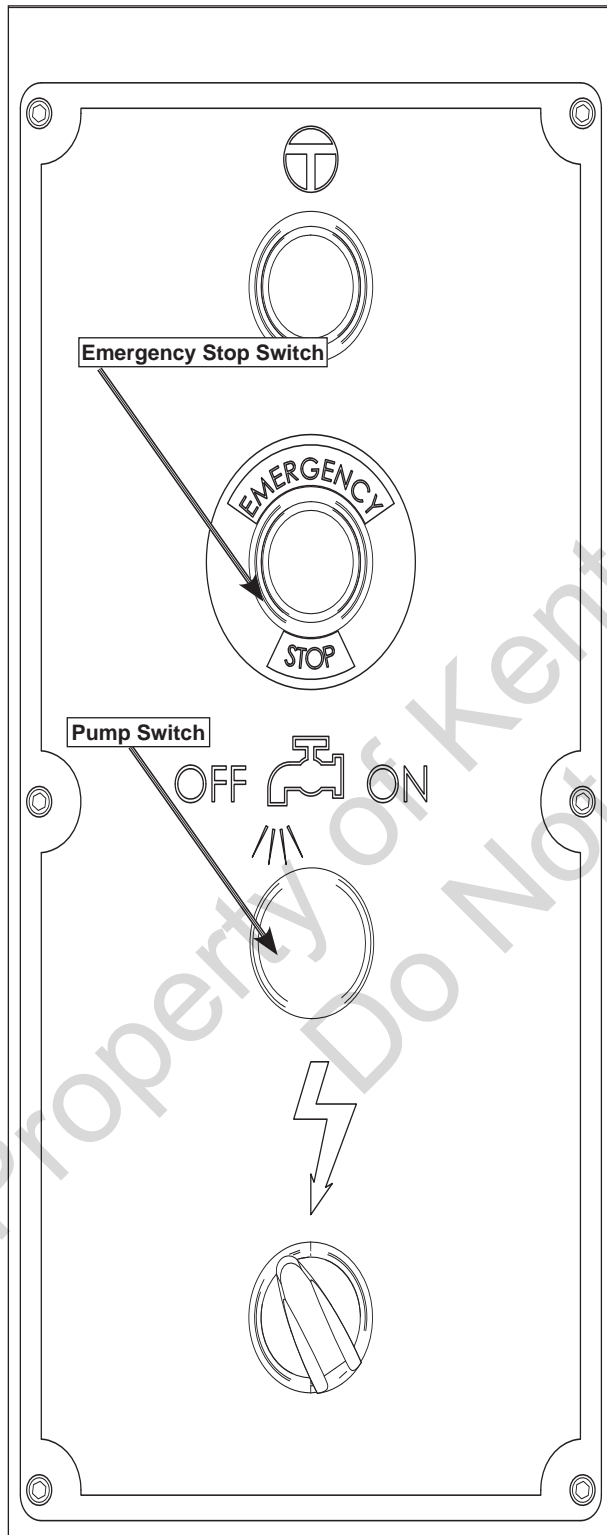


Figure 18. Control Panel.

To test run the lathe:

1. Disconnect the lathe from POWER !
2. Make sure that the headstock oil tank, gearbox, apron oil levels are full.

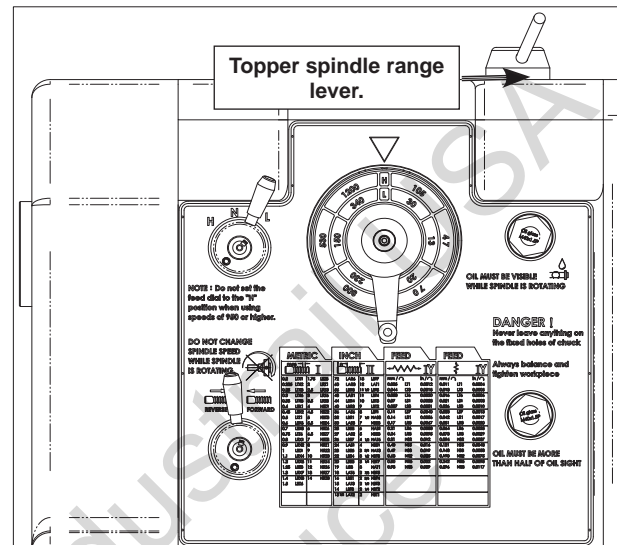


Figure 19. Headstock range lever.

3. Make sure that the chuck and jaws are secure, If a chuck is not installed on the lathe, you do not

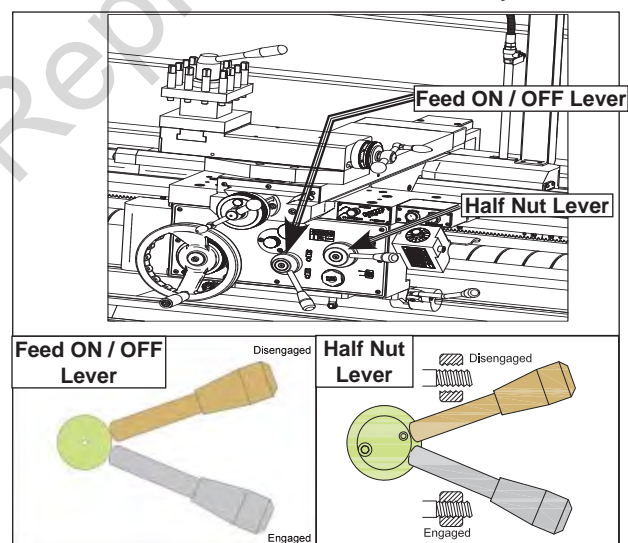


Figure 20. Apron controls for test run.

- need to install one for this test.
4. Move the topper spindle range lever so that the indicator points to the L. (Figure 19)
5. Rotate the spindle speed lever so that the indicator points to the Lowest spindle speed. (Figure 19)
6. Pull up on the half nut and the feed ON/OFF levers as shown in Figure 20.
7. Using a 10mm hex wrench, loosen the carriage lock (Figure 21) so the carriage is free to slide.

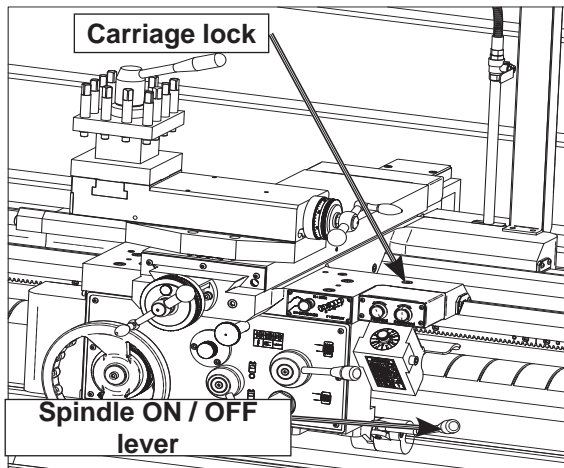


Figure 21. Carriage lock & Spindle ON / OFF lever.

8. Move the spindle ON / OFF lever to the OFF (middle) position as shown in Figure 21.
9. Press the STOP button on the control panel to ensure that the lathe does not unexpectedly start when connected to power during the next step.
10. Connect the lathe to power source.
11. Rotate STOP button clockwise until it pops out. The power light on the control panel should illuminate.
12. Move the spindle ON / OFF lever down and the spindle/chuck will rotate.
13. Observe and listen for any abnormal noises or vibration. The lathe should run smoothly with little or no vibration or rubbing noises.
14. Push the foot brake, and the lathe should come to a quick stop.
15. Move the spindle ON/OFF lever to the OFF (middle) position. Remove the lathe end gear cover so the safety switch opens and disables the lathe from starting.
16. Attempt to start the lathe. Should the lathe start, the safety switch is faulty and needs replacement.
17. Push the STOP button in, move the spindle ON/ OFF lever to the OFF position, then replace the end gear cover.
18. Point the coolant nozzle down into the chip drawer and verify that there is coolant in the reservoir.
19. Start the lathe, turn the coolant pump on, then open the valve. Verify that the coolant flows from the nozzle, then close the valve and turn the pump OFF.
20. The test run is now finished. Shut the lathe down and begin the Spindle Break-In procedure.

Spindle Break-in

It is essential to closely follow the proper break-in procedures to ensure trouble-free performance. Complete this process once you have familiarized yourself with all instructions in this manual and completed the test run.

To break-in the spindle :

1. Complete the Test Run procedure.
2. Set the spindle speed for 13 RPM.
3. Run the lathe for 10 minutes.
4. Turn the lathe OFF and wait until the spindle is completely stopped.
5. Repeat Steps 2–4 for each of the remaining 11 spindle speeds.
6. Set the spindle speed to 13 RPM and let the lathe run for a final 15 minutes to allow it to cool down, then turn the lathe OFF.
7. Change the oil in the headstock, universal gearbox, and apron reservoirs.
8. Check and, if necessary, re-tension the V-belts.

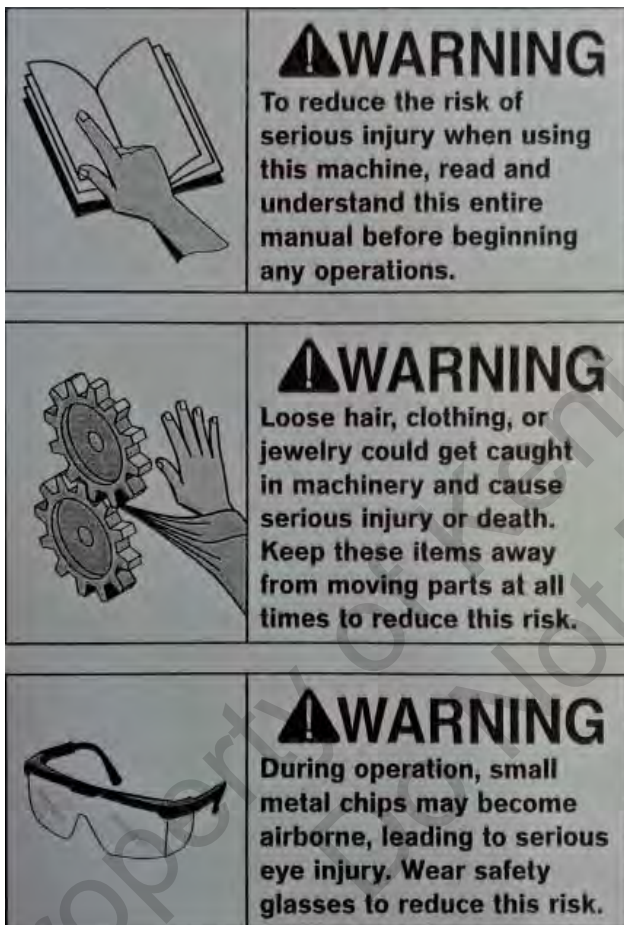
Section 3 : Operation

OPERATION OVERVIEW

The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

Note: Due to the generic nature of this overview, it is not intended to be an instructional guide for performing actual machine operations.

To learn more about specific operations and machining techniques, seek training from people experienced with this type of machine, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



To complete a typical operation, the operator does the following:

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
2. Examines the workpiece to make sure it is suitable for turning, then mounts the workpiece in one of the chucks or on the faceplate, and removes the chuck key from the chuck.
3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.
4. Clears all tools from the lathe.
5. Sets the correct spindle speed range for the operation, and turns the spindle speed dial all the way counterclockwise (to the lowest speed) to avoid the possibility of damage from a high speed start.
6. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.
7. Moves slides to where they will be used during operation.
8. If using power feed, selects the proper feed rate for the operation.
9. Turns the main power switch ON, resets the stop button so it pops out, then moves the spindle ON/OFF lever down to start spindle rotation. The spindle will rotate counterclockwise (down and toward the operator when facing the front of the lathe).
10. Turns the spindle speed dial clockwise to the desired **RPM**.
11. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.
12. When finished cutting, moves the **ON/OFF** lever to the center position to turn the lathe **OFF**, then removes the workpiece.

Chuck

This lathe is shipped with the 3-jaw chuck installed. This is a scroll-type chuck, meaning that all three jaws move in unison when adjusted.

The optional 4-jaw chuck features independent jaws, which are used for square or unevenly-shaped stock.

If neither chuck can hold your workpiece, the cast-iron faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, this faceplate will hold non-cylindrical parts such as castings.

The chucks and faceplate have a D1-11 camlock mount. A chuck key is used to turn the locking cams (Figure 22) to secure / release the chuck / faceplate.

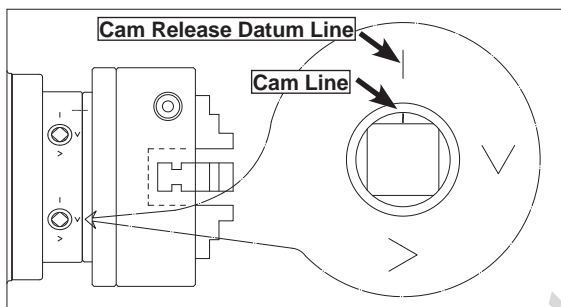


Figure 22. Camlock loosened with the cam line aligned with the datum line.

To install a chuck :

1. Disconnect lathe from POWER !
2. Lay a chuck cradle (see **Figure 23**) or plywood under the chuck or faceplate and over the bedway to protect the precision ground surfaces from damage and reduce injury if fingers get pinched

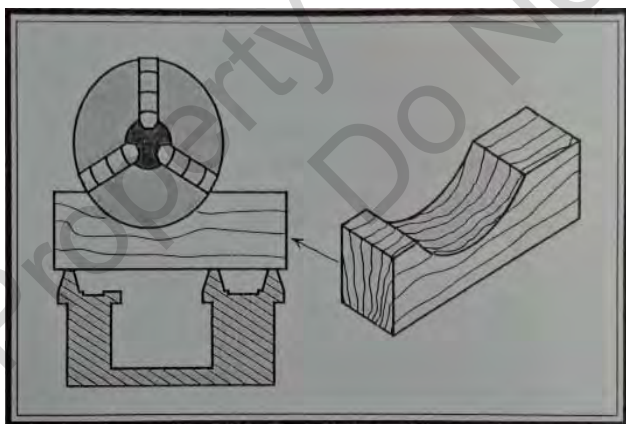


Figure 23. Wood chuck support cradle.

3. Place the chuck on the cradle.
4. Make sure the chuck taper and spindle taper mating surfaces are perfectly clean.
5. Inspect and make sure that all camlock studs are undamaged, are clean and lightly oiled, and that the camlock stud cap screws are in place and snug.

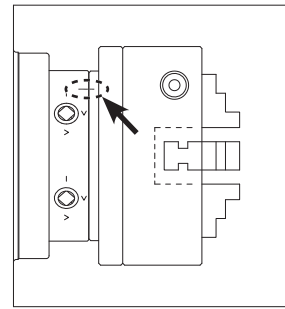


Figure 24. Chuck timing marks aligned.

6. If equipped, align the chuck-to-spindle timing marks (Figure 24), and slide the chuck onto the spindle.
7. Turn a camlock with the chuck key until the cam line falls between the "V" marks shown in Figure 25.
8. Lock the other cams in a crisscross or star pattern so the chuck is drawn up evenly on all sides without any chance of misalignment.
9. Remove the chuck key.

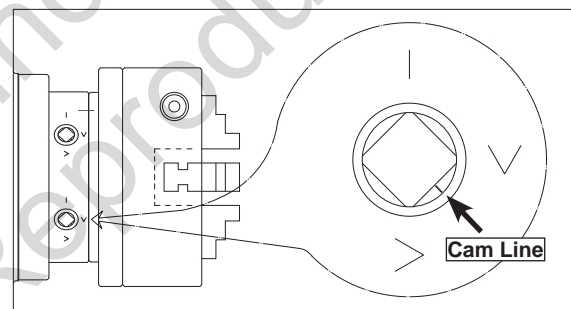


Figure 25. Cam and lines.

Installing and Adjusting Camlock Studs

When fitting a chuck or faceplate with camlock studs, or when mounting a new chuck or faceplate, it may be necessary to install or adjust the camlock studs.

To install or adjust camlock studs onto a chuck or faceplate:

1. Lay the chuck or faceplate upside down on a protective, flat surface.
2. If installed, remove the locking cap screw adjacent to each of the six camlock mounting holes (see **Figure 26**).



Figure 26. Identifying chuck camlock studs and locking cap screws.

3. Thread each cam-lock stud into the chuck or faceplate until the depth mark shown in **Figure 27** is even with the surface of the chuck or faceplate and the curved indent on the side of the stud faces the locking cap screw hole, as shown in **Figure 28**. This is an initial adjustment.



Figure 27. Example of camlock stud depth mark.

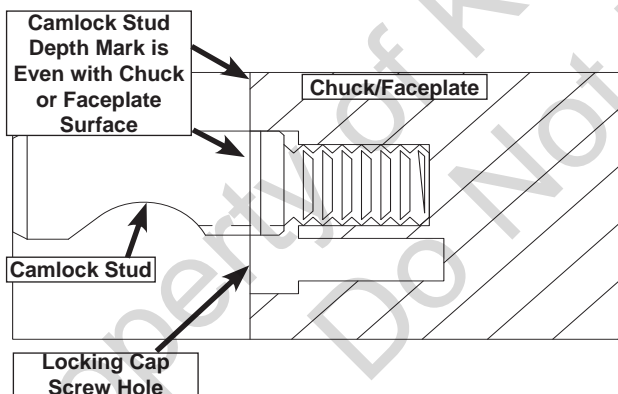


Figure 28. Initial adjustment of camlock stud.

4. Install and tighten the locking cap screws.
5. Make sure that the cam-lock studs can rotate back and forth against the head of the locking cap screw (see **Figure 29**).

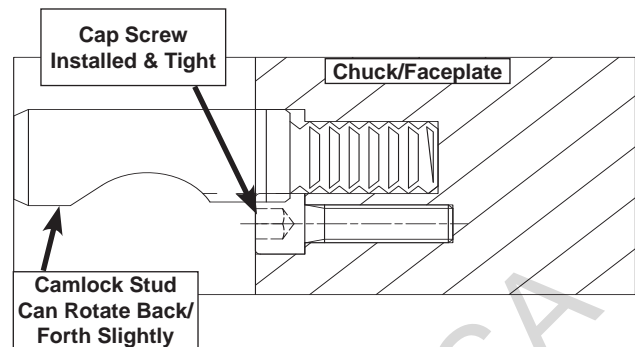


Figure 29. Camlock stud cap screw correctly installed.

To remove a chuck :

1. Disconnect lathe from POWER !
2. Place a piece of plywood across the lathe ways to protect the ways, or use a support cradle and position it just under the chuck.
3. Turn a cam with the chuck key until the cam line aligns with the cam release datum line.
4. Unlock the other cams in the same manner. Make sure to support the chuck as you align the last cam.
5. With a rocking motion, carefully remove the chuck or faceplate from the spindle nose, as shown in **Figure 30**, making sure to support the weight with an adequate chuck cradle.

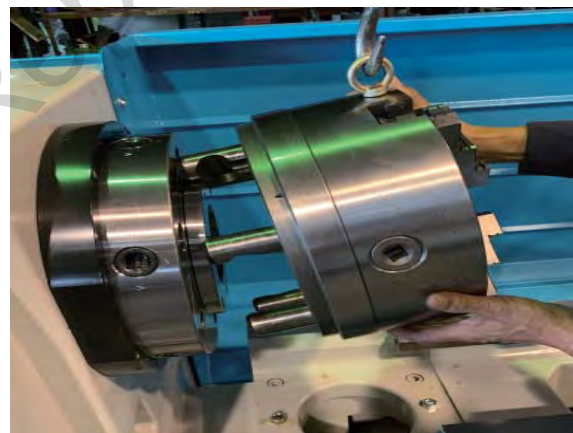


Figure 30. Example of removing a 3-jaw chuck from a spindle nose.

Installing and Adjusting Camlock Stud

When fitting a chuck or faceplate with camlock studs, or when mounting a new chuck or faceplate, it may be necessary to install or adjust the camlock studs. In order to properly install or adjust one or more camlock studs, you must remove a stud locking cap screw, then thread the camlock stud in or out until the line on the side of the stud is flush with the top of the chuck casting.

3-Jaw Chuck

The 3-jaw scroll-type chuck included with this lathe features hardened steel jaws that center the workpiece. When the operator opens or closes the jaws with the chuck key, the jaws move in unison.

There are two sets of jaws included with the 3-jaw chuck — inside and outside jaws. Use the correct jaws for the size and configuration of the workpiece to hold it firmly and securely on the chuck.

Numbered from 1-3, the jaws must be used in the matching numbered jaw guides, as shown in Figure 31.



Figure 31. Jaw guides and jaw numbers.

To change the jaw :

1. Disconnect Lathe from POWER !
2. Place a piece of wood over the ways to protect them from potential damage.
3. Insert the chuck key and turn it counterclockwise to back the jaws out and remove them.
4. Clean the jaw mating surfaces and apply a thin film of white lithium grease to the mating surfaces.
5. Set the previously mounted 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 Insert jaw #1 into jaw guide #1 and hold the jaw against the scroll gear lead thread.
7. Rotate the chuck key clockwise one turn to engage the tip of the scroll gear lead thread into the jaw.



Figure 32. Inserting jaw.

8. Pull on the jaw—now it should be locked into the jaw guide.
9. Repeat the Steps 6–8 on the remaining jaws.

To mount a workpiece in the 3-jaw chuck :

1. Disconnect Lathe from POWER !
2. Place a chuck cradle or plywood on the bedway below the chuck to protect it.
3. Use the chuck key to move the jaws and mount the workpiece to the chuck, similar to one of the methods shown in Figure 33. Make sure the workpiece is mounted firmly on the chuck.

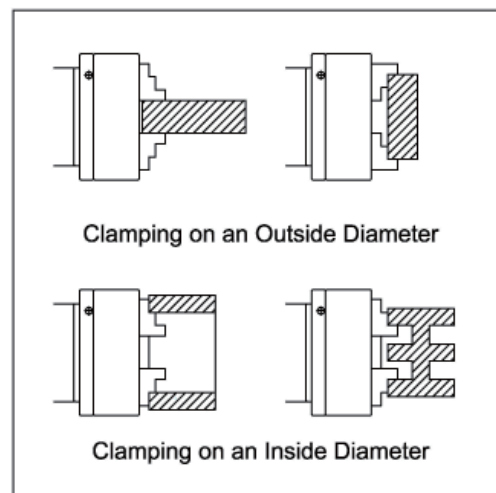


Figure 33. Examples of workpiece mounted in the 3-jaw chuck.

4. Rotate the chuck by hand to make sure the workpiece makes even contact with all three jaws and is centered.

4-Jaw Chuck

The 4-jaw chuck features independently adjustable hardened steel jaws to hold non-cylindrical or off-center workpieces. Each jaw can be removed from the chuck body and reversed for a wide range of work holding versatility.

To mount a workpiece on the 4-jaw chuck :

1. Disconnect Lathe from POWER !
2. Place a chuck cradle or plywood on the bedway below the chuck to protect it.
3. Use the chuck key to open each jaw so the workpiece will lay flat against the chuck face or jaw steps.
4. With help from another person or a supporting device, mount the workpiece centered on the chuck, then turn each jaw until it makes contact with the workpiece.
5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening in an opposing sequence.
6. After the workpiece is held in place by the jaws, turn the chuck by hand and pay attention to the workpiece alignment.

Tailstock

The tailstock on your lathe can be used to support workpieces with the use of a live or dead center.

It can also be used to drill or bore holes in the center of a part or cut shallow tapers by using the offset adjustment.

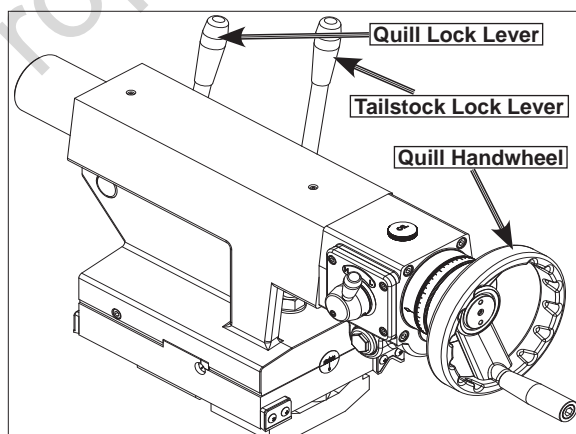


Figure 34. Tailstock and quill lock handles in locked position.

To move the tailstock :

1. Pull back on the lock lever.
2. Slide the tailstock to the desired position.
3. Push the tailstock lock lever forward to lock the tailstock to the lathe bed.

To use the tailstock quill :

1. With the tailstock locked to the bed, release the quill lock lever.
2. Turn the quill feed handwheel clockwise to feed/move the quill towards the spindle, or turn counterclockwise to move the quill away from the spindle.
3. Push the quill lock lever forward to lock the quill in place.

To install tooling in the tailstock :

1. With the tailstock locked, unlock the quill lock lever.
2. Turn the quill handwheel CW to extend quill about 25mm out of the casting.
3. Insert a tapered drill arbor or a tapered drill bit into the quill until the taper is firmly seated and the tang is locked to the quill slot.
4. Turn the quill handwheel CW to feed the drill bit into the rotating workpiece.
5. To remove the tooling from the tailstock, turn the quill handwheel CCW until the tooling is pushed out of the taper.

To offset the tailstock :

1. Lock the tailstock in position.
2. Loosen two nuts of bottom, adjust the left and right jack screws until the scale (Figure 35) indicates the offset you want. See Figure 36 for adjustment direction.
3. When the offset is achieved, snug the jack screws so the tailstock position is locked.

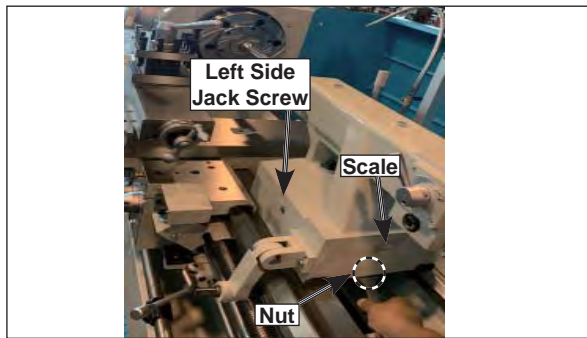


Figure 35. Tailstock offset adjustments.

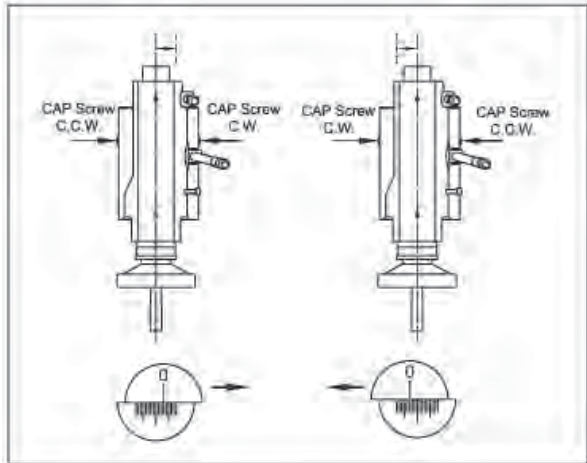


Figure 36. Jack screw for adjustment tailstock movement.

Centers

Dead Centers

The dead center achieves more accurate results than a live center, but it requires low spindle speeds and a small amount of oil to reduce friction heat that may damage the workpiece.

Use the HSS dead center in the spindle, where the workpiece does not rotate on the tip and does not generate friction.

Use the carbide-tipped dead center in the tailstock where the workpiece will rotate against it and generate friction. The carbide-tipped dead center can better withstand the effects of friction; however, the tip of the center must be lubricated to avoid premature wear and maximize smooth operation. Also, using low spindle speeds will also reduce the heat and wear from friction.

Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together, and can be installed in the spindle and the tailstock quill for higher speeds, but with a slight bit of accuracy loss.

Mounting Dead Center in Spindle

1. Disconnect Lathe from POWER !
2. Thoroughly clean and dry the tapered mating surfaces of the spindle bore, tapered sleeve, and the center.
3. Insert the center into the sleeve, then insert the sleeve into the spindle bore through the chuck or faceplate.

Removing Center from Spindle

To remove the sleeve and center from the spindle, insert a piece of round bar stock or similar tool through the outboard end (on the left side of the headstock), then tap the sleeve loose.

Mounting Center in Tailstock

Either a dead center or live center can be mounted in the tailstock. Mounting instructions are the same for both.

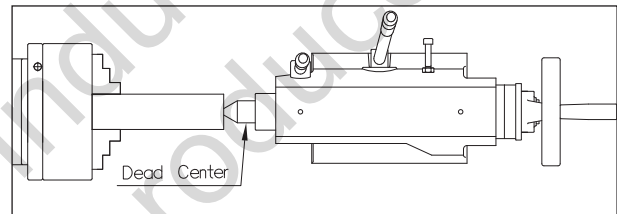


Figure 37. Example of using a dead center installed in the tailstock.

To mount a center in the tailstock :

1. Disconnect Lathe from POWER !
2. Thoroughly clean and dry the tapered mating surfaces of the tailstock quill bore and the carbide-tipped dead center.
3. Use the tailstock quill handwheel to feed the quill out from the casting about 25mm.
4. Insert the center into the tailstock quill.
5. Seat the center firmly into the quill during workpiece installation by rotating the quill handwheel clockwise to apply pressure.

Removing Center from Tailstock

To remove the center from the quill, hold onto it with a rag in one hand, then rotate the tailstock handwheel counterclockwise to draw the quill back into the casting until the center released.

Steady Rest

The steady rest supports long shafts and can be mounted anywhere along the length of the bed.

To install and use the steady rest :

1. Disconnect Lathe from POWER !
2. Thoroughly clean the machined base of the steady rest, then place it on the lathe bedways so the triangular notch fits over the bedway prism.
3. Position the steady rest where required to properly support the workpiece, then tighten the hex nut shown in Figure 38 to secure it in place.

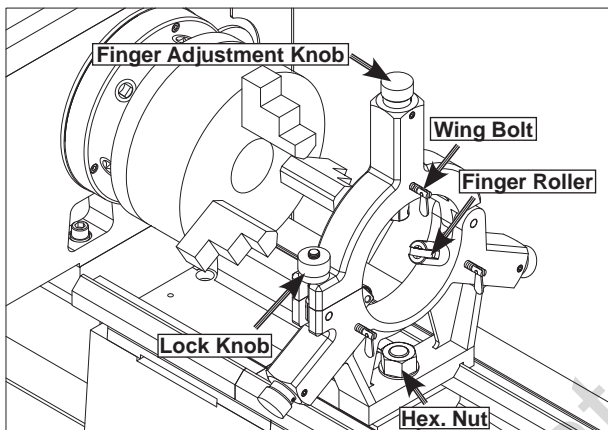


Figure 38. Steady rest components.

4. Loosen the lock knob and open the steady rest so the workpiece can rest on the bottom two finger rollers, as shown in Figure 39.

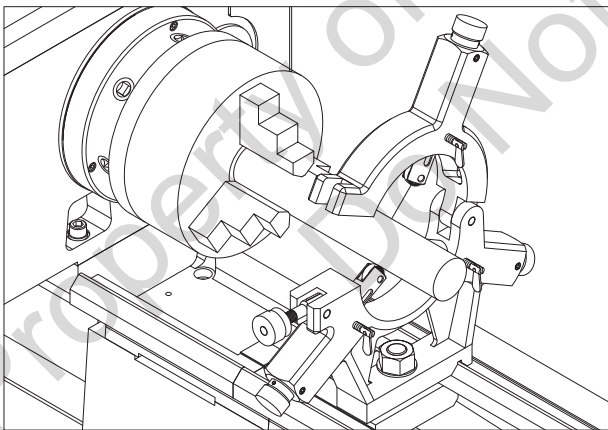


Figure 39. Workpiece mounted in the steady rest.

5. Close the steady rest so that the workpiece is inside the finger rollers, then tighten the lock knob.
6. Loosen the three wing bolts so the finger roller positions can be adjusted.
7. Use the finger adjustment knobs to just touch the finger rollers against the workpiece without causing workpiece deflection.
8. Tighten the three wing bolts.

Follow Rest

The follow rest mounts to the saddle with two cap screws (Figure 40). It is used on long, slender parts to prevent workpiece flexing from the pressure of the cutting tool during operation.

Adjust the sliding finger rollers on the follow rest in the same manner as those on the steady rest.

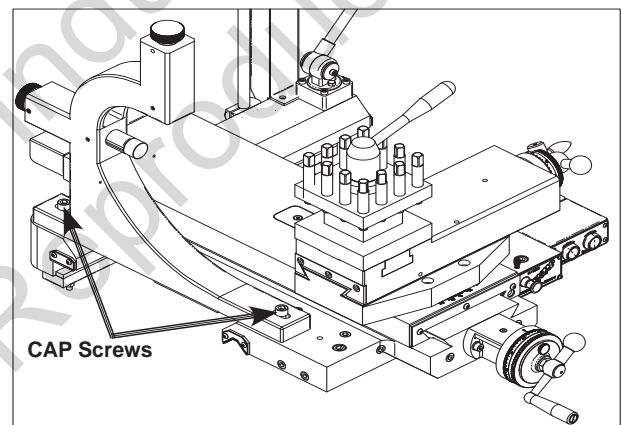


Figure 40. Follow rest attachment.

Compound Slide

The compound slide handwheel has an indirect-read graduated scale. This means that the distance shown on the scale represents the actual distance the tool moves, which of course, will remove twice as much material from the diameter of the workpiece. The base of the compound slide has another graduated scale used for setting the tool to a specific angle.

To set the compound slide at a certain angle :

1. Loosen the three CAP screws at the base of the compound slide (Figure 41).

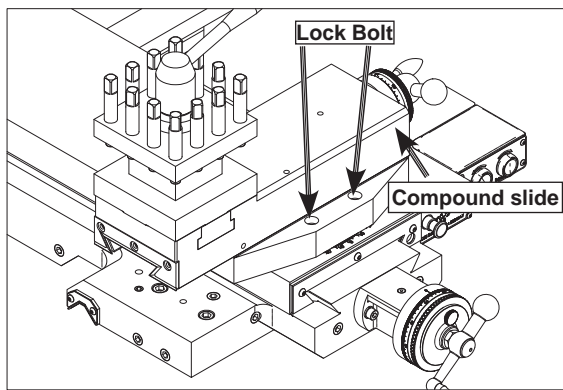


Figure 41. Compound slide set at an angle.

2. Rotate the compound to the desired angle, as indicated by the scale at the base, then retighten the two CAP screw.

4-Way Tool Post

The four-way tool post is mounted on top of the compound slide, and allows a maximum of four tools to be loaded simultaneously.

The four-way tool post allows for quick indexing to different tools. This is accomplished by loosening the top handle, rotating the tool post to the desired position, then re-tightening the handle to lock the tool into position.

To load the tool post :

1. Choose the desired cutting tool.
2. Loosen the tool post bolts so that the cutting tool can fit underneath them.
3. Firmly secure the cutting tool with at least two tool post bolts, as shown in Figure 42.

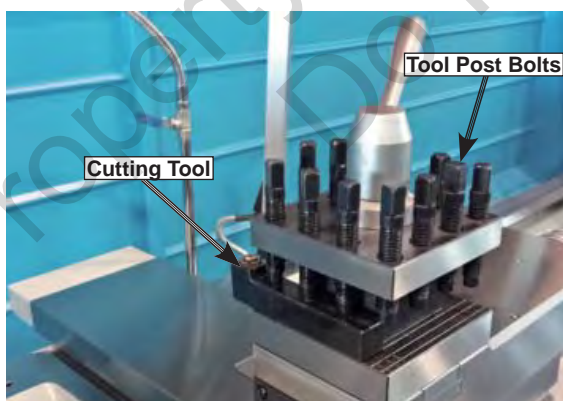


Figure 42. 4-way tool post.

Aligning Cutting Tool with Tailstock Center

For most operations, the cutting tool tip should be aligned with the spindle center line, as illustrated in Figure 43.

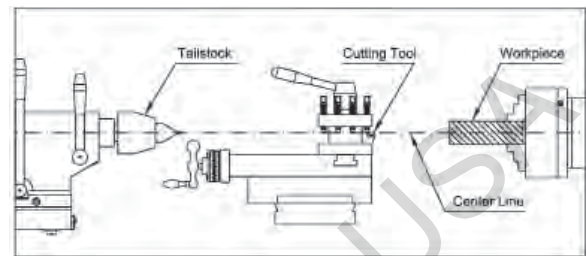


Figure 43. Cutting tool aligned with workpiece center.

There are a number of ways to check and align the cutting tool to the spindle center line. Below are two common methods :

- Align the tip of the cutting tool with a center installed in the tailstock. For this to work, the tailstock must be aligned to the spindle center line.
- Make a facing cut on a piece of round bar stock. If the tool is above/below the spindle center line, a nub will be left in the center of the workpiece. Adjust the height of the workpiece, then repeat the facing cut to check the adjustment. Repeat as necessary until the center of the workpiece is smoothly faced.

To align the cutting tool with the tailstock center :

1. Mount the cutting tool in the tool post, then turn the tool post so the tooling faces the tailstock.
2. Install a center in the tailstock, and position the center tip near the tip of the cutting tool.
3. Lock the tailstock and quill in place.
4. Adjust the height of the cutting tool with a steel shim, so the tip just touches the end of the tailstock center.

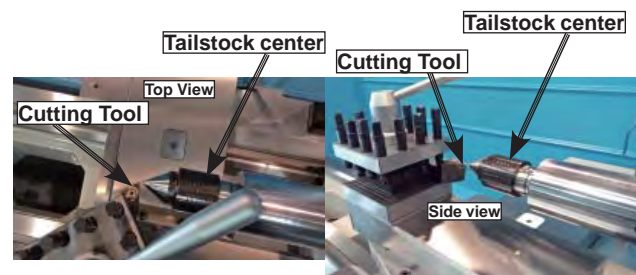


Figure 44. Cutting tool tip aligned with railstock center.

Apron Stop

Use the adjustable apron stop collar to set the location where the carriage will be disengaged by the feedrod friction clutch.

When the adjustable apron stop contacts the stop collar during a longitudinal feeding operation, the clutch disengages the feedrod from the apron and the carriage movement stops.

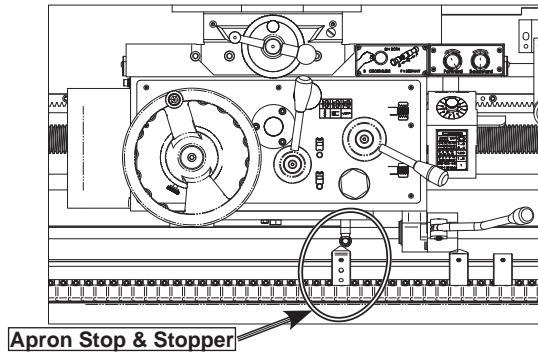


Figure 45. Apron stop and Stopper.

Manual Feed

You can manually move the cutting tool around the lathe for facing or turning operations using the handwheels shown in Figure 46 and described below.

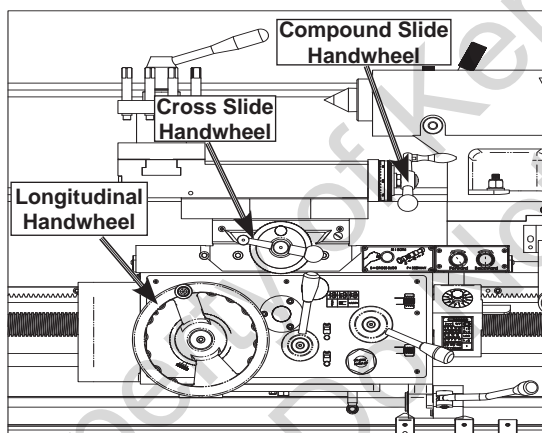


Figure 46. Carriage Controls.

Longitudinal Handwheel

The longitudinal handwheel moves the carriage left or right along the bed. Use this control when setting up the machine for facing or turning.

Cross Slide Handwheel

The cross slide handwheel moves the top slide toward and away from the work. Turning the dial clockwise moves the slide toward the workpiece. Adjust the graduated scale by holding the handwheel with one hand and turning the dial with the other.

Compound Slide Handwheel

The compound slide handwheel controls the position of the cutting tool relative to the workpiece. The compound is adjustable for any angle within its range. The combo inch/metric graduated scale is engraved into a rotatable barrel. Angle adjustment is secured by cap screws on the base of the compound.

Spindle Speed

Using the correct spindle speed is important for safe and satisfactory results, as well as maximizing tool life.

To set the spindle speed for your operation, you will need to :

1. Determine the best spindle speed for the cutting task.
2. Configure the lathe controls to produce the required spindle speed.

Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operations, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula :

$$\text{RPM} = \frac{CS \times 4}{D}$$

RPM = Spindle speed, revolution per minute.

CS = Cutting speed in surface feet per minute (SFM)

D = Diameter of workpiece

EXAMPLE :

If the cutting speed is 40 for a certain alloy steel and the workpiece is 2 inches in diameter, find the rpm as follows :

$$\text{RPM} = (40 \times 4) / 2 = 80$$

After calculating the RPM, use the nearest or next lower speed on the lathe and set the spindle speed.

Cutting speed, typically defined in feet per minute (FPM), is the speed at which the edge of a tool moves across the material surface.

A recommended cutting speed is an ideal speed for cutting a type of material in order to produce the desired finish and optimize tool life.

The books Machinery's Handbook or Machine Shop Practice, and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed.

These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.

Also, there are a large number of easy-to-use spindle speed calculators that can be found on the internet. All of these sources will help you take into account all the applicable variables in order to determine the best spindle speed for the operation.

Setting Spindle Speed

1. Make sure the spindle is turned OFF and it has come to a complete stop.
2. Use the chart in Figure 47 to determine the available spindle speed range closest to your calculated spindle speed.

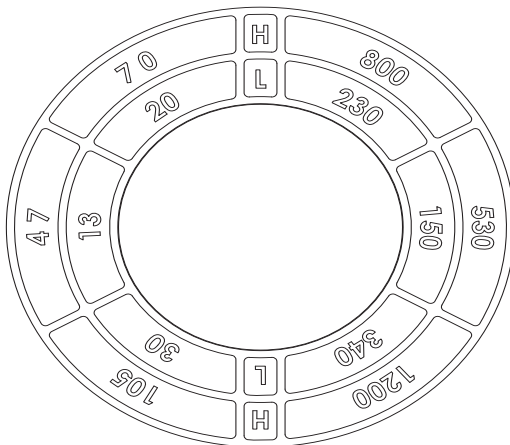


Figure 47. Spindle speed range chart.

3. Move the spindle speed range lever to the range that covers your calculated spindle speed.
4. Move the spindle speed lever to your calculated spindle speed.

Power Feed

On this machine, both the carriage and cross slide have power feed capability. The rate that these components move (feed rate) is controlled by how the levers are configured on the gearbox.

Feed rate and spindle speed must be considered together. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed rate to use with that spindle speed.

Often, the experienced machinist will use the feeds and speeds given in their reference charts or web calculators as a starting point, then make minor adjustments to the feed rate (and sometimes spindle speed) to achieve the best results.

The carriage can alternately be driven by the leadscrew for threading operations. However, this section covers using the power feed option for the carriage and cross slide components for non-threading operations.

Power Feed Controls

The headstock feed direction lever shown in Figure 48 controls the direction the carriage moves. However, it is important to understand that there is a direction change relationship between the headstock feed direction lever and the apron feed direction knob (Figure 48). The apron feed direction knob and the headstock feed direction lever reverse the feed direction of each other. For example:

- When the apron feed direction knob is pushed-in, the direction of carriage travel shown on the headstock feed direction lever plate is applicable only when threading. For feeding, the directions shown will be opposite.
- When the apron feed direction knob is pulled-out, the direction of carriage travel shown on the headstock feed direction plate is accurate only when feeding. For threading, the directions shown will be opposite.

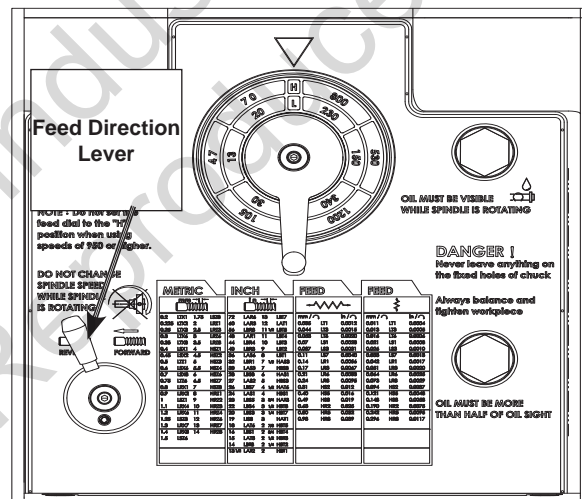


Figure 48 . Feed Direction Lever.

The main benefit of the apron feed direction knob shown in Figure 49 is that it changes the direction of the selected feed without having to stop the lathe, and walk over and shift the headstock feed direction lever.

The feed selection knob shown in Figure 49 engages either the carriage or cross slide feed.

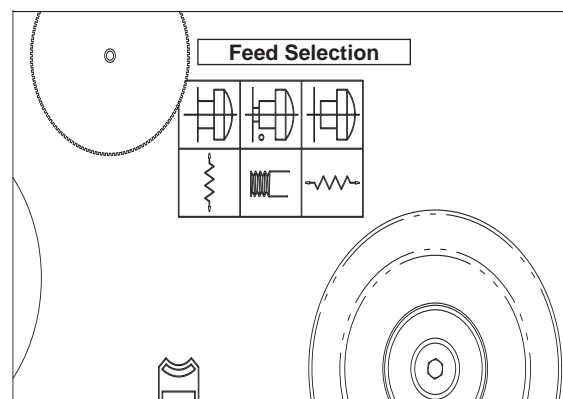


Figure 49. Apron feed knobs.

If the threading or general carriage feed is required, the carriage lock (Figure 50) must be disengaged. If the cross feed will be used for facing, the carriage lock should be engaged and the cross feed gib lock screw should be loose. If it is tight, loosen the cross feed gib lock using a 3mm hex wrench.

To engage the power feed :

1. Make sure the spindle is OFF and has come to a complete stop.
2. Shift the headstock feed direction lever to engage the leadscrew or feed rod. Sometimes you need to slightly rotate the handwheel of the component you are trying to engage, so that the gears can mesh.

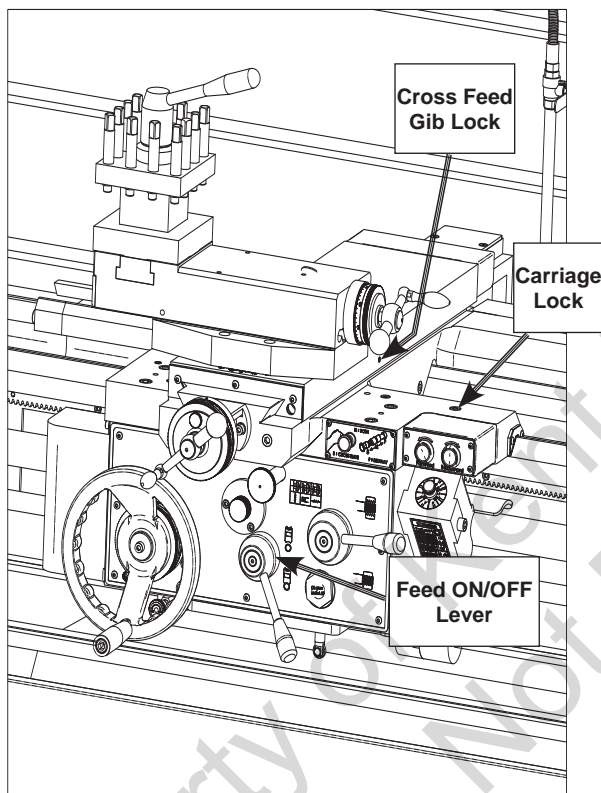


Figure 50. Carriage lock and gib lock.

3. Push down on the feed ON / OFF lever (Figure 50) on the front of the apron to engage power feed for either the carriage or the cross slide.
4. Push the feed selection knob in to select carriage feed, or pull the feed selection knob out to select cross feed.

To use the quick change feed direction knob :

1. While the lathe is running, place the feed control lever in neutral.
2. Push or pull the quick change feed direction knob to change the direction of the feed rod.
3. Re-engage the feed direction lever. The feed rod rotation will now be reversed, causing the engaged carriage or cross slide to move in the opposite direction.

Leadscrew & Feed Rod support

This support bracket was used for protect the Leadscrew and Feed rod to prevent these parts to be out of shape when the apron has been moved toward the chuck side, when the shorter cutting job required.



Figure 51. Leadscrew & Feed rod support

Thread & Feed Rate Chart

Figure 52 shows the configurations of gearbox levers that are required to set the available feed rates. This same chart can also be found on the machine.









THREAD AND FEED CHART															
METRIC				INCH				FEED				FEED			
 I				 II				 IY				 IY			
0.2	LTX1	1.75	LSZ8	72	LAR6	13	LBT7	mm / 	in / 			mm / 	in / 		
0.225	LTX2	2	LRZ1	60	LAR3	12	LAT1	0.035	LT1	0.0012		0.011	LT1	0.0004	
0.25	LTX3	2.5	LRZ3	56	LBR8	11 1/2	LBT5	0.044	LT3	0.0015		0.013	LT3	0.0005	
0.3	LTX6	3	LRZ6	48	LAR1	11	LBT4	0.053	LT6	0.0020		0.016	LT6	0.0006	
0.35	LTX8	3.5	LRZ8	44	LBR4	10	LBT3	0.07	LS1	0.0028		0.021	LS1	0.0008	
0.4	LSX1	4	HSZ1	40	LBR3	9	LBT2	0.087	LS3	0.0031		0.026	LS3	0.0010	
0.45	LSX2	4.5	HSZ2	36	LAS6	8	LBT1	0.11	LS7	0.0040		0.033	LS7	0.0013	
0.5	LTZ1	5	HSZ3	32	LBR1	7 1/2	HAS3	0.14	LR1	0.0056		0.042	LR1	0.0017	
0.6	LSX6	5.5	HSZ4	30	LAS3	7	HBS8	0.17	LR3	0.0067		0.051	LR3	0.0020	
0.7	LSX8	6	HSZ6	28	LBS8	6	HAS1	0.21	LR6	0.0083		0.064	LR6	0.0025	
0.75	LTZ6	6.5	HSZ7	27	LAS2	5	HBS3	0.24	LR8	0.0095		0.073	LR8	0.0029	
0.8	LRX1	7	HSZ8	26	LBS7	4 1/2	HAT6	0.31	HS2	0.012		0.094	HS2	0.0037	
0.9	LRX2	8	HRZ1	24	LAS1	4	HBS1	0.40	HS5	0.016		0.121	HS5	0.0048	
1	LSZ1	9	HRZ2	23	LBS5	3 3/4	HAT3	0.49	HS8	0.019		0.148	HS8	0.0058	
1.1	LRX4	10	HRZ3	22	LBS4	3 1/2	HBT8	0.63	HR2	0.025		0.190	HR2	0.0075	
1.2	LRX6	11	HRZ4	20	LBS3	3 1/4	HBT7	0.80	HR5	0.032		0.242	HR5	0.0095	
1.25	LSZ3	12	HRZ6	19	LIS8	3	HAT1	0.98	HR8	0.039		0.296	HR8	0.0117	
1.3	LRX7	13	HRZ7	18	LAT6	2 7/8	HBT5								
1.4	LRX8	14	HRZ8	16	LBS1	2 3/4	HBT4								
1.5	LSZ6			15	LAT3	2 1/2	HBT3								
				14	LBT8	2 1/4	HBT2								
				13 1/2	LAT2	2	HBT1								

Figure 52. Thread and feed rate chart.

Positioning Gearbox Levers

To cut a particular thread or establish a particular feed rate, you may need to first swap the gearbox drive gear, depending on where it is currently set.

Once you have confirmed that the end gear is set up properly, you can then move the gearbox levers to the required positions. The arrows going from Figure 52 to Figure 53 show which gearbox levers must be moved to achieve an example feed rate.

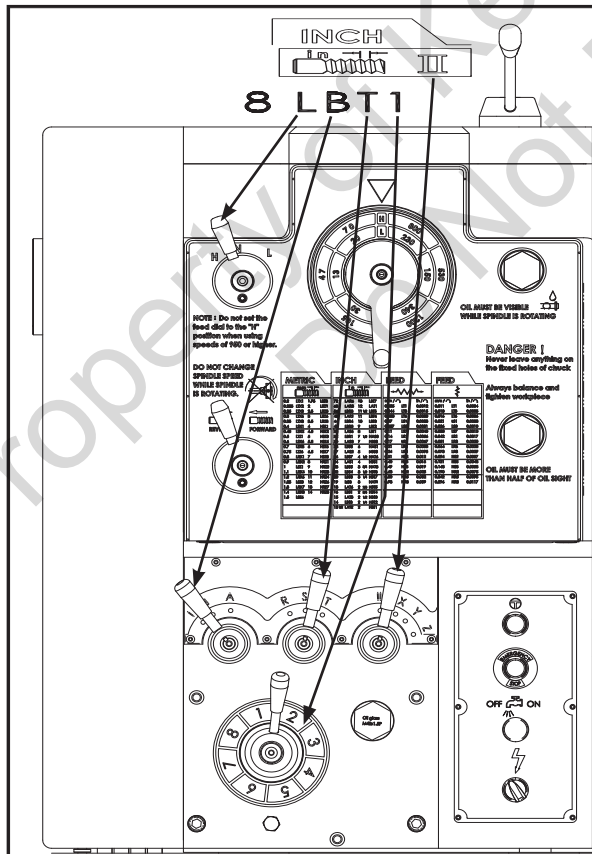


Figure 53. Example for thread and feed rate chart.

End Gear Setup

The gearbox drive gear on this lathe can be configured for the normal position or the alternate position, depending upon the type of operation to be performed. The lathe is shipped with the end gears in the normal position. Gears must be thoroughly cleaned and re-coated in grease before installing, and the backlash must be maintained at 0.127mm (0.005") for correct meshing.

Normal Position (Inch)

The Idler is for adjusting tension of the belt.

Belt type:

CH22-245H.
CH26-285H.
CH30-325H.

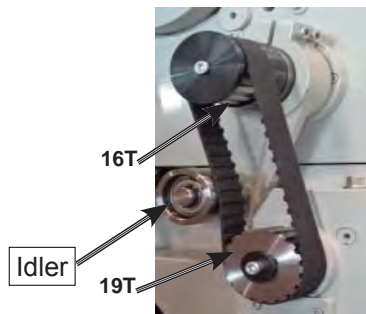


Figure 54. Normal end gear position for Inch system.

Normal Position (Metric)

The 55T end gear is installed in the top position, the 55T/54T end gears in the middle position, and the 64T end gear in the bottom position, as shown in Figure 55. In the normal position, the 55T and 64T gears are meshed, which allows for metric threading and all general feed operations.

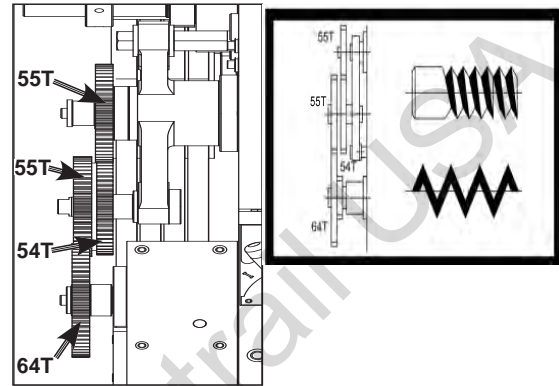


Figure 55. Normal end gear position for Metric system.

Threading Controls

If you are unfamiliar with threading procedures on a lathe, we strongly recommend that you read books, review industry trade magazines, or get formal training before beginning any threading projects.

Power Feed Lever

The feed control lever must be in the fully up disengaged position or the internal lockout will prevent the half nut lever from applying the half nut. Also to avoid shearing the leadscrew shear pin, the carriage lock (Figure 56) must be loosened before threading begins.

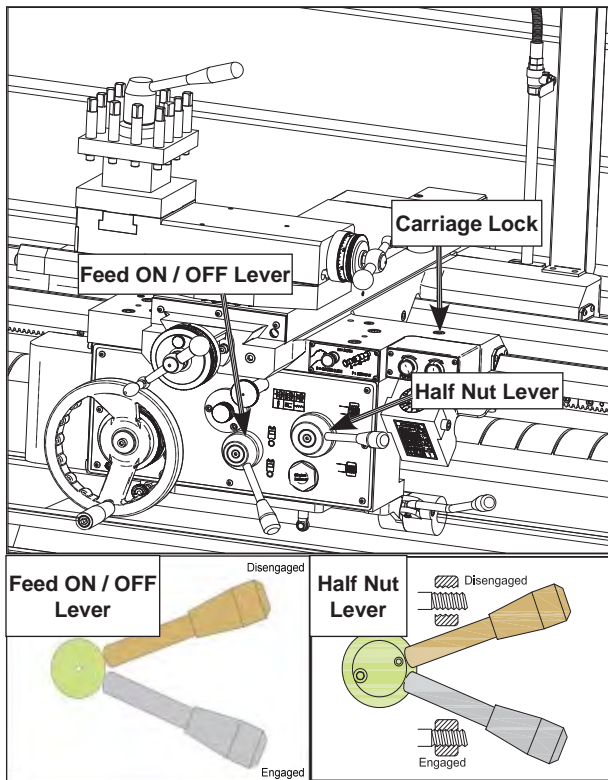


Figure 56. Carriage controls.

Overload safety device for apron automatic

There is a taper safety sleeve between and gear in the apron. When the infeed loading is over the setting load, the taper sleeve will slide, so that the cross and longitudinal cannot transmit to prevent the apron gear break down.

Please follow the ways listed below:

1. Open the end cover.
2. Use 8mm hexagonal spanner for adjustment of getting the proper loading, turn c.w to tight the adjusting bolt when you want to carry out heavy cutting or turn c.c.w to release the adjusting bolt for light cutting.
3. Close the end cover.

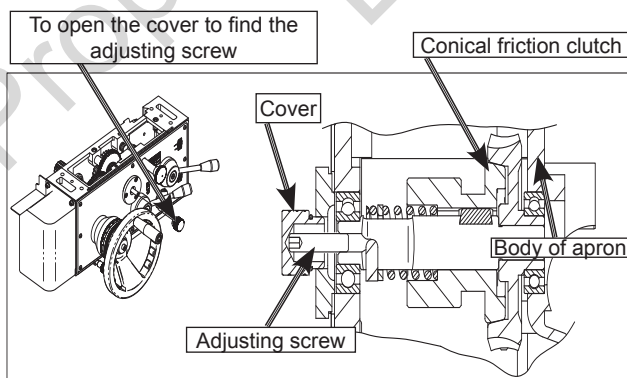


Figure 57. Overload safety device for Apron .

Half Nut Lever

The half nut lever engages the carriage with the leadscrew which moves the cutting tool along the length of the workpiece.

Thread Dial & Chart Overview

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work. Loosen the knurled hand knob on the thread dial, pivot the dial gear into mesh with the leadscrew, then tighten the hand knob (Figure 58).

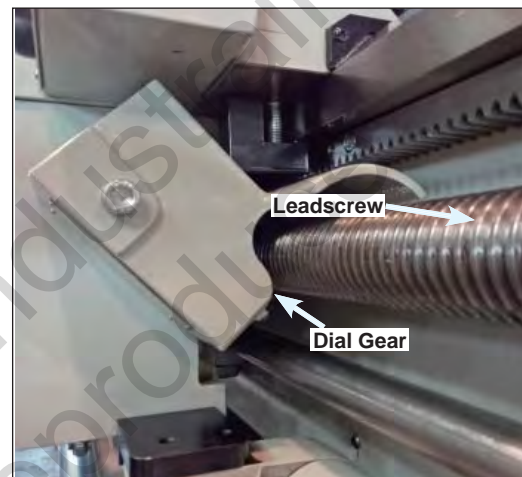


Figure 58. Thread dial engaged with the leadscrew.

Using Thread Dial and Chart (Inch)

Find the TPI (threads per inch) that you want to cut in the left column (Figure 59), then reference the dial number to the right of it. The dial numbers indicate when to engage the half nut for a specific thread pitch. The thread dial chart can also be found on the front of the thread dial housing.

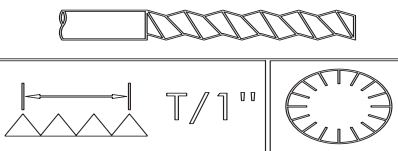
	
4 8 12 16 20 24 28 32 36 40 44 48 56 60 72	1 . 2 3 . 4
2 6 10 14 18 22 26 30	1.2.3
3 5 7 9 11 13 15 19 23 27	1 . 2
2½ 3½ 4½ 7½ 11½ 13½	1

Figure 59. Thread dial chart (Inch).

TPI 4-72 Divisible By 4

Use any line (position) on the thread dial, shown in Figure 60, or threading TPI divisible by 4.

TPI	
4 8 12 16 20 24 28 32 36 40 44 48 56 60 72	1 . 2 3 . 4

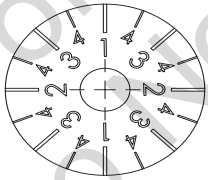


Figure 60. Any position is selected on the dial for threading 4-72 TPI.

TPI 2-54 Not Divisible By 4

Use any of the non-numbered lines on the thread dial for threading the TPI shown in Figure 61.

TPI	
2 6 10 14 18 22 26 30	1.2.3

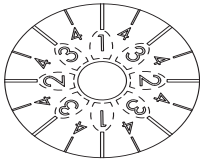


Figure 61. Marks are selected on the dial for threading 2-30 TPI.

Odd Numbered TPI

Use any of the numbered lines on the thread dial for threading the TPI shown in Figure 62.

TPI	
3 5 7 9 11 13 15 19 23 27	1 . 2

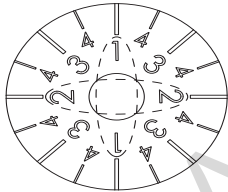


Figure 62. Numbers are selected on the dial for threading odd numbered TPI.

1/2 Fractional TPI

Use position 1 on the thread dial for cutting the TPI shown in Figure 63.

TPI	
2½ 3½ 4½ 7½ 11½ 13½	1

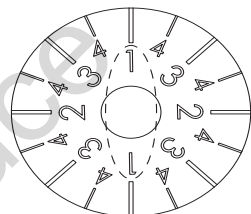


Figure 63. Opposing number group are selected on dial for cutting 1/2 thread TPI.

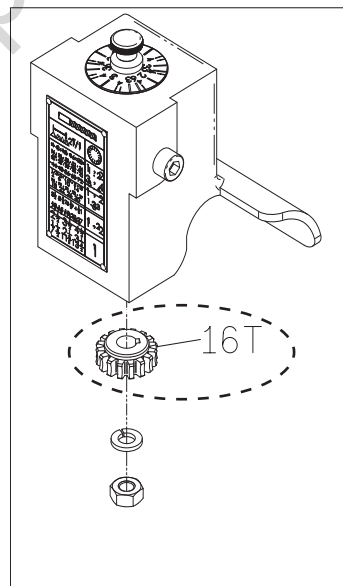


Figure 64. Example of thread dial - 16T.

Using Thread Dial and Chart (Metric)

Find the length of each thread that you want to cut in the left column (Figure 64), then reference the dial number to the right of it. The dial numbers indicate when to engage the half nut for a specific thread pitch. The thread dial chart can also be found on the front of the thread dial housing.

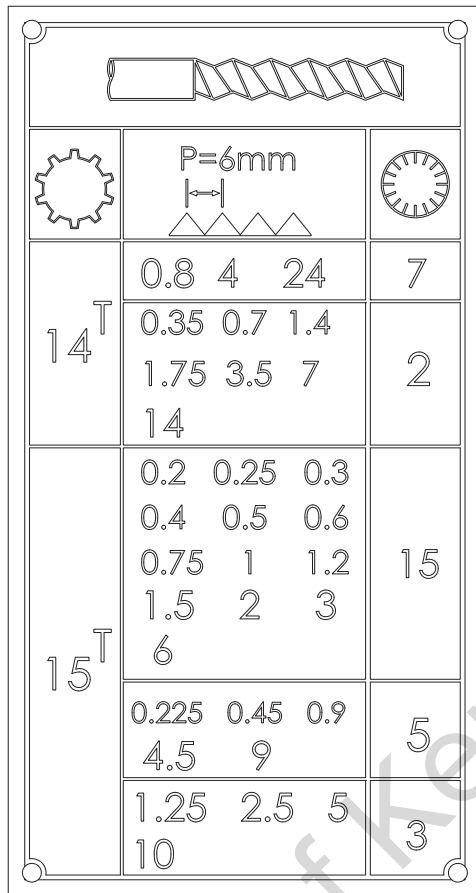


Figure 65. Thread dial chart (Metric).

Length of each thread 1.75, 3.5, 7, 14

Select position 1, 3 on the thread dial and use the 14T gear on the bottom of thread dial for threading length of each thread 1.75, 3.5, 7, 14. (Figure 65 - 66)

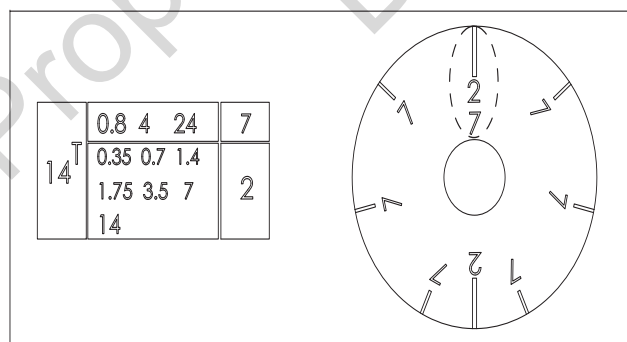


Figure 66. Thread dial chart of numbered position 1, 3.

Length of each thread 4.5, 9

Select position 1, 3 on the thread dial and use the 18T gear on the bottom of thread dial for threading length of each thread 4.5, 9. (Figure 65 - 66)

Length of each thread 5.5, 11

Select position 1, 3 on the thread dial and use the 22T gear on the bottom of thread dial for threading length of each thread 5.5, 11. (Figure 65 - 66)

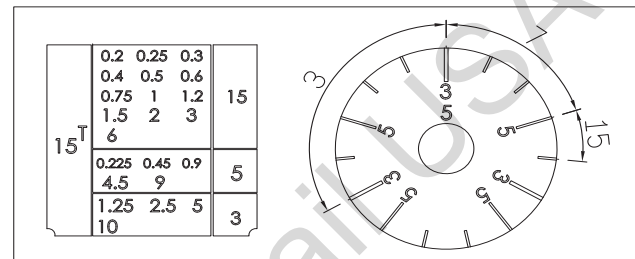


Figure 67. Thread dial chart of numbered position 1, 2, 3, 4.

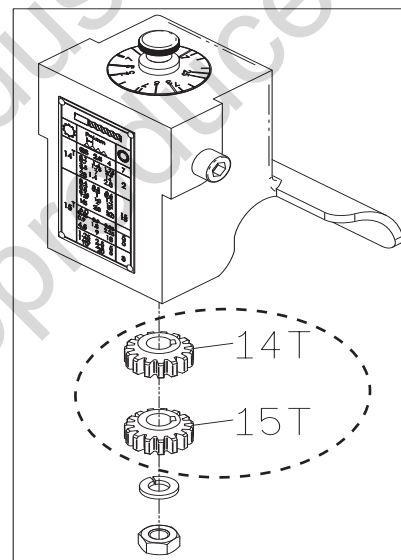


Figure 68. Example of thread dial - 16T.

Length of each thread 0.25 - 12 divisible by 0.25

Select position 1, 2, 3 or 4 on the thread dial and use the 16T gear on the bottom of thread dial for threading length of each thread 0.25 - 12 divisible by 0.25. (Figure 67 - 68)

Length of each thread 1.25, 2.5, 5, 10

Select position 1, 2, 3 or 4 on the thread dial and use the 20T gear on the bottom of thread dial for threading length of each thread 1.25, 2.5, 5, 10. (Figure 67 - 68)

Cutting Fluid System

The cutting fluid system delivers cutting fluid through a positionable nozzle and is controlled by the control panel cutting fluid pump switch and the valve lever near the base of the nozzle hose.

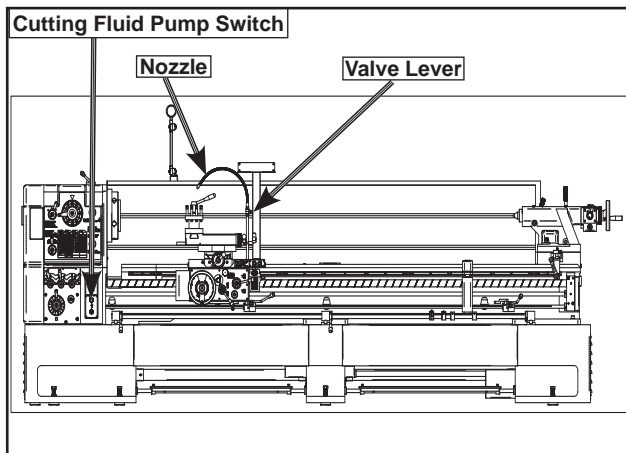


Figure 69. Coolant system controls and components.

Always use high quality cutting fluid in your coolant system and follow the manufacturer's instructions for diluting.

To use the cutting fluid system on your lathe :

1. Make sure the tank is properly serviced and filled with cutting fluid, and that you wear the necessary personal protection equipment.
2. Position the cutting fluid nozzle for your operation.
3. Use the control panel cutting fluid pump switch to turn the coolant pump ON.
4. Adjust the flow of cutting fluid by using the valve lever near the base of the nozzle hose.

Section 4 : Maintenance

Schedule

Each operator of this machine is responsible for ensuring proper care of the equipment. We strongly recommend all operators make a habit of following the daily maintenance procedures.

For optimum performance from this machine, this maintenance schedule must be strictly followed.

Ongoing

To maintain a low risk of injury and proper machine operation, if you ever observe any of the items below, shut the machine down immediately and fix the problem before continuing operations :

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards removed.
- Limit/kill switches bypassed.
- Emergency stop button not working correctly or not requiring you to reset it before starting the machine again.
- A reduction in braking speed or efficiency.
- Headstock oil not flowing against sight glass.
- Cutting fluid not flowing out.
- Any other unsafe condition.

Daily, Before Operations

- Check / add gearbox oil.
- Check / add apron oil.
- Check cutting fluid level.
- Lubricate the ways.
- Put oil in the ball oilers.
- Check / add leadscrew & feedrod bearing oil.
- Clean / lubricate the leadscrew.
- Move the power feed lever on the apron to neutral (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

Daily, During Operations

- Verify headstock oil flows when power is turned ON.
- Verify electrical box cooling fan is operating.
- Verify headstock oil temperature is under 138°C (280° F).

Daily, After Operations

- Vacuum/clean all chips and swarf from bed, slides, and chip drawer.
- Wipe down all unpainted or machined surfaces with an oiled rag.
- Depress emergency stop button and shut OFF the main power switch (to prevent accidental startup).

Monthly

- Drain and clean the cutting fluid tank, then add new cutting fluid.
- Remove electrical box air filter and clean with compressed air or a vacuum.

Annually (or Semi-Annually with Hard Use)

- Drain and clean the headstock oil reservoir, then add new oil.
- Change the apron oil.
- Change the gearbox oil.

Cleaning

Regular cleaning is one of the most important steps in taking good care of this lathe. Each operator is responsible for cleaning the machine immediately after using it or at the end of the day. We recommend that the cleaning routine be planned into the workflow schedule, so that adequate time is set aside to do the job right.

Typically, the easiest way to clean swarf from the bed ways and chip drawer is to use a wet/dry shop vacuum that is dedicated for this purpose only. The small chips leftover after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off chips, as it may drive them deeper into moving surfaces and could cause sharp chips to fly into your face or hands.

All visible swarf should be removed from the lathe during cleaning. Remember, personal neatness gives you personality.

Lubrication

Headstock

Checking & Adding Oil

Before operating the lathe, please check the status of the oil inside of the headstock from the oil sight glass. To replenish it up to the center line of the oil sight glass when it is lower than this center line.

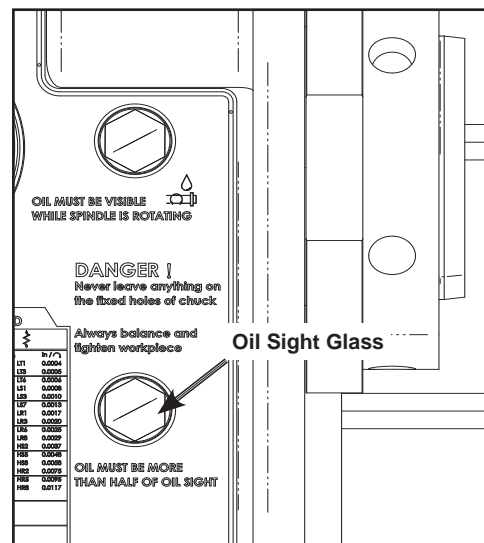


Figure 70. Location of the headstock oil sight glass.

Changing Oil

The headstock oil must be changed after the break-in period and then annually (or every six months with heavy service or extreme working conditions). The fill and drain plug is shown in Figure 71.

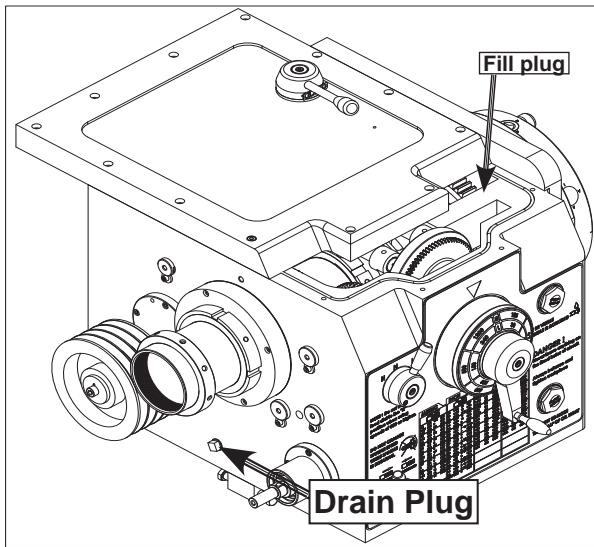


Figure 71. Location of headstock fill and drain plugs.

Gearbox

Checking & Adding Oil

The sight glass shown in Figure 72 shows the oil level in the gearbox. At the maximum level, the oil fills approximately 3/4 of the sight glass. At the minimum level, the oil only fills 1/4 of the sight glass.

Check the oil level daily. When the oil approaches the minimum level, add enough oil to bring it up to the maximum level.

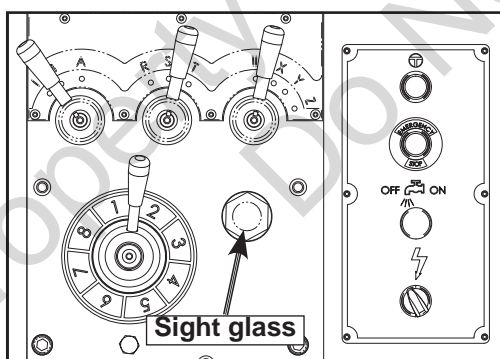


Figure 72. Gearbox sight glass location.

Changing Oil

The gearbox oil must be changed after the break-in period and then annually (or every six months with hard service or extreme working conditions). Figure 73 shows fill and drain plugs used when changing the gearbox oil.

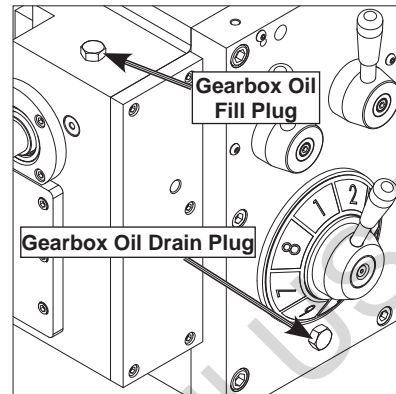


Figure 73. Location of gearbox fill and drain plugs.

Apron

Checking & Adding Oil

The sight glass shown in Figure 74 shows the oil level in the apron. At the maximum level, the oil fills approximately 3/4 of the sight glass. At the minimum level, the oil only fills 1/4 of the sight glass.

Check the oil level daily. When the oil approaches the minimum level, add enough oil to bring it up to the maximum level. This oil is also used by the way pump to lubricate the ways and slides.

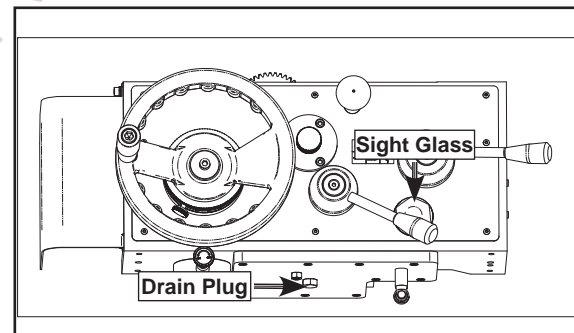


Figure 74. Location of apron drain plug & sight glass.

Changing Oil

The oil in the apron reservoir must be changed after the break-in period and then annually (or every six months with hard service or extreme working conditions). The drain plug is shown in Figure 74 and the fill plug is shown in Figure 75.

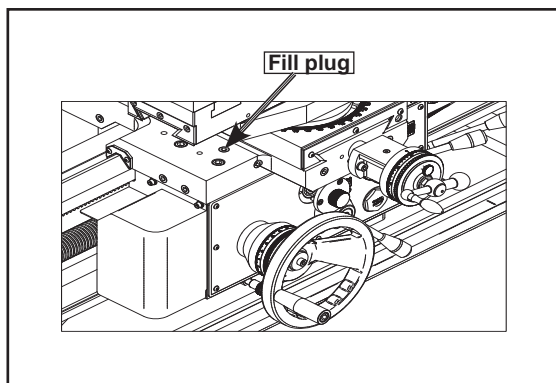


Figure 75. Location of fill plug for apron oil reservoir.

Lead Screw

Before lubricating the leadscrew, clean it first with mineral spirits. A paint brush works well to help clean out the threads. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

Apply oil along the length of the leadscrew. Use a paint brush to make sure the oil is evenly applied and down in the threads.

Ways & Slides

The way pump shown in Figure 76 lubricates the saddle and cross slide way guides with the oil from the apron reservoir.

To use the way pump to lubricate the ways, pull the pump knob out for two or three seconds and then push it in. The pump draws oil from the apron reservoir and then forces it through drilled passages to the way guides.

Repeat this process and move the carriage left/ right and the cross slide forward/backward to distribute oil along the way guides.

Lubricate the guides once before and once after operating the lathe. If the lathe is in a moist or dirty environment, increase the lubrication interval and make sure to keep the oil level full.

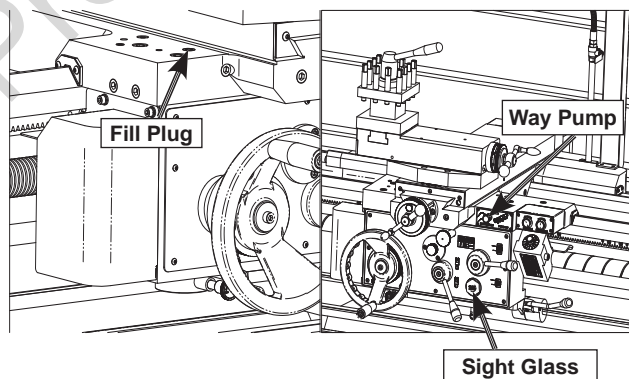


Figure 76. Location of way pump, fill plug and sight glass on the apron.

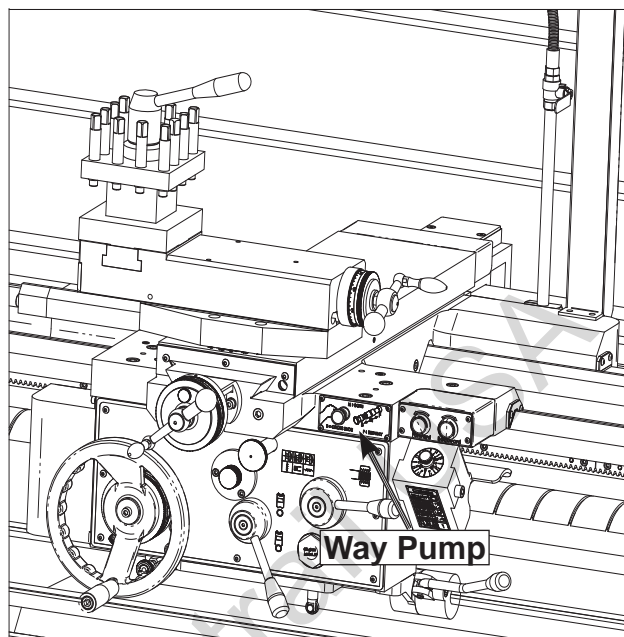


Figure 77. 3-Step Way device for Apron .

The 3-step way pump offers the lubrication oil for both bed ways and cross slide ways.

B: To pull the knob backward to the operator, the lubrication will be for cross slide ways.

F: To push the know backward to the machine, the lubrication will be for bed ways.

M: To put the knob at the middle position, the lubrication will be for both ways.

Unpainted & Machined Surfaces

Besides the ways and leadscrew, all other unpainted and machined surfaces should be wiped down daily to keep them rust-free and in top condition. This includes the top of the saddle, the cross slide, compound slide, tool post, chuck, feedrod, and any other surface you can find that could be vulnerable to rust if left unprotected (this especially includes any parts that may be exposed to water soluble cutting fluids). Typically with these parts, a thin film of oil is all that is necessary for protection.

Ball Oilers

Proper lubrication of ball oilers is done with a pump-type oil can that has a plastic or rubberized cone tip. We do not recommend using metal needle or lance tips, as they can push the ball too far into the oiler, break the spring seat, and lodge the ball in the oil galley.

Lubricate the ball oilers before and after machine use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the rubber or plastic tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. If you see sludge and contaminants coming out of the lubrication area, keep pumping the oil can until the oil runs clear. When finished, wipe away any excess oil. (Figure 78 - 79)

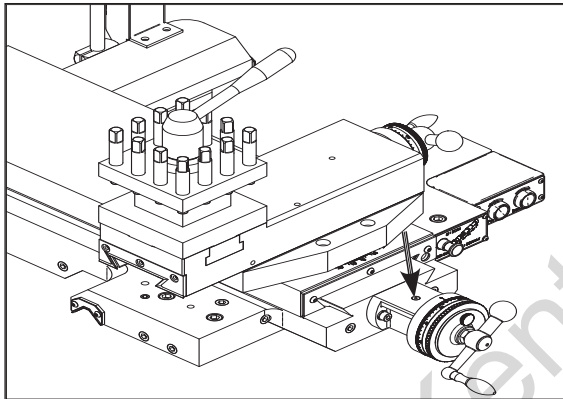


Figure 78. Carriage ball oiler .

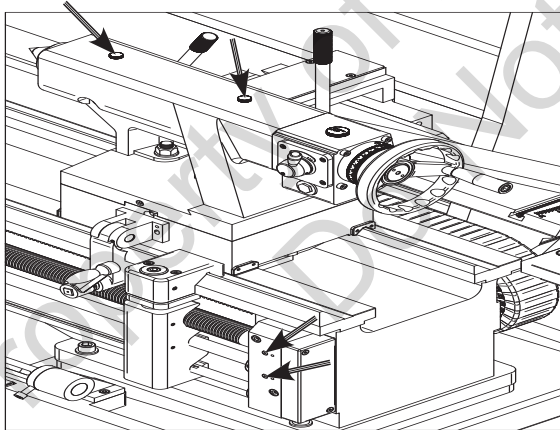


Figure 79. Tailstock and Leadscrew end ball oiler.

End Gearing

The end gears, shown in Figure 80, should always have a thin coat of heavy grease to reduce the minimize/prevent corrosion, noise, and wear. Care must be taken to avoid over-greasing because excess grease may be flung onto the V-belts, which will reduce optimal power transmission from the motor.

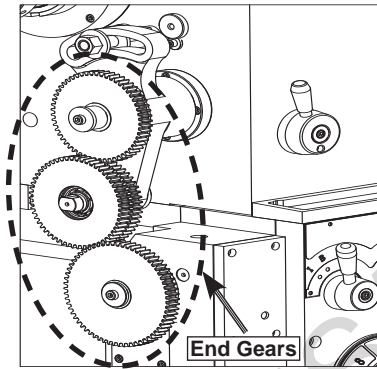


Figure 80. Location of end gears that require grease.

Handling & Care

Make sure to clean and lubricate any gears you install or swap. Unless you are very careful during handling and storage, the coating of grease on the gears will easily pickup dirt or debris, which can then spread to the other gears and increase the rate of wear.

Make sure to the cover remains installed whenever possible to keep the gears free of dust or debris from the outside environment.

Lubricating

1. Disconnect Lathe from POWER !
2. Remove the headstock side cover and all the end gears.
3. Clean the end gears thoroughly in mineral oil to remove all the old grease. Use a small brush if necessary to clean between the teeth.
4. Clean the shafts from which the end gears were removed, and wipe up any old grease splatters in the vicinity and on the inside of the headstock cover.
5. With clean hands, apply a thin layer of grease on both sides of the gears. Make sure to get grease between the gear teeth, but not so much that it fills the voids between the teeth.
6. Install the end gears and mesh them together with an approximate backlash of 0.127mm. Once the gears are meshed together, apply a small dab of grease in the crux of where the gears mesh together—this grease will spread around when the gears start moving and re-coat any areas scraped off during installation.

Annual Maintenance

Once a year, remove all the end gears, clean them thoroughly, and apply a new coating of grease. Even if the headstock side cover has been kept in place throughout the year, it is still possible for dust from the V-belts to build-up in the grease, and the grease may also start to break down with extended or heavy use.

Safety Device

In order to prevent damages of the machine when excessive cutting power occurred during the thread cutting, the safety pin(7) will be broken by shearing force.

In this case, replace it with a new safety pin.

The replace method is:

1. Turn the screw (A) counter clockwise and remove it. Remove the thrust washer (B) of the pulley of timing belt.
2. Remove the timing belt pulley (C).
3. Remove the gear sleeve (D), safety pin inner locking ring (E), safety pin outer locking ring(F), safety pin(G) and safety pin stopper (H) in the sequence.
4. Use a 3mm rod to remove the broken safety pin and replace a new one. (There are 2 safety pins in tool box prepared for this purpose)
5. Reassembly the parts to the state as shown on figure 81.

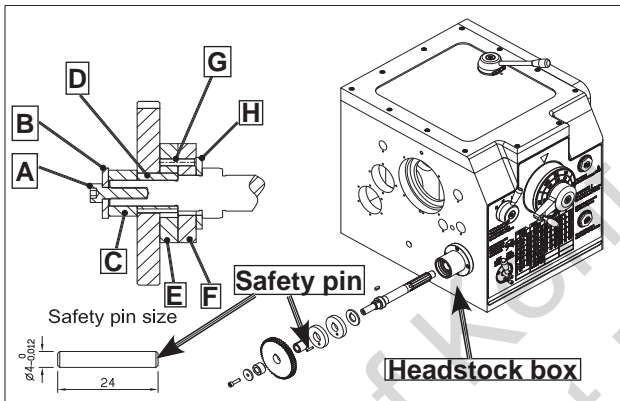


Figure 81. Safety Device for headstock.

Cutting Fluid System

The cutting fluid system consists of a fluid tank, pump, and flexible nozzle. The pump pulls fluid from the tank and sends it to the valve, which controls the flow of cutting fluid to the work area. When the valve is opened or closed, the fluid comes out of the nozzle and drains through the chip drawer and into the catch tray and then into the tank where it is picked up again by the pump. Figure 82 shows many of these components and their locations.

Although most swarf from machining operations falls into the chip tray and stays there, some small chips drain into the tank. The pump uses a screen to prevent it from picking up the small swarf that ends up in the tank.

Since the swarf is spread throughout the coolant system, cleaning the system on a regular basis is a requirement to maintain the life of the pump.

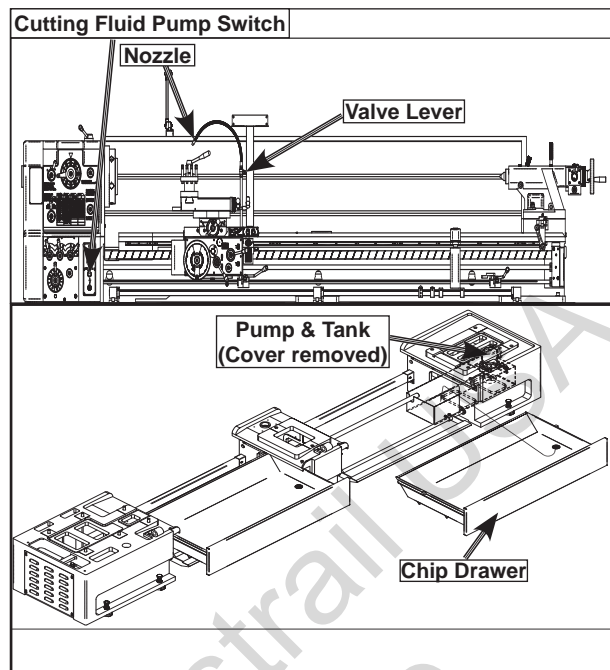


Figure 82. Cutting fluid system components and locations.

Hazards

As some cutting fluid ages, dangerous microbes can proliferate and create a biological hazard.

The risk of exposure to this hazard can be greatly reduced by replacing the old cutting fluid on a monthly basis, as indicated in the maintenance schedule.

The important thing to keep in mind when working with the cutting fluid is to minimize exposure to your skin, eyes, and respiratory system by wearing the proper PPE (personal protective equipment), such as splash-resistant safety glasses, long-sleeve gloves, protective clothing, and a NIOSH approved respirator.

Adding Fluid

1. Disconnect Lathe from POWER !
2. Remove the vented cover and slide the tank out, as shown in Figure 83.
3. Pour cutting fluid in the tank until it is nearly full.
4. Slide the tank back into the base and replace the vented cover.

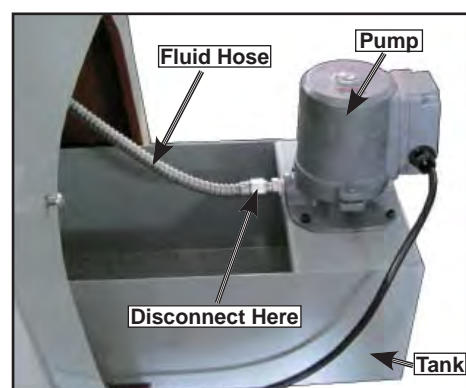


Figure 83. Cutting fluid pump and tank.

Changing Cutting Fluid

When you replace the old cutting fluid, take the time to thoroughly clean out the chip drawer, catch tray, and chip tray while you are at it. The entire job only takes about a 1/2 hour when you are prepared with the proper materials and tools.

To change the cutting fluid :

1. Position the coolant nozzle over the splash guard, so it is pointing behind the lathe. If you have the optional hose, connect it to the end of the coolant nozzle now.
2. Place the 5-gallon bucket behind the lathe and underneath the coolant nozzle. If you have the optional hose, place the hose in the bucket. Otherwise, you may need to hold the bucket up to the coolant nozzle to prevent coolant from splashing outside of the bucket.
3. Turn cutting fluid the pump ON (or have another person turn it ON if you are holding the bucket), and pump the old cutting fluid out of the tank. Turn the pump OFF immediately after fluid stops flowing.
4. Disconnect Lathe from POWER !
5. Remove the vented cover and slide the tank half way out of the base, as shown in Figure 82.

If necessary, disconnect the fluid hose from the pump, where shown in Figure 82.

6. Pour out the old cutting fluid into your 5-gallon bucket and close the lid.
7. Flush the tank with hot soapy water, making sure the intake screen at the bottom of the pump intake pipe (inside the tank) is clean, and wipe up any remaining fluid residue.
8. Slide the tank partially into the base and reconnect the fluid hose.
9. Refill the tank with new cutting fluid, then slide the tank completely into the base.
10. Connect Lathe to power.
11. Open the valve on the cutting fluid nozzle.
12. Turn the cutting fluid pump ON to verify that fluid cycles properly, then turn it OFF.

Machine Storage

If the machine is not properly prepared for storage, it may develop rust or corrosion. If decommissioning this machine, use the steps in this section to ensure that it remains in good condition for later use.

To prepare your machine for short-term storage (up to a year) :

1. Pump out the old cutting fluid, and flush the lines and tank.
2. Disconnect Lathe from POWER !
3. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil.
4. Lubricate the machine as outlined in the lubrication section.
5. Cover and place the machine in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make plastic guards cloudy.
6. Once or twice a month, depending on the ambient humidity levels in the storage environment, wipe down the machine as outlined in Step 3.
7. Every few months, start the machine and run all gear-driven components for a few minutes. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion, especially during the winter months.

To prepare your machine for long-term storage (a year or more) :

1. If the machine has oil-lubricated gearboxes, bring the machine to operating temperature and drain and refill the all gearboxes with fresh oil.
2. Pump out the old cutting fluid, and flush the lines and tank.
3. Disconnect Lathe from POWER !
4. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, a heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that the rust preventative or grease is kept off of painted surfaces.
5. Lubricate the machine as outlined in the lubrication section.
6. Loosen or remove machine belts so they do not become stretched during the storage period. Be sure to also affix a maintenance note on the machine as a reminder that the belts have been loosened or removed.
7. Place a few moisture absorbing desiccant packs inside of the electrical box.
8. Cover and place the machine in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make plastic guards cloudy.

Lubrication oil sheet for conventional lathe

Model: CH

Location	Description	Cycle	No. of oil	Q'ty
Headstock	Fill: Remove head cover fill up to 80% of sight glass. Drain: Remove plug.	1st change: After pprox. 200 hours . Thereafter: Every 6 months	ISO # 32	17 liters
Universal gear box	Add/Fill. Remove top cover, till to 80% of the sight glass. Drain: Remove plug directly beneath largest numbered feed.	Add: As need to sight glass (less than 80%) Drain / change: Six months intervals	ISO # 32	4.6 liters
Apron	Add/Fill. Remove top cover (with word "OIL"), till to 80% of the sight glass. Drain: Remove fixed bolt directly bottom center side of bottom plate.	Add: As need to sight glass (less than 80%) Drain / change: Six months intervals	ISO # 68	2.5 liters
Sliding ways	"One shot" pump, left side of apron. Use the oil of apron. Same way to add / drain with the one for apron.	3 times a day (normal operation)	ISO # 68	1-3 shots normal
Compound & cross slide screw	Oil fittings- Top surface both cross & compound slides. Using pump type oil can when oil required.	Daily / when needed	ISO # 68	2 - 3 drops
Tailstock	2 fittings - Lube with pump type oil can.	Daily / when needed	ISO # 68	2 - 3 drops / 0.3 liters
Lead screw & feed rod	Luricating surface with brush or close oil fitting in end support block.	Daily / when needed	ISO # 68	Lead screw must be cleaned & threads lightly oiled

Section 5 : Service

Backlash Adjustment

Compound Leadscrew

Backlash is adjusted by tightening the set screws shown in Figure 84. When these screws are adjusted against the leadscrew nut, they offset part of the half nut to remove play between the nut and leadscrew.

If you end up adjusting the half nut too tight, loosen the set screws, tap the compound a few times with a rubber or wooden mallet, and turn the handle slowly back and forth until it moves freely.

To readjust the backlash, rock the handle back and forth, and tighten the screws slowly until the backlash is at approximately 0.025mm as indicated on the handwheel dial.

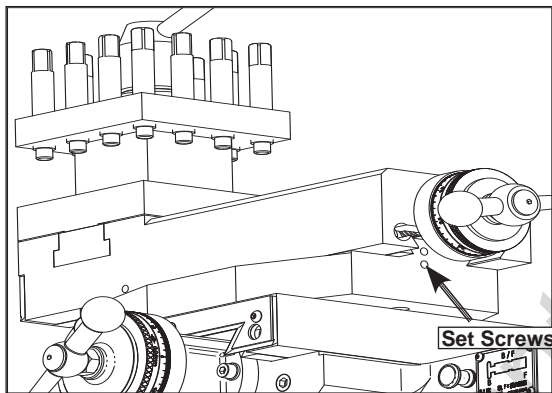


Figure 84. Compound slide backlash adjustment set screws.

Cross Slide Leadscrew

Backlash can be felt by turning the cross slide handwheel in one direction, then turning the handwheel the other direction, then noticing the amount the handwheel moves while the cross slide does not. When the cross slide begins to move, the backlash has been taken up.

Backlash is adjusted by loosening all four cap screws shown in Figure 85, and then tightening the center set screw, which pushes down on a wedge and forces the half nut apart, taking up lash in the half nut and leadscrew. If you end up adjusting the half nut too tight, loosen the set screw, tap the cross slide a few times with a rubber or wooden mallet, and turn the handle slowly back-and-forth, until the handle turns freely.

To re-adjust the backlash, rock the handle back and forth and tighten the set screw slowly until the backlash is at approximately 0.025mm as indicated on the handwheel dial.

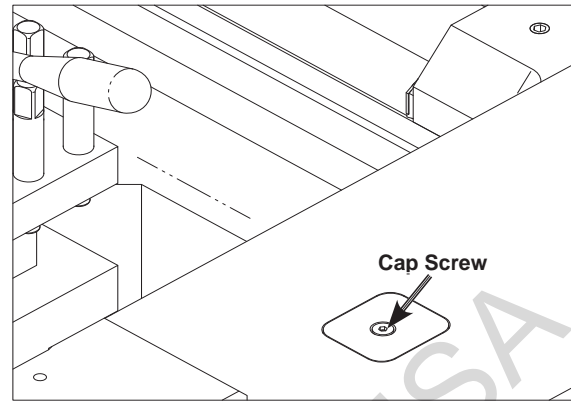


Figure 85. Cross slide backlash adjustment screws.

Adjustment of cross slide female screw backlash

The backlash can be adjusted within a certain amount by a special designed screw of a two nuts set on the cross slide leadscrew.

The adjustment is carried out by means of the three screws on the center of cross slide. Release the lock screw (1) from the water-proof cover. (2) using a magnetic stand of dial gauge to remove the waterproof cover and waterproof gasket. (3) don't release the screw (4) unless it is necessary. Release the screw (6) a little and slowly tighten the screw. (5) turn the handwheel and tighten the screw (5-6) slowly until the backlash become satisfactory.

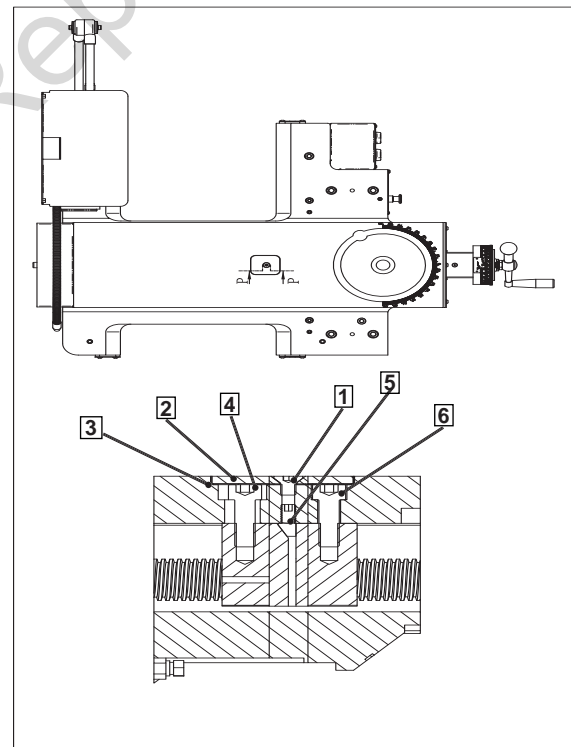


Figure 86. Adjustment of cross slide backlash .

Leadscrew End Play Adjustment

After a long period of time, you may find that the leadscrew develops a small amount of end play. This lathe is designed so that leadscrew end play can be easily removed with adjustment.

To remove leadscrew end play :

1. Disconnect Lathe from POWER !
2. Remove the two cap screws and end cover.
3. Loosen both retaining nut set screws shown in Figure 87.

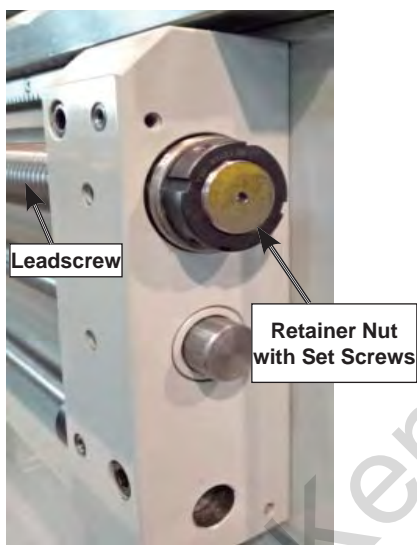


Figure 87. Leadscrew end play adjustment.

4. Engage the half nut lever.
5. Rotate the carriage feed handwheel back and forth slightly and tighten the retaining nut at the same until the end play is removed.
6. Tighten both set screws and reinstall the cover.

Gib Adjustment

The goal of adjusting the cross slide, tailstock, saddle, and compound gib screws is to remove sloppiness in the ways without over-adjusting them to the point where the slides become stiff and difficult to move.

In general, loose gibs cause poor finishes and tool chatter; however, over-tightened gibs cause premature wear on the slide, leadscrew, and half nut, and are difficult to operate.

The gibs have a tapered shape and are held in position by screws at opposing ends of the slide. When the opposing screws are turned in the opposite directions from each other, the taper fills the void between the sliding components.

The gib adjustment process usually requires some trial-and-error. Typically, you make a slight adjustment to the gib screw, then check the feel of the adjustment by turning the handwheel.

You then repeat this process as necessary until you find the best balance between loose and stiff movement. Most machinists find that the ideal gib adjustment is where a small amount of drag or resistance is present yet the handwheels are still easy to move.

Figures 88 – 90 show the location of the screws for each gib on this machine.

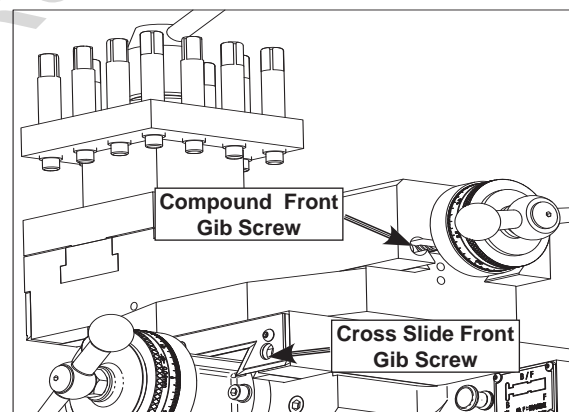


Figure 88. Compound and cross slide gib screw.

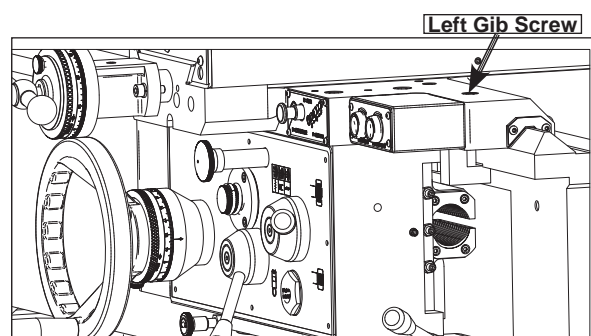


Figure 89. One of two front saddle gib screws.

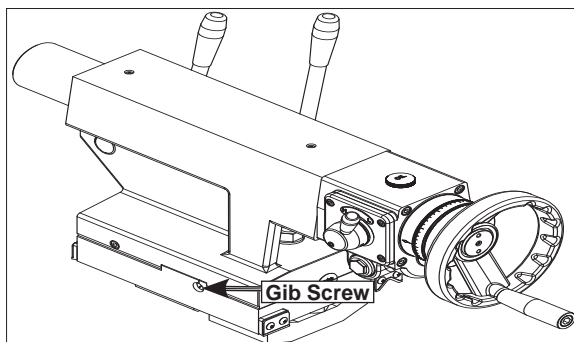


Figure 90. One of two tailstock gib screws.

V-Belts

V-belts stretch and wear with use, so they should be checked on a monthly basis to ensure optimal power transmission. Replace all the V-belts if any of them show signs of glazing, fraying, or cracking.

To adjust or replace the V-belts on the lathe :

1. Disconnect Lathe from POWER !
2. Remove the cover.

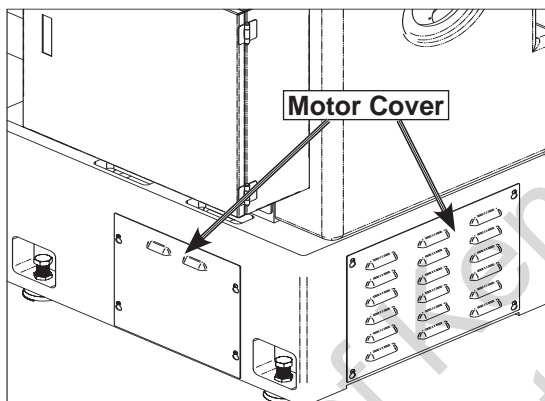


Figure 91. Location of motor cover.

3. Turn the hex nuts on the motor mount bolts shown in Figure 91 to move the motor mount plate up or down and adjust the V-belt tension. When correctly tensioned, each belt should have about 19mm deflection when pressed firmly.

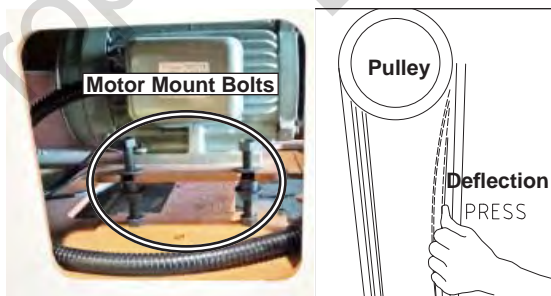


Figure 92. V-belt adjustment.

4. Firmly tighten the hex nuts (loosened in the previous step) against the motor mount plate to prevent it from moving out of adjustment during operation, then reinstall the motor cover.

Brake & Switch

As the brake lining wears, the foot pedal develops more travel. If the brake band is not adjusted to compensate for normal wear, the limit switch will still turn the lathe off, but the spindle will not stop as quickly. It is especially important that the brake is kept properly adjusted so you can quickly stop the spindle in an emergency.

To adjust the brake and brake switch :

1. Disconnect Lathe from POWER !
2. Put on a respirator and eye protection to protect yourself from hazardous brake dust.
3. Remove the motor cover.
4. Measure the remaining brake band lining at the thinnest point, which is usually at the 8 o'clock position, as shown in Figure 93.

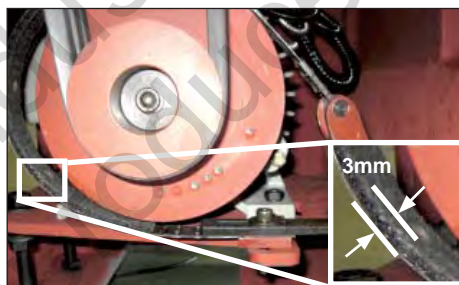


Figure 93. Minimum brake band lining thickness.

When the brake band is new, the lining is approximately 6mm thick. If the lining thickness wears to 3mm or less, the brake band must be replaced; otherwise, the rivets that secure the lining to the band will soon grind into the brake hub. If the hub becomes damaged, it must be replaced, which will substantially increase the cost of repair, compared to just replacing the brake band.

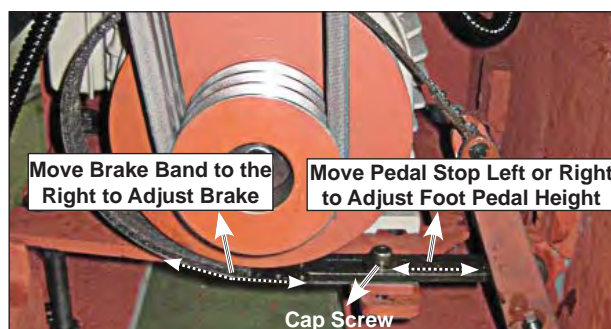


Figure 94. Brake linkage adjustments.

5. Remove pedal stop shown in Figure 94.
6. Move the brake band to the right one hole, and reinstall the pedal stop, tightening it until it is just snug.
7. Firmly push the pedal lever to the right until it stops and the brake band is fully clamped around the brake hub.
8. Tap the pedal stop into position so there is approximately a 25mm gap between the pedal lever and the stop.

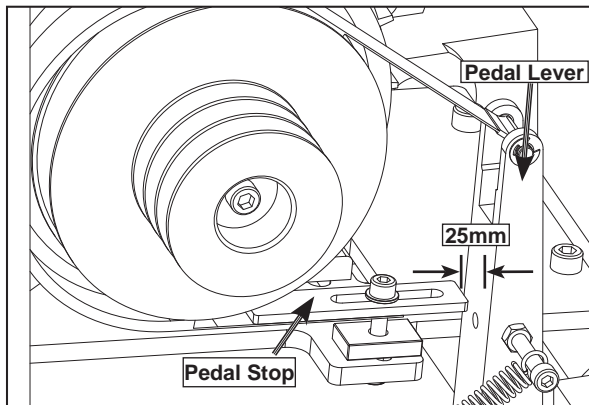


Figure 95. Pedal travel adjustment.

9. Tighten the cap screw on the pedal stop.
10. Locate the motor kill switch (Figure 96) at the tailstock end of the lathe.

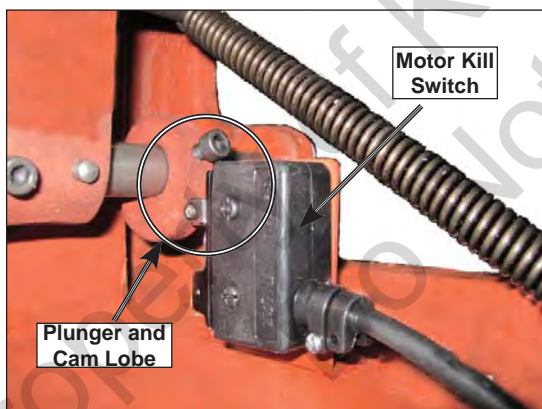
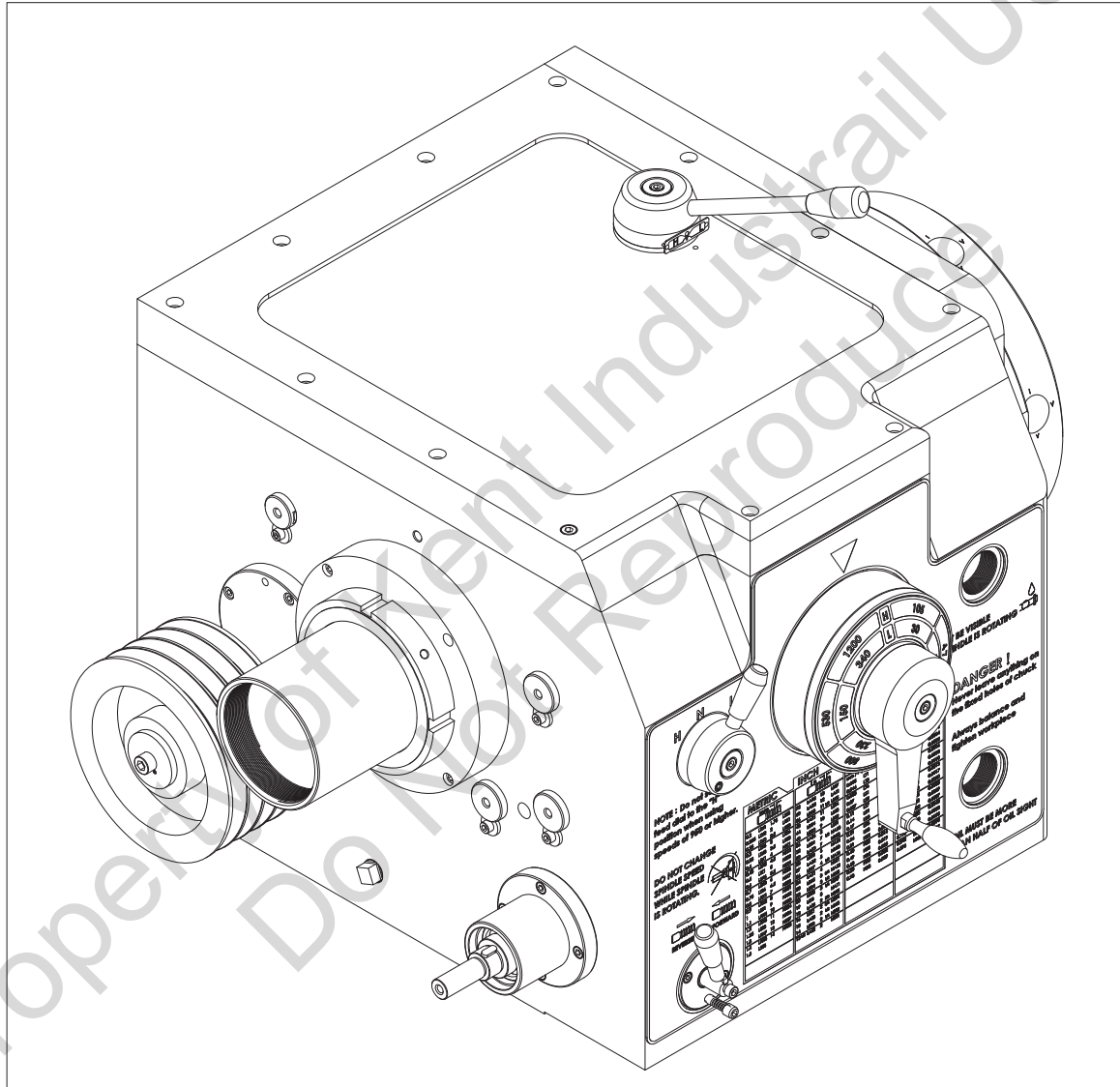
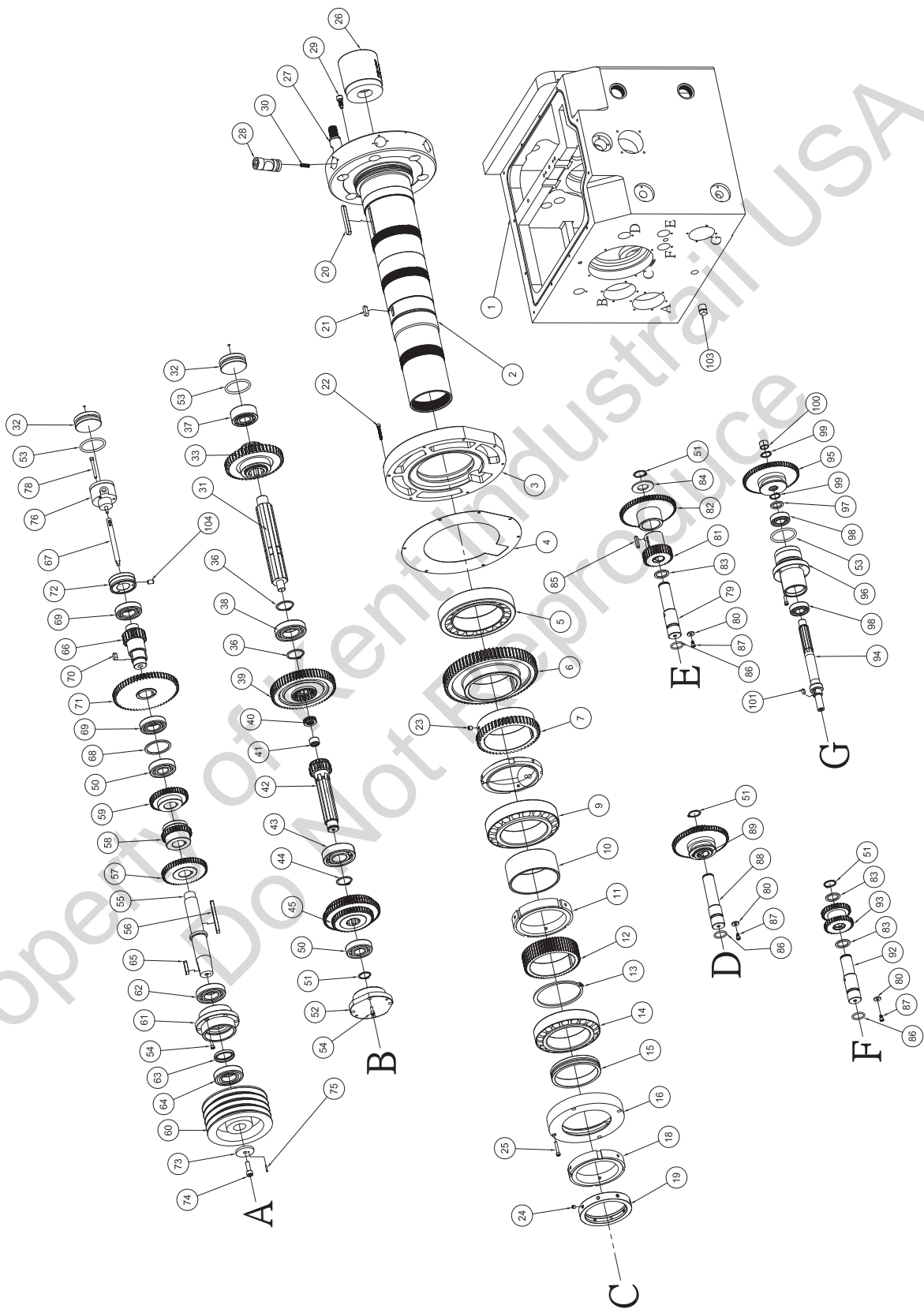


Figure 96. Motor kill switch.

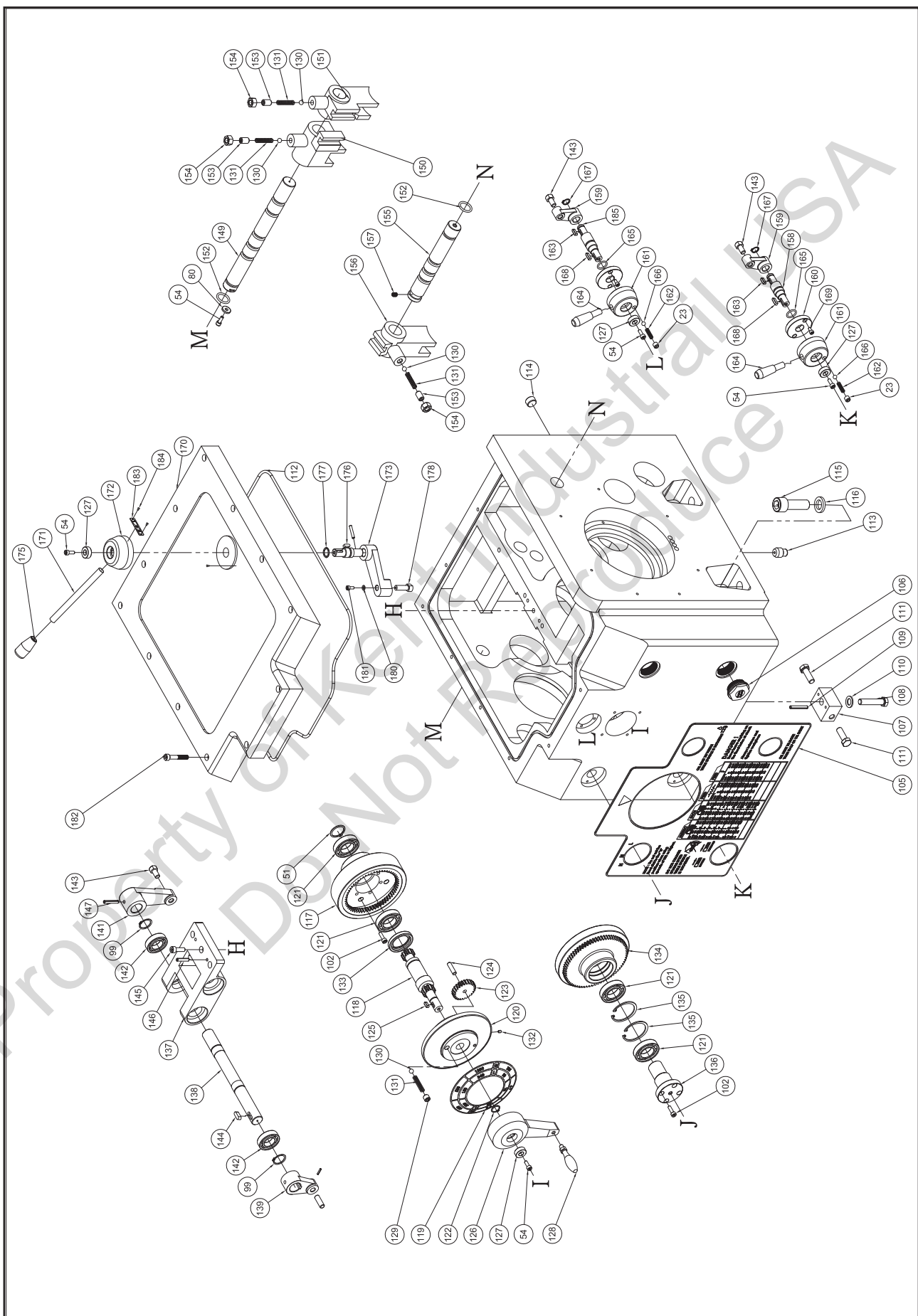
Headstock



Headstock



Headstock



Headstock

HEADSTOCK ASSEMBLY									
Page 1/3									
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	22-10001	Head stock	1		44		C-Type snap ring(external)	1	S40
	26-10001	Head stock	1		45	10019	Gear	1	43T
	30-10001	Head stock	1			10020	Gear	1	61T
2	10030-D11	Spindle	1			10021	Gear	1	52T
3	10031-D11	Front cover	1				Sunk key	2	10x8x30
4	10032	Front cover packing	1				C-Type snap ring(external)	1	S55
5		Taper roller bearing	1	32028	50		Deep groove ball bearing	2	6306
6	10033	Gear	1	72T	51		C-Type snap ring(external)	5	S30
7	10034	Gear	1	48T	52	10017	Axle cover for shaft B	1	
8	10035	Spindle nut	1		53		O ring	3	P62
9		Taper roller bearing	1	32026	54		Hex. cover head cap screw	18	M6x16
10	10036	Bearing washer	1		55	10002	Shaft A	1	
11	10037	Spindle nut	1		56		Sunk key	1	10x8x100
12	10038	Gear	1	60T	57	10006	Gear	1	48T
13		Snap ring(External)	1	S125	58	10007	Gear	1	31T
14		Taper roller bearing	1	32024	59	10008	Gear	1	40T
15	10041	Labyrinth ring	1		60	10003	Spindle box pulley	1	
16	10039	Back cover for spindle	1		61	10004	Bearing block for shaft A	1	
18	10042	Spindle nut	1		62		Deep groove ball bearing	1	6208
19	10203	Fixed ring	1		63		Oil seal	1	TC405508
20		Sunk key	2	12x8x90	64		Deep groove ball bearing	1	6208ZZ
21		Sunk key	1	10x8x30	65		Sunk key	1	10x8x40
22		Hex. cover head cap screw	7	M6x40	66	10010	Gear	1	
23		Hexagon socket set screw	4	M10x10	67	10013	Oil pump drive rod	1	
24		Hexagon socket set screw	4	M8x8	68	10009	Spacer ring	1	
25		Hex. cover head cap screw	4	M6x35	69		Deep groove ball bearing	2	6207
26	10044	Center cover	1		70		Sunk key	2	10x8x20
27	10092-D11	Cam lock lever	1		71	10011	Gear	1	60T
28	10091-D11	Eccentric locking pin	1		72	10012	Thrust sleeve for shaft A	1	
29	10047-1	Bolt	1		73	10002-C	Washer	1	
30	10080-1	Spring	1		74		Hex. cover head cap screw	1	M10x30
31	10022	Shaft D	1		75		Spring pin	1	ø3x18
32	10028	Shaft cover	2		76		Pump for spindle	1	
33	10026	Gear	1	19T	78		Hex. cover head cap screw	3	M6x55
	10027	Gear	1	44T	79	10052	Shaft E	1	
		Snap ring (External)	1	S60	80	10051	Spacer ring	4	
		Sunk key	2	14x9x30	81	10053	Gear	1	30T
36		C-Type snap ring(external)	2	S45	82	10054	Gear	1	60T
37		Double law deep groove ball bearing	1	4306	83	10055	Spacer ring	3	
38		Deep groove ball bearing	1	6209	84	10056	Spacer ring	1	
39	10023	Gear	1	60T	85		Sunk key	1	6x6x35
40		Thrust bearing	1	51104	86		O ring	3	P29
41		Needle bearing	1	HK2016	87		Hex. cover head cap screw	3	M6x10
42	10016	Gear	1		88	10048	Shaft D	1	
43		Deep groove ball bearing	1	6308					

Headstock

HEADSTOCK ASSEMBLY									
					Page 2/3				
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
89	10049	Gear	1	30T	133		Oil seal	1	T355508
	10050	Gear	1	60T	134	10162	Cam	1	
		C-Type snap ring(external)	1	S50	135		C-Type snap ring(Internal)	2	R55
		Sunk key	1	6x6x35	136	10161	Shaft J	1	
92	10057-1	Shaft F	1		137	10183	Bearing block for shaft Q&R	1	
93	10058	Gear	1	30T	138	10182	Shaft Q&R	2	
94	10059	Timing pulley for shaft G	1		139	10184	Cam shifting arm for shaft Q&R	2	
95	10060	Gear	1	60T		10185	Pin	2	ø10x30
96	10061	Bearing block for shaft C	1				Spring pin	2	ø3x16
97	10062	Spacer ring	1		141	10187	Cam shifting arm for shaft Q&R	2	
98		Deep groove ball bearing	2	6205	142		Deep groove ball bearing	4	6005
99		C-Type snap ring(external)	6	S25	143	10071	Feed shifting block	2	
100		Dry bearing	1	DU202315	144		Sunk key	2	7x7x20
101		Sunk key	1	6x6x15	145		Hex. cover head cap screw	3	M8x25
102		Hex. cover head cap screw	12	M6x20	146		Spring pin	2	ø6x30
103		Oil plug	1	PT1/2	147		Spring pin	2	ø6x36
104		Hex. socket set screw	1	M10x16	149	10171	Shaft M	1	
105	10117	Spindle box name plate	1		150	10172	Rear shifting yoke	1	
106		Oil mirror	2		151	10173	Mid shifting yoke	1	
107	10121	Governing part	1		152		O ring	2	P24
108		Hexagon head bolt	1	M12x60	153		Hex. socket set screw	3	M12x20
109		Spring pin	2	ø6x45	154		Hexagon nut	3	M12
110		Washer	1	M12	155	10175	Shaft N	1	
111		Hexagon head bolt	1	M12x35	156	10176	Front shifting yoke	1	
112		Spindle O ring	1	ø5x1775	157		Hex. socket set screw	1	M8x10
113	10120	Special pin	1		158	10072	Shaft K	1	
114		Oil plug	1	PT1/2	159	10070	Feed shifting arm	2	
115		Hex. cover head cap screw	2	M20x60	160	10073	L-axis collar	2	
116	10005	Washer	2		161	10074	Feed handle block	2	
117	10153	Bearing block for shaft I	1		162	10075	Compressing spring	2	14-20028共用
118	10151	Shaft I	1		163		Sunk key	4	5x5x16
119	10088-1	Speed indicating plate	1		164	10200	Handle	2	
120	10154	Rocker disc for speed indicator	1		165		O ring	2	P18
121		Deep groove ball bearing	4	6006	166		Steel ball	2	8mm
122		C-Type snap ring(external)	1	S17	167		C-Type snap ring(external)	2	S14
123	10155	Gear	1	24T	168		Single Round Key	2	5x5x17
124	10154-C	Pin	1		169		Hex. cover head cap screw	4	M5x10
125		Sunk key	1	5x5x14	170	10081	Spindle box cover	1	
126	10157	Rocker arm for change speed	1		171	10191	Grip	1	
127	10159	Washer	4		172	10194	Handle block	1	
128	10160	Handle	1		173	10195	Displacements arm	1	
129		Hex. socket set screw	1	M12x12		10202	Mandrel	1	
130		Steel ball	4	9mm			Spring pin	1	ø5x28
131	10177	Compressing spring	4		175	10192	Handle	1	13-63030共用
132		Hex. socket set screw	1	M5x6	176		Sunk key	1	5x5x15

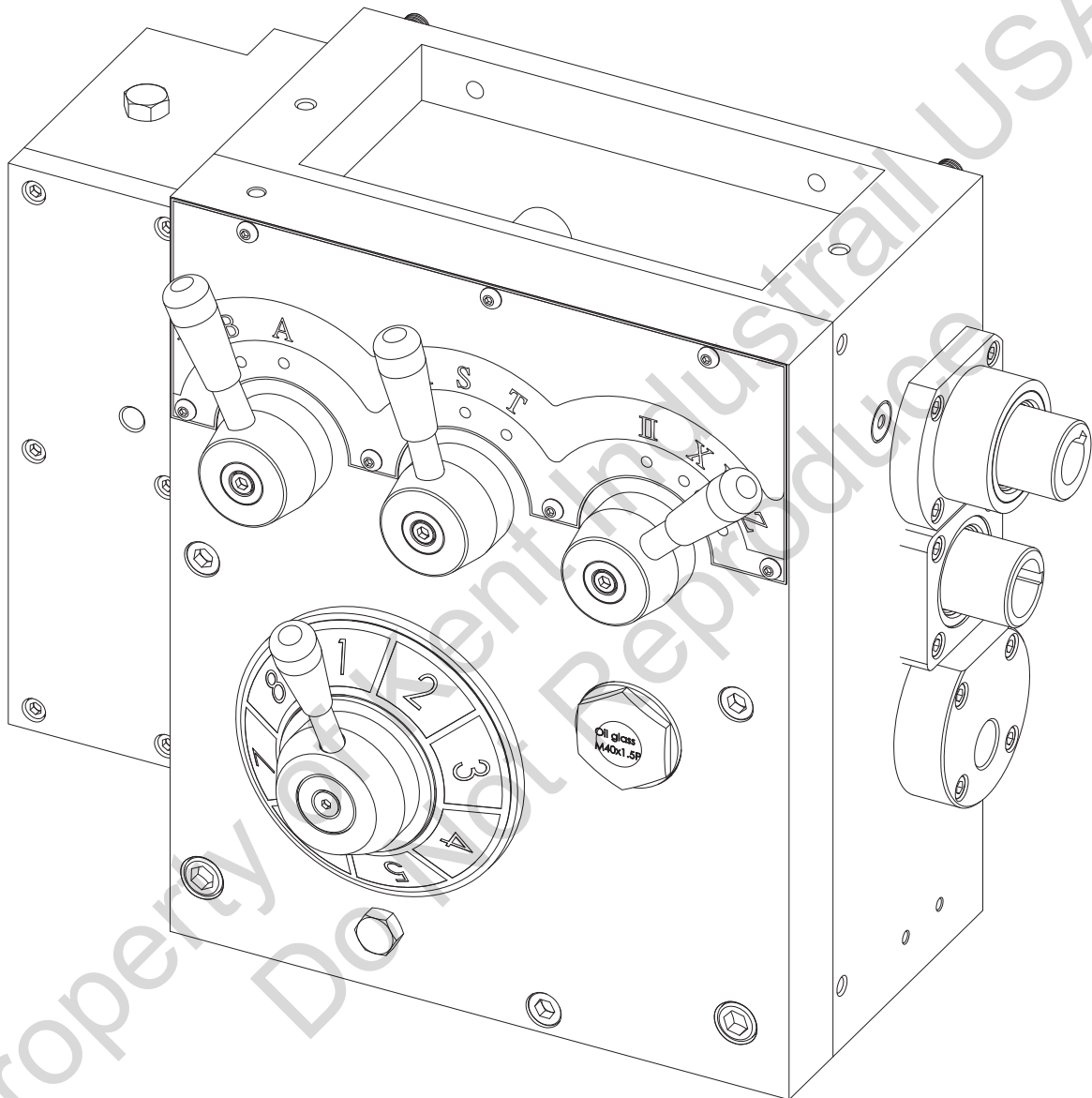
Headstock

HEADSTOCK ASSEMBLY

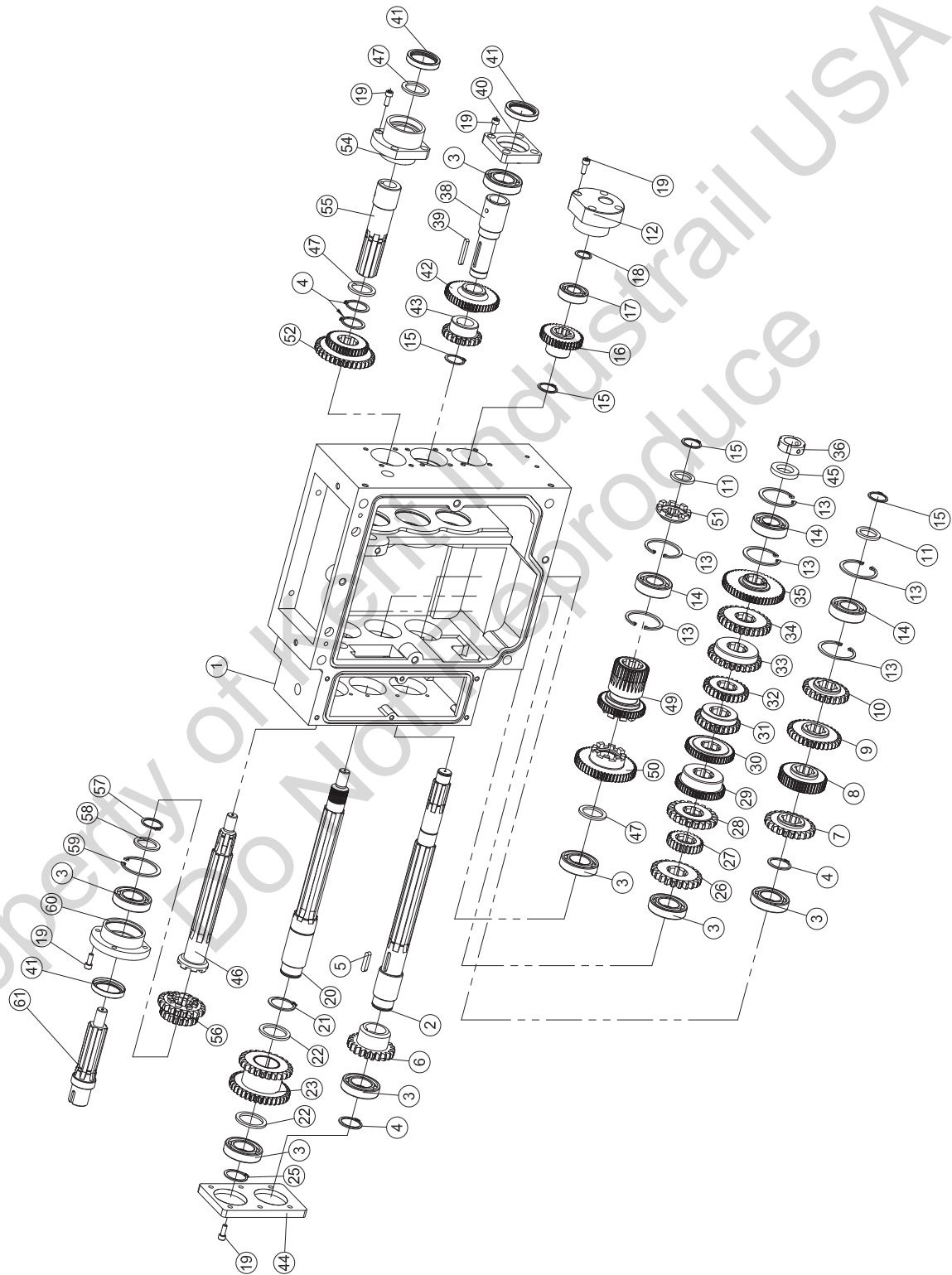
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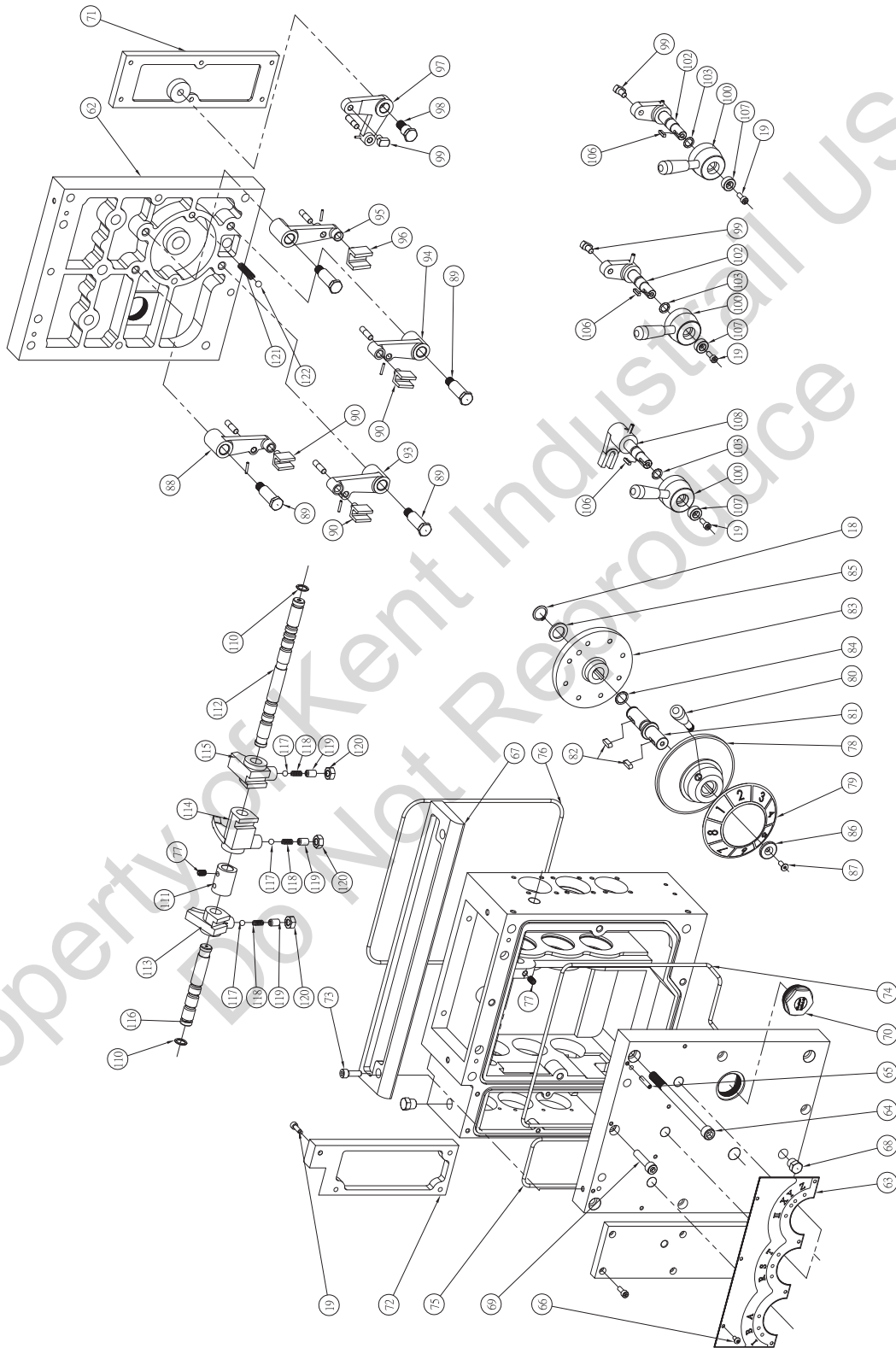
Gearbox



Gearbox



Gearbox



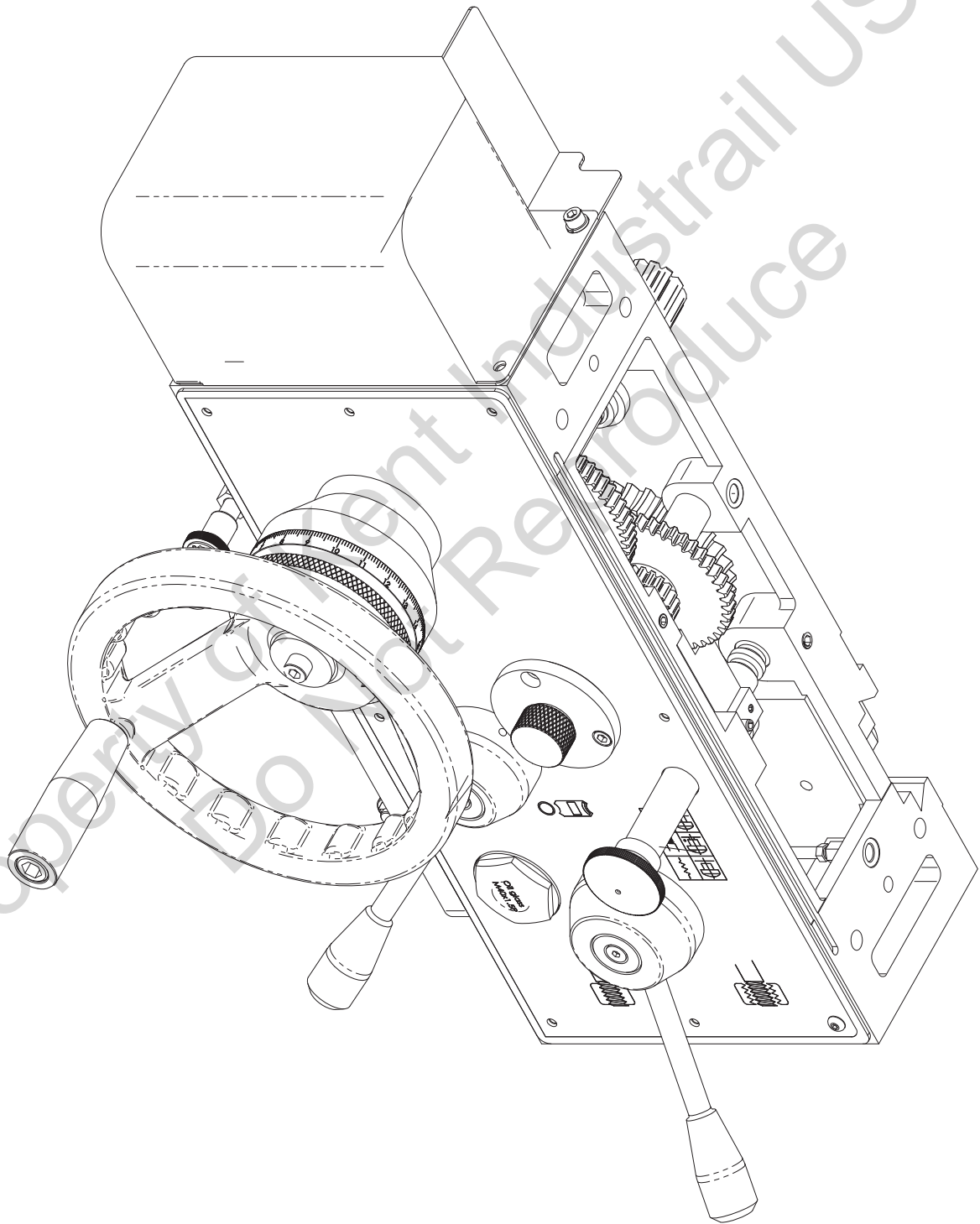
Gearbox

GEARBOX ASSEMBLY									
					Page 1/2				
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	30001	Gear box casting	1		46	30045	Shaft B	1	
2	30080	Shaft F	1				Dry bearing	1	U151715
3		Deep groove ball bearing	7	6006	47	30046	Washer	3	
4		C-Type snap ring (external)	4	S30	49	30048	B2 Gear	1	
5		Sunk key	1	6x6x30	50		Dry bearing	1	DU303430
6	30081	F1 Gear	1	22T		30047	B1 Gear	1	
7	30082	F2 Gear	1	22T	51	30052	Clutch	1	
8	30083	F3 Gear	1	44T	52	30058	C1 Gear	1	
9	30084	F4 Gear	1	33T	54		Dry bearing	2	DU303420
10	30085	F5 Gear	1	22T		30053	Axle cover for shaft A	1	
11	30051	Washer	2		55	30055	Shaft C	1	
12	30087	Axle cover for shaft C	1				Dry bearing	1	U151715
13		C-Type snap ring (internal)	6	R52	56	30044	A1 Gear	1	
14		Deep groove ball bearing	3	6205	57		C-Type snap ring (external)	1	S28
15		C-Type snap ring (external)	4	S25	58	30042	Washer	1	
16	30086	F6 Gear	1	36T	59		C-Type snap ring (internal)	1	R55
17		Deep groove ball bearing	1	6004	60	30038	Shaft cover	1	
18		C-Type snap ring (external)	2	S20	61	30040	Shaft A	1	
19		Hexagon socket head bolt	35	M6x16	62	30002	Gear box cover	1	
20	30061	Shaft D	1		63	30095	Gear box nameplate	1	
21		C-Type snap ring (external)	1	S35	64		Hexagon socket head bolt	4	M12x180
22	30062	Washer	2		65		Spring pin	2	ø6x30
23	30063	D1 Gear	1		66		Hexagon round head screw	7	M5 x 10
		Dry bearing	2	DU353920	67	30006-1	Upper cover	1	
25		C-Type snap ring (external)	1	S30	68		Pipe plug	2	PT3/8"
26	30064	D2 Gear	1		69		Hexagon socket head bolt	4	M10x45
27	30065	D3 Gear	1		70		Oil glass	1	
28	30066	D4 Gear	1		71	30089	Front cover	1	
29	30067	D5 Gear	1		72	30091	Gearbox rear cover	1	
30	30068	D6 Gear	1		73		Hexagon socket head bolt	2	M8 x 25
31	30069	D7 Gear	1		74		O ring	1	ø5x110
32	30070	D8 Gear	1		75		O ring	1	ø5x60
33	30071	D9 Gear	1		76		O ring	1	ø5x106
34	30072	D10 Gear	1		77		Hex. socket head set screw	2	M8x8
35	30073	D11 Gear	1		78	30008	Eight-step variable wheel	1	
36	30074-1	Lock nut	1		79	30009	Eight-step transmission plate	1	
38		Dry bearing	1	U151715	80	30008-1	Hand grip	1	
	30077	Shaft E	1		81	30004	Cam spindle	1	
39		Sunk key	1	5x5x40	82		Sunk key	2	6x6x20
40	30075	Axle cover for shaft B	1		83	30003	Cam	1	
41		Oil seal	3	TC354808	84		O ring	1	P16
42	30079	E2 Gear	1		85	30011	Washer	1	
43	30078	E1 Gear	1		86	30012	Washer	1	
44	30059	Left cover	1		87		Hex. socket flat head screw	1	M5x16
45	30074	Washer	1		88				

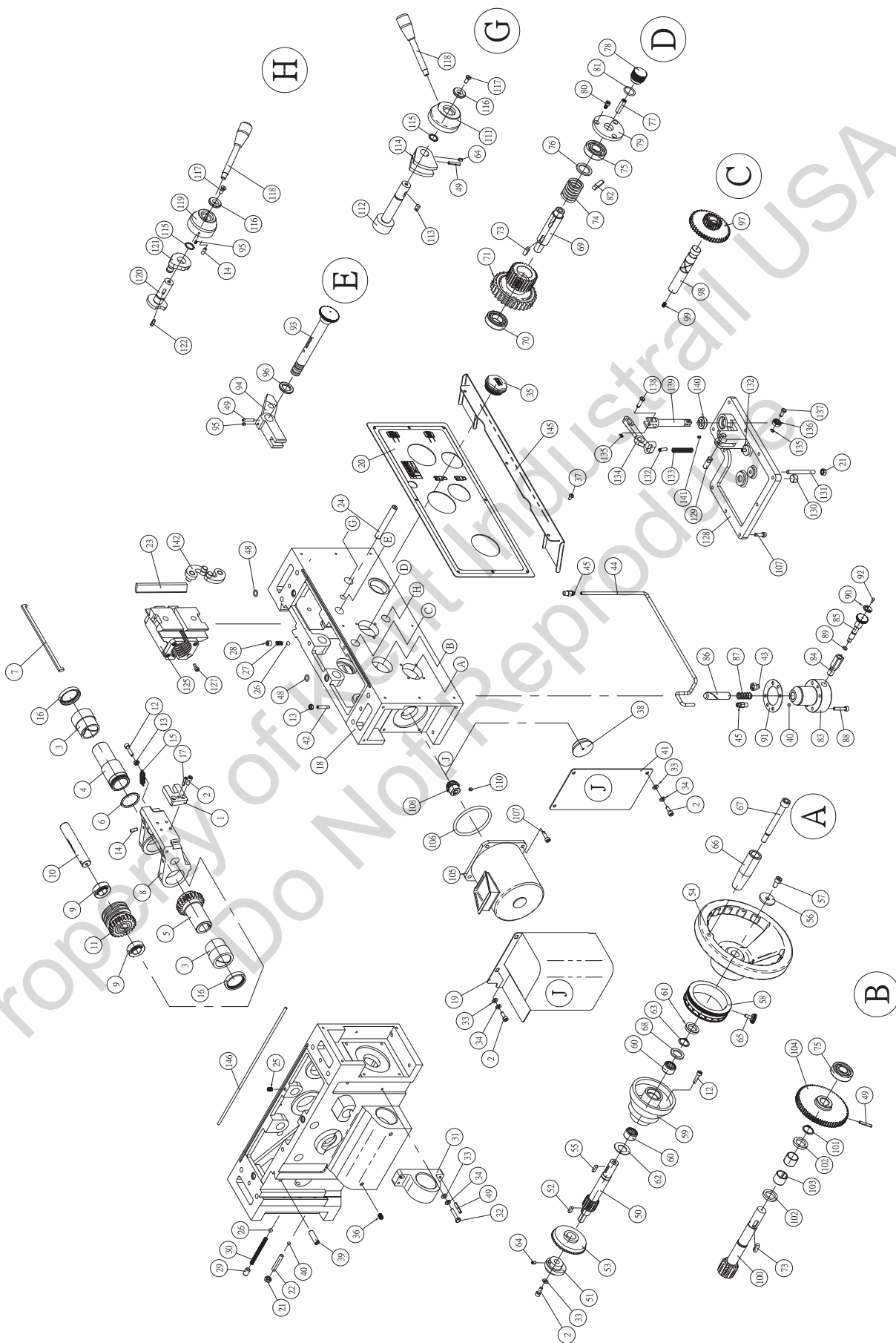
Gearbox

GEARBOX ASSEMBLY									
Page 2/2									
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
88	30016	Cam block	1						
	30023	pin	1						
		Spring pin	1	ø3x18					
89	30017	Positioning pin	4						
90	30019	Copper dial	3						
93	30013	Cam block	1						
	30023	pin	1						
		Spring pin	1	ø3x18					
94	30014	Cam block	1						
	30023	pin	1						
		Spring pin	1	ø3x18					
95	30015	Cam block	1						
	30023	pin	1						
		Spring pin	1	ø3x18					
96	30018	Copper dial	1						
97	30020	Shift block	1						
	30023	pin	1						
		Spring pin	1	ø3x18					
98	30028	Positioning pin	1						
99	30024	Shift pin	3						
100	30025	Handlebar	3	18-20021-J 共用					
	30030	Handle	3	18-20048-J 共用					
102	30021	Shift block	2						
	30027	Mandrel	2						
		Spring pin	2	ø5x28					
103		O ring	3	P12					
106		Sunk key	3	4x4x16					
107	30029	Washer	3	17-10045 共用					
108	30022	Toggle block	1						
	30026	Mandrel	1						
		Spring pin	1	ø5x28					
110		O ring	2	P14					
114	30037	Coupling	1						
112	30035	Detent rod (Long)	1						
113	30031	Shift block	1						
114	30032	Shift block	1						
115	30033	Shift block	1						
116	30034	Detent rod	1						
117		Steel ball	3	ø5/16"					
118	30100	Compressing spring	3	ø7.5xø1.2x20					
119		Hexagon round head screw	3	M10 x 16					
120		Hexagon nut	3	M10					
121	30099	Compressed spring	1						
122		Steel ball	1	9mm					

Apron



Apron



Apron

APRON(L.H) ASSEMBLY

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NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	40038	Plate	1		42		Hex. socket set screw	1	M6 x 30
2		Hex. cover head cap screw	6	M6 x 16	43		Copper joint oil suction net	1	1/8" PT-14H-155L
3	40046	Bush	2		44		Aluminum tube	2	Ø6 x 580
4	40044	Bush	1		45		Copper head		1/8 x Ø 6
5	40043	Gear	1	22T	48		O ring	2	P10A
6		O ring	1	P36	49		Spring pin	5	Ø5 x 28
7	40045	Sunk key	1		50	40003	Gear Shaft	1	
8	40039	Worm box	1		51	40010	Cam	1	
9		thrust bearing	2	2904	52		Single round key	1	5x5x15
10	40040	Shaft	1		53	40095	Bevel gear	1	45T
11	40041	Worm	1		54	40005	Hand wheel	1	
12		Hex. cover head cap screw	6	M6 x 25	55		Sunk key	1	5x5x18
13		Hexagon nut	3	M6	56	40006	Bolt	1	
14		Hex. socket set screw	4	M6 x 16	57		Hex. cover head cap screw	1	M8 x 16
15	40047	Spring	2		58	40007-M	Index ring	1	
16		Oil seal	2	TC364708		40007-1			
17		Spring pin	1	Ø5 x 22	59	40009	Handaheel bracket	1	
18	40001-L	Apron	1		60		Needle bearing	2	HK2016
	40001-R				61		Oil seal	1	TC203005
	40097-L				62		Self-lube gasket	1	ALFW-2015
19	40097-R	Motor cover	1		63		C-Type Snap ring (external)	1	S20
	40002-L				64		Hex. socket set screw	2	M6 x 8
20	40002-R	Name plate	1		65	40008	Set screw	1	
21		Hexagon nut	4	M8 x 1.25	66	40016	Handle	1	THL-15-40011
22		Hex. socket set screw	3	M8 x 45	67	40017	Screw	1	THL-15-40012
23	40071	Adjust plate	1		68	40019	Washer	1	
24	40012	Guide rod	1		69	40023	Worm shaft	1	
25		Hex. socket set screw	1	M8 x 10	70		Deep groove ball bearing	1	6005Z
26		Steel ball	2	5/16"	71	40030	Worm gear	1	
27	40053	Spring	1			40029	Toothed clutch	1	
28		Hex. socket set screw	1	M10 x 10	73		Sunk key	2	7x7x20
29		Hex. socket set screw	1	M10 x 16	74	40028	Compressing spring	1	
30	40075	Spring	1	ML-17-10083	75		Deep groove ball bearing	2	6204Z
31	40070	Screw bracket	1		76	40027	Collar	1	
32		Hexagon head screw	2	M6 x 30	77		Hex. socket set screw	1	M10 x 35
33		Washer	6	M6	78	40024	Cover	1	
34		Lock washer	5	M6	79	40025	Bearing cap	1	
35		oil sight	1	M40x1.5P	80		Hex. cover head cap screw	3	M6 x 10
36		Hex. cover head cap screw	2	M8 x 12	81		O ring	1	P21
37		Hex. roundhead bolt	8	M5 x 10	82		Sunk key	1	7x7x40
38	40004	Oil cover	1		83	40083	Manual shaft seat	1	
39	40078	Pin	1		84	40084	Into the oil seat	1	
40		Steel ball	4	1/4"	85	40085	Adjustment bolt button	1	
41	61019	Dust board	1		86	40080	Manual piston	1	

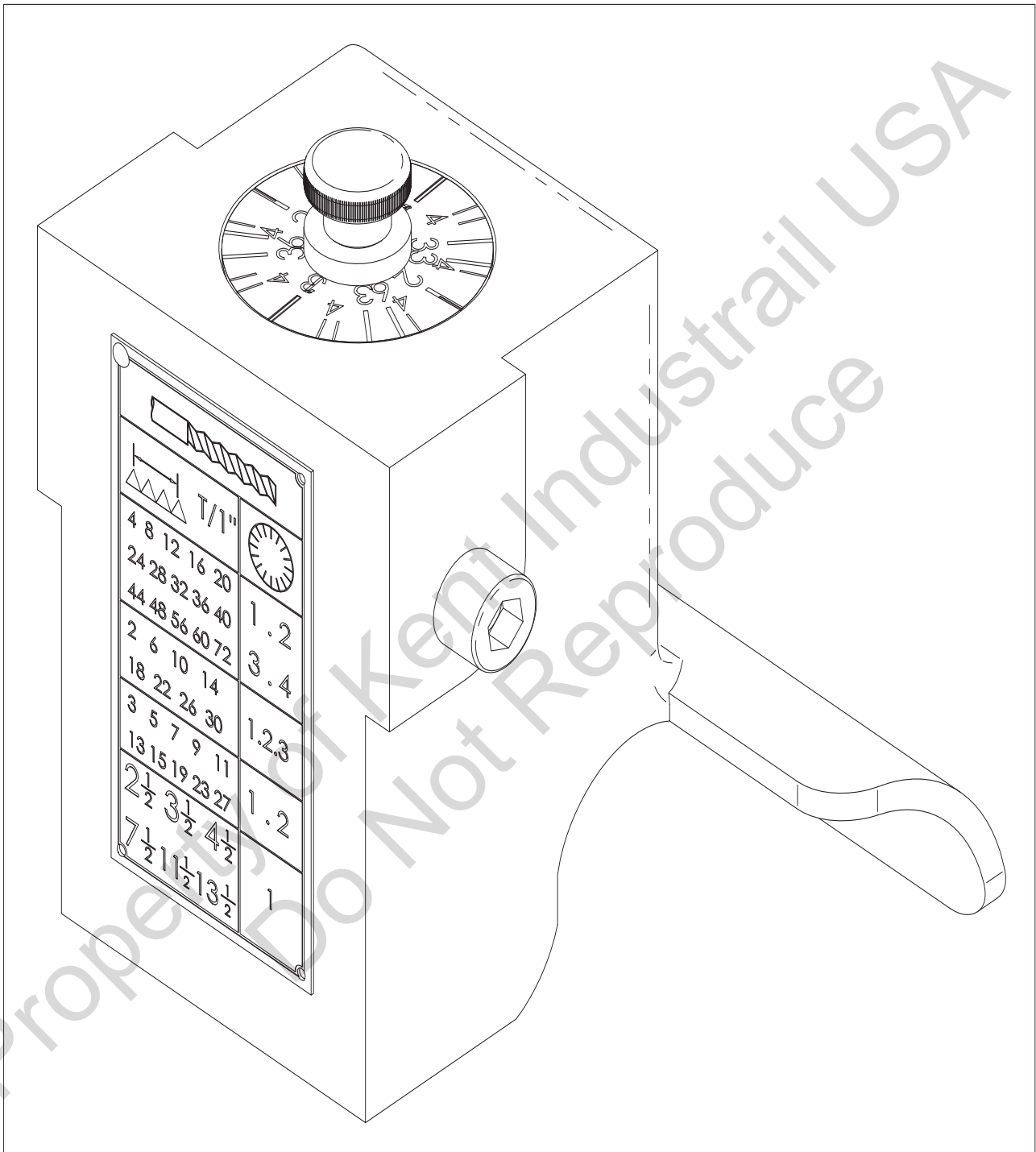
Apron

APRON(L.H) ASSEMBLY

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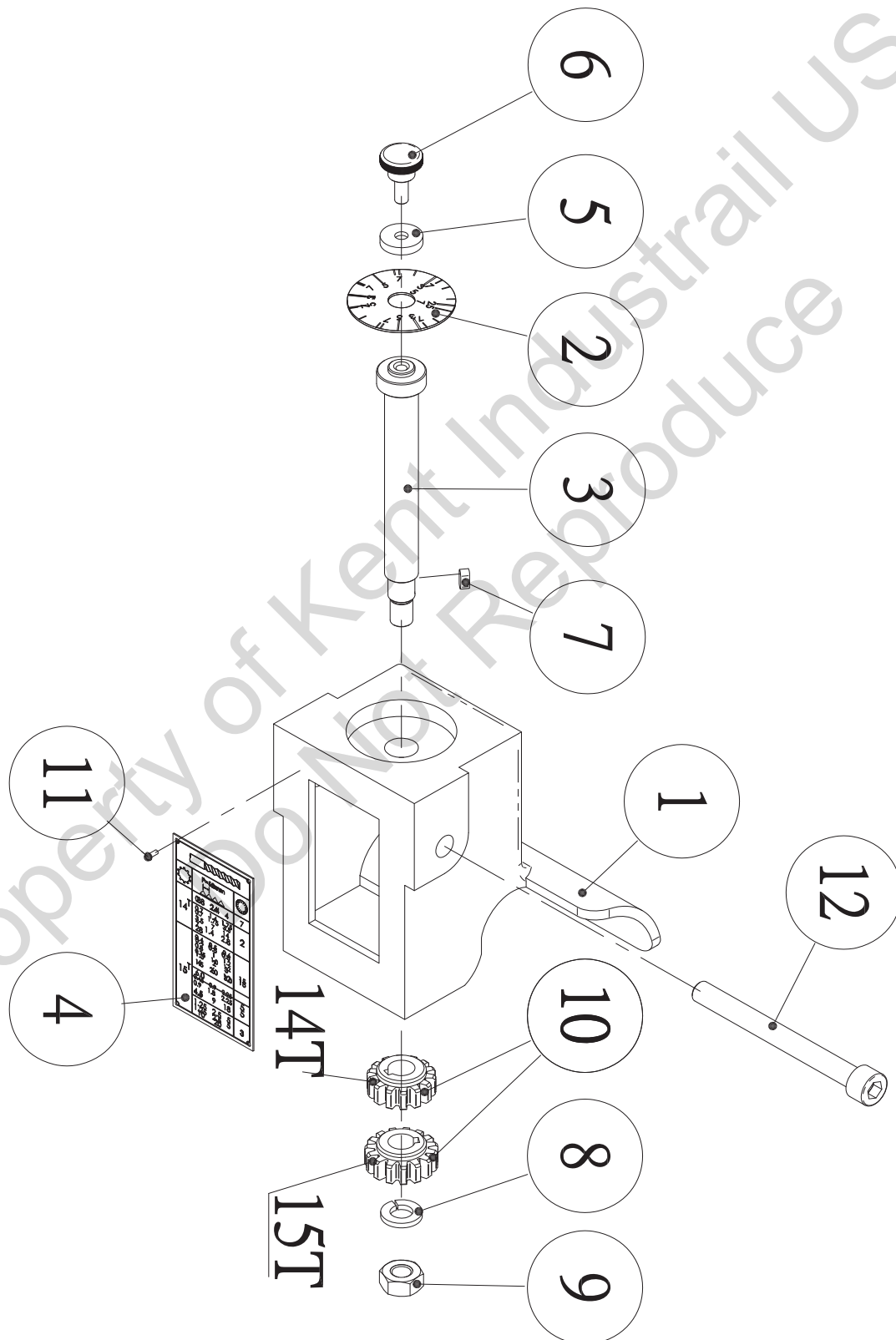
NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
87	40081	Piston compression spring	1		129	40018	pin	1	
88		Hex. cover head cap screw	4	M6 x 30	130	40048-L	Plunger	1	PT 3/8x0.38
89		O ring	1	P7	131	40048-R	Hex. socket set screw	1	M8 x 70
90	40086	Nameplate	1		132		spring pin	2	Ø6 x20
91	40087-P	Seal	1		133	40049	Compressing spring	1	
92		Rivet	1	Ø2.8 x120	134	40048-L	Trip rod	1	
93	40054	Positioning axis	1			40048-R			
94	40057	Gear shaft shifter	1		135		E-Type snap ring (external)	2	E4
95		Hex. socket set screw	2	M5 x 6	136		Deep groove ball bearing	1	626ZZ
96	40077	Spacer	1		137	40052	Pin	1	
97	40021	Gear	1	(21T-44T)	138	40051	Pin	1	
98	40020	Shift gear shaft	1		139	40050	Crankshaft	1	
99		Hex. socket set screw	1	M6 x 10	140		Oil seal	1	TC152507
100	40011-M	Gear	1		141		Hex. socket set screw	2	M5 x 5
	40011-I					40066	Connection board	2	
101		C-Type Snap ring (external)	1	S22	142	40067	Pin	2	
102	40014	Collar	2			40065	Pin	2	
103		Dry bearing	2	DU222520	145	40076	Water tray	1	
104	40013	Gear	1	(66T)	146		O-ring	1	35cm
105		Apron motor	1	1/5HPx8P					
106		O ring	1	G80					
107		Hex. socket set screw	14	M6 x 20					
108	40096	Bevel gear	1	(15T)					
110		Hex. socket set screw	1	M6 x 6					
111	40060-L	Grip seat	1						
	40060-R								
112	40059	Cam shaft	1						
113		Sunk key	1	6x6x15					
114	40064	Rocking block	1						
115		O ring	2	P16					
116	40015	Washer	2	CH-22-30012					
117		Hex.socket flat head cap screw	2	M6 x 16					
118	40035	Handle	2						
119	40033	Lead nut lever	1						
120	40032-L	Operating shaft	1						
	40032-R								
121	40037	Crank plate	1						
122		Sunk key	1	5x5x16					
125	40068	Slide plate	1						
	40069-M	Half nut	1						
	40069-I								
127		Hex. cover head cap screw	8	M5 x 12					
128	40074-L	Plate	1						
	40074-R								

Dail Indicator



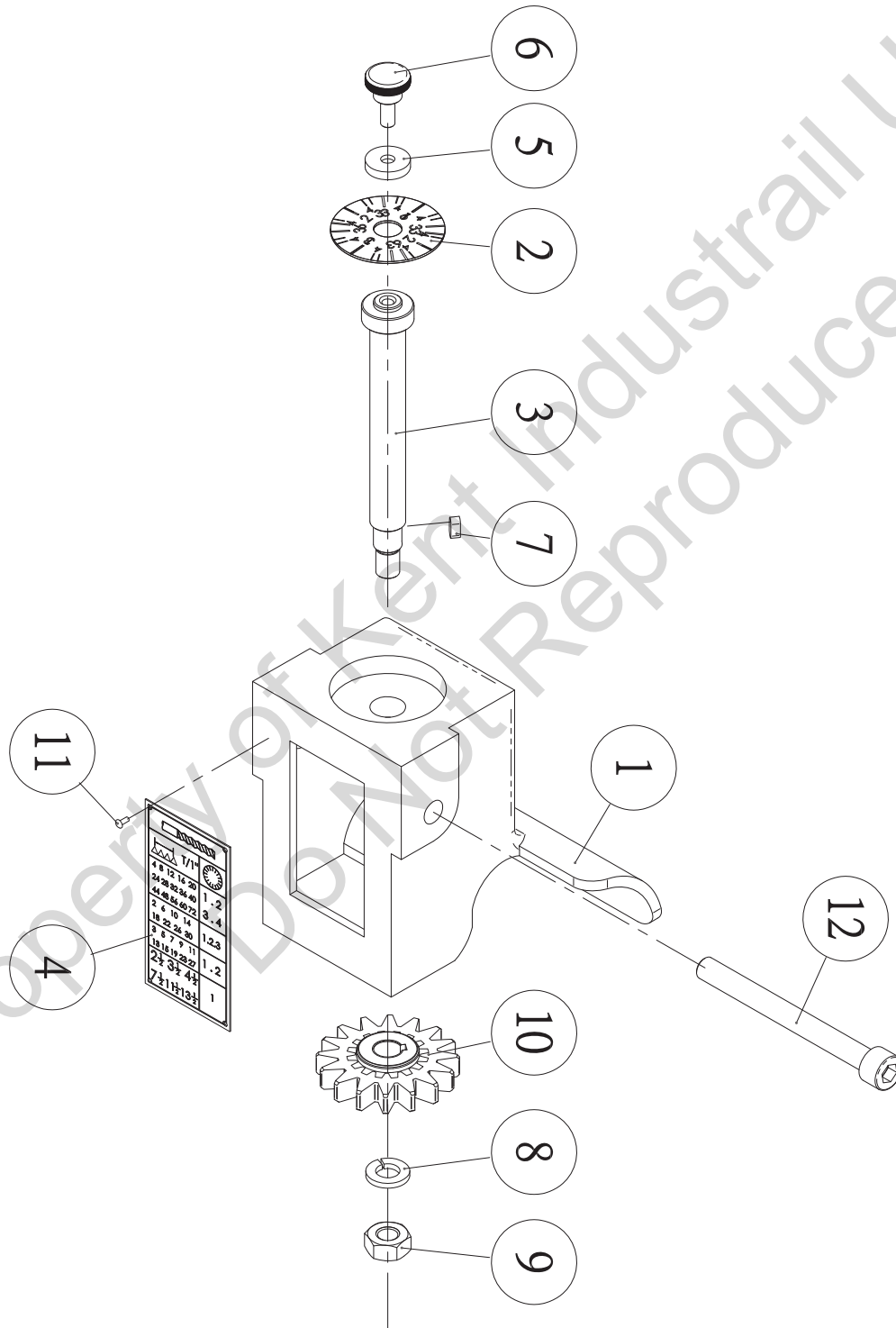
Dial Indicator METRIC

METRIC (LEADSCREW PITCH 6)



Dial Indicator IMPERIAL

IMPERIAL (LEADSCREW 4 T.P.I.)



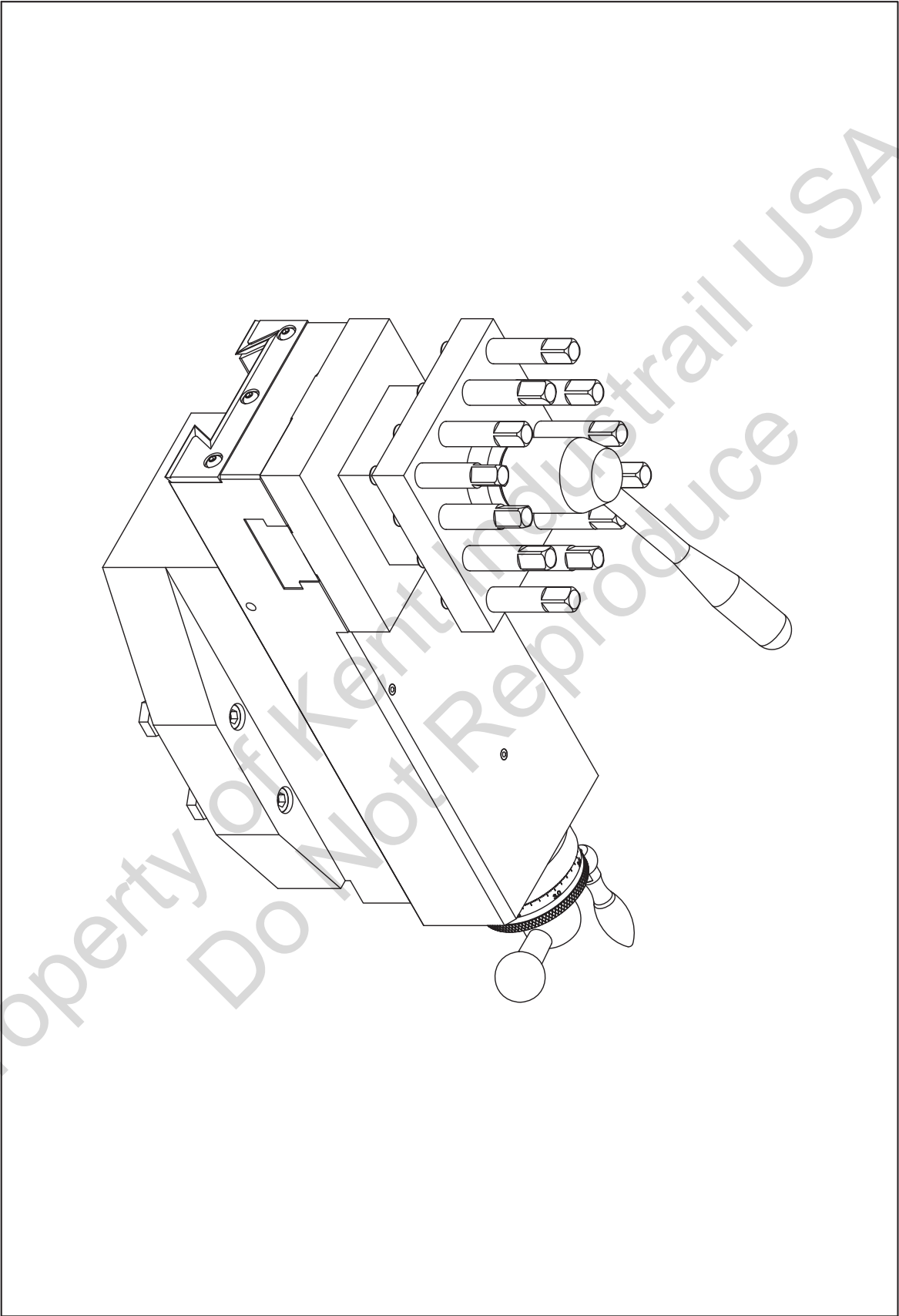
Dail Indicator

DIAL INDICATOR ASSEMBLY

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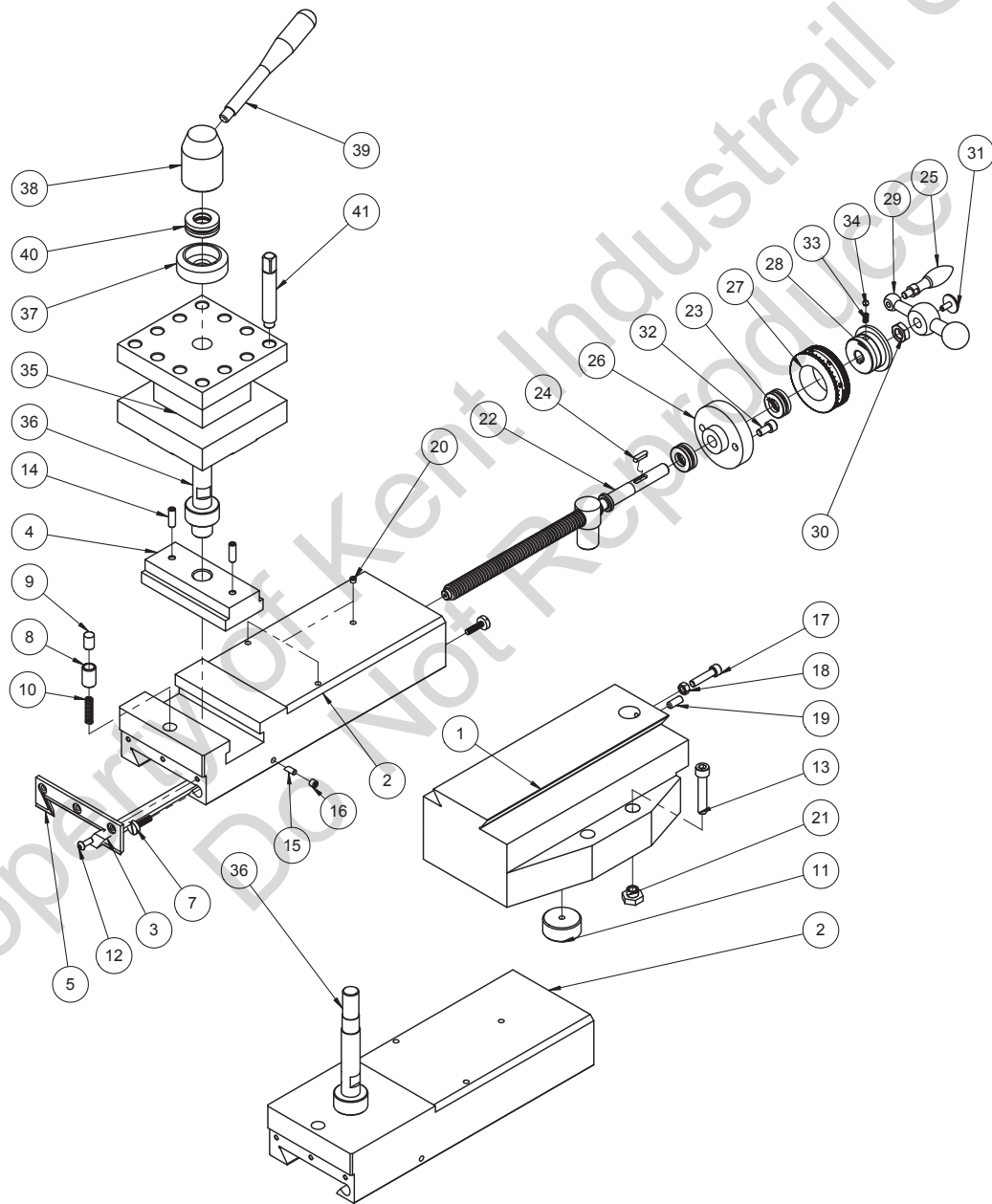
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Compound Rest & Tool Post



Compound Rest & Tool Post

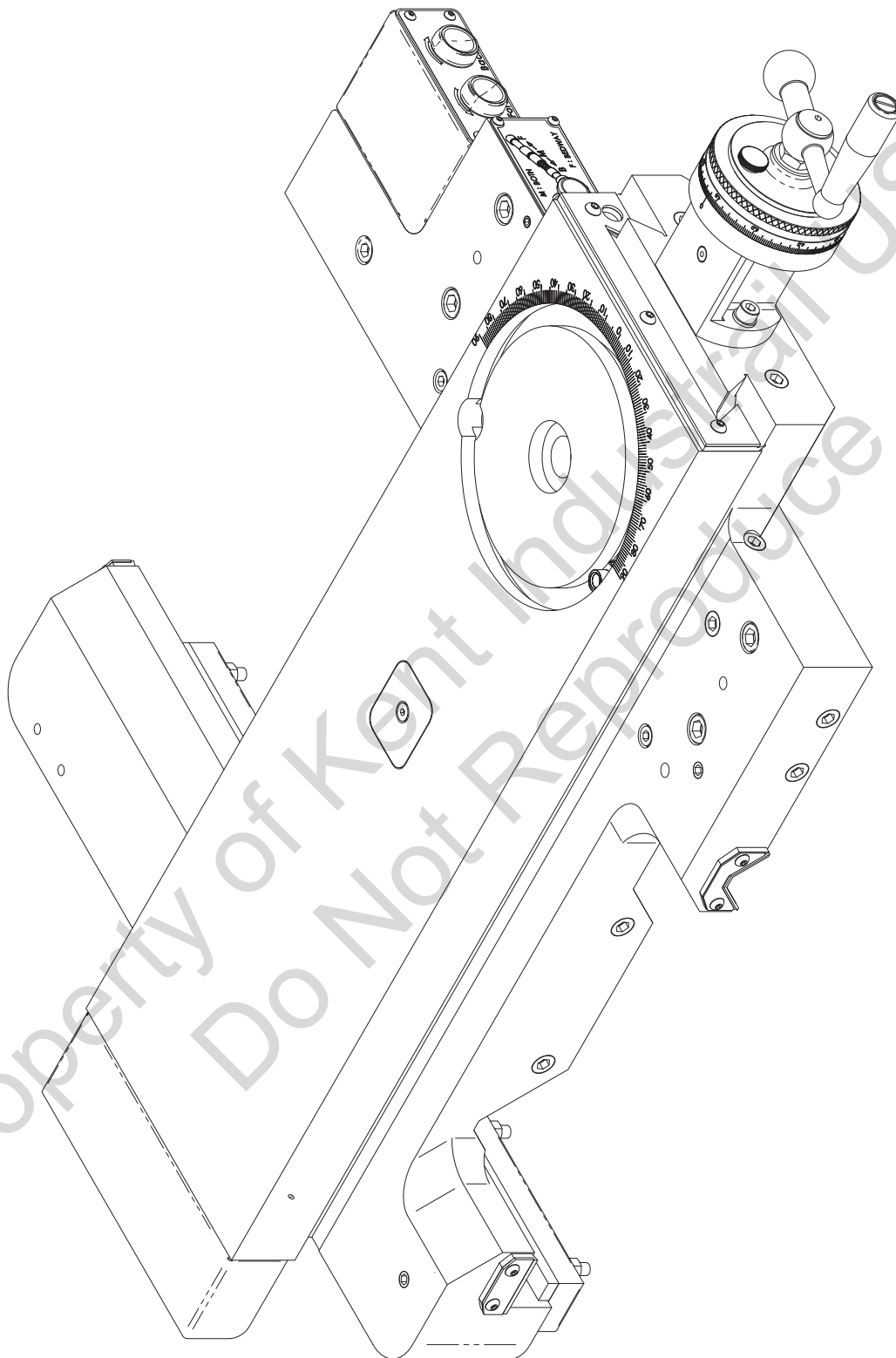
Compound Rest & Tool post



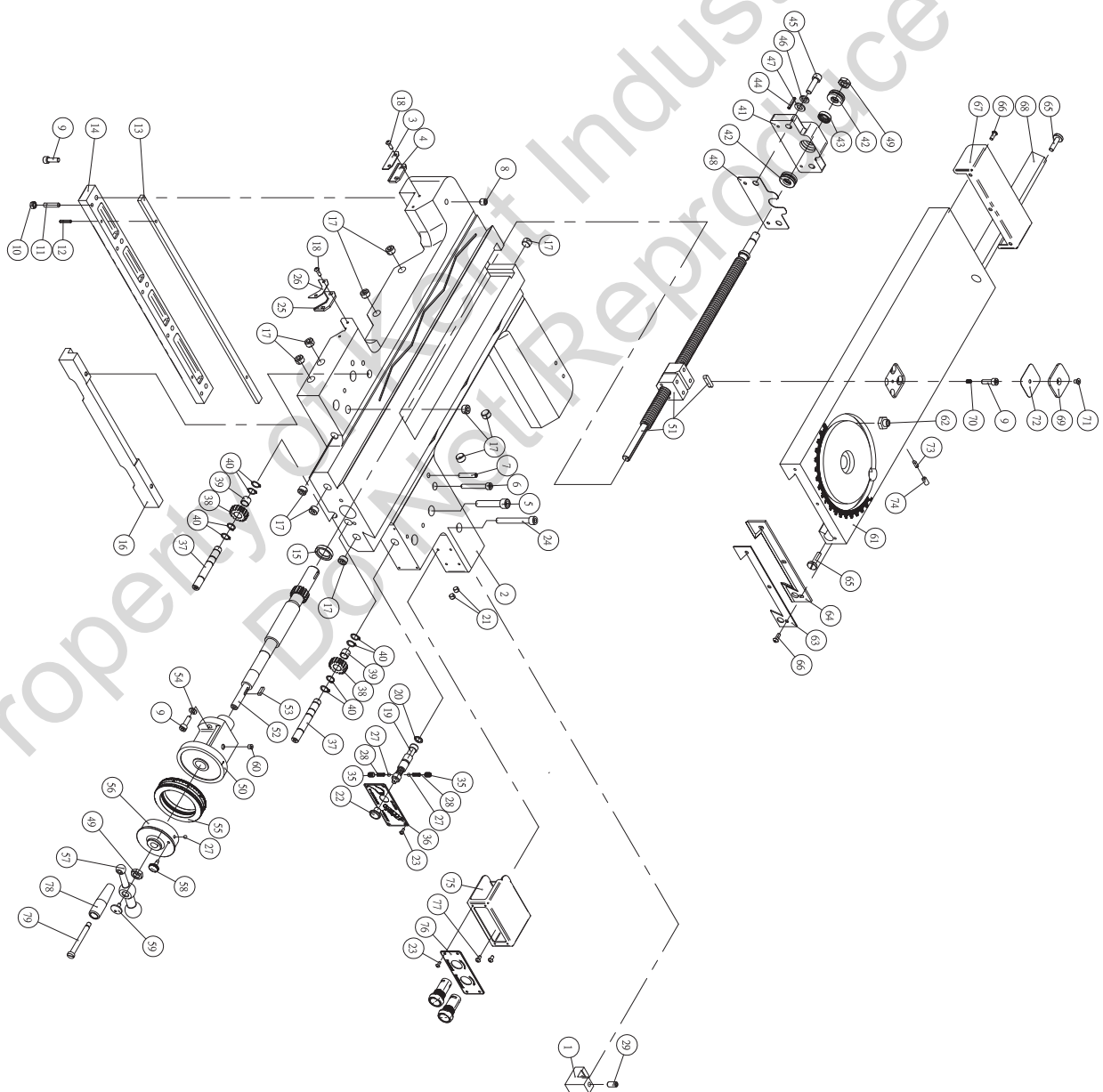
Compound Rest & Tool Post

Compound Rest & Tool post									
					Page 1/1				
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	22-50040	Compound table	1		41	50047	Square head bolt	12	
	26-50040	Compound table	1						
2	50041-SP	Compound sliding	1						
	50041	Compound sliding	1						
3	50042	Wedge	1						
4	50061	T-block	1						
5	50079	Dust proof gasket plate cover	1						
7	50063	Adjusting screw	2						
8	50059	Bushing	1						
9	50049	Tacking pin	1						
10	50074	Spring	1						
11	50064	Fixed block	1						
12		Button head socket cap screw	3	M6x12					
13		Hex. cover head cap screw	4	M10x55					
14		Hex. socket set screw	2	M8x25					
15	50081	Oblique copper pillar	1						
16		Hex. socket set screw	1	M8x8					
17		Hex. cover head cap screw	1	M8x35					
18		hexagonal nut	1	M8					
19		Hex. socket set screw	1	M8x20					
20		Oil beads	3	1/4"					
21	50057	Nut for horizontal slide	4						
22	50051-M	Lead screw	1						
	50050-M	Nut	1						
	50051-I	Lead screw	1						
	50050-I	Nut	1						
23		Thrust bearing	2	51202					
24		Sunk key	1	5x5x20					
25	50006	Grip	1						
26	50052	Bearing block	1						
27	50053-M	Graduated micro collar	1						
	50053-I	Graduated micro collar	1						
28	50054	Graduated micro collar bushing	1						
29	50056	Hand grip	1						
30		hexagonal nut	1	M14x1.5					
31	50008	Hand grip set screw	1						
32		Hex. cover head cap screw	2	M8x16					
33	50075	Spring	1						
34		Steel ball	1	1/4"					
35	50043	Clamp tool rest	1						
36	50048	Tool rest spindle	1						
37	50044	Washer	1						
38	50045	Clamp tool rest handle bar seat	1						
39	50046	Clamp tool rest handle bar	1						
40		Thrust bearing	1	51204					

Saddles

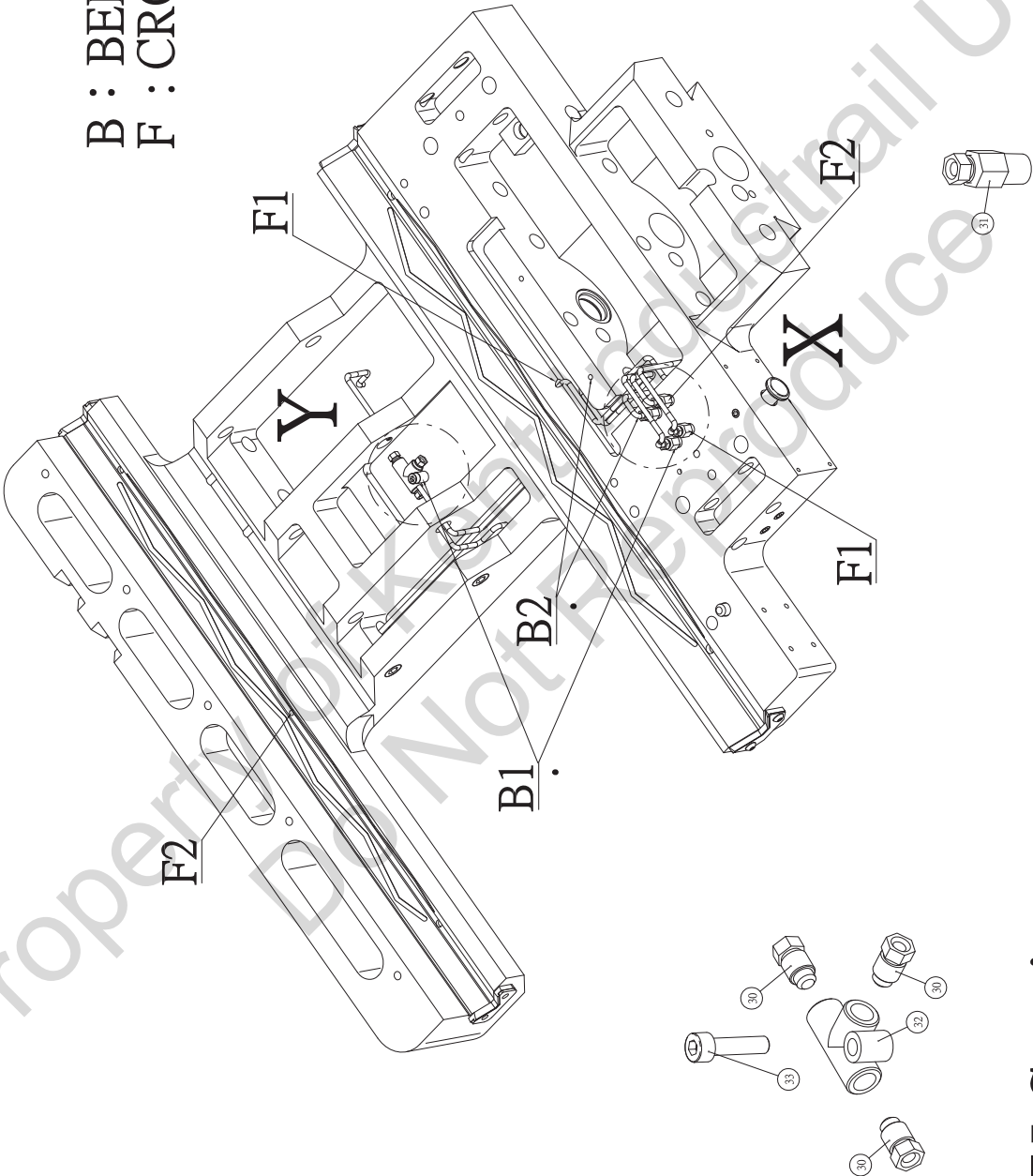


Saddles



Saddles

B : BEDWAY
F : CROSS SLIDE



X Section

Y Section

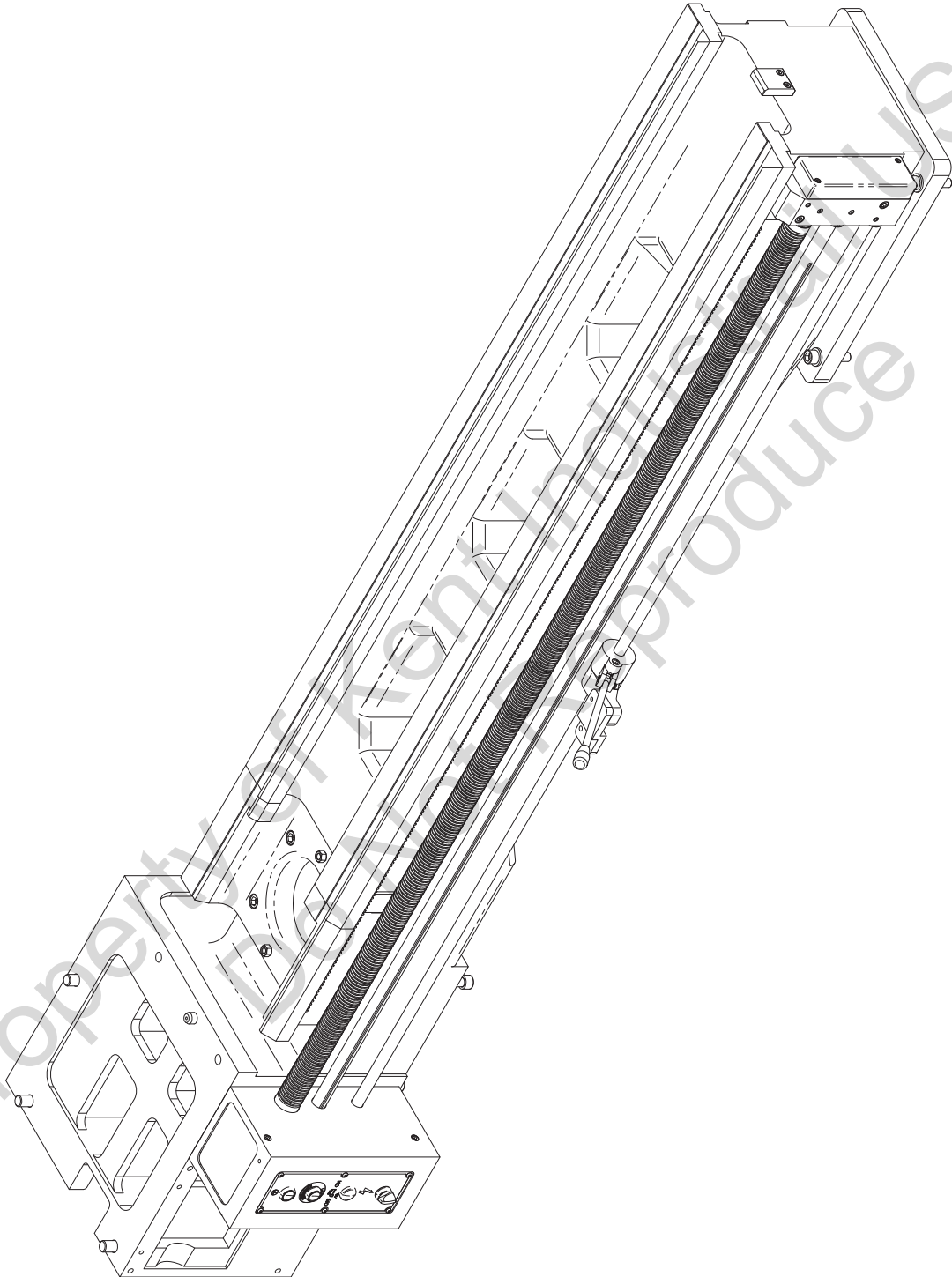
Saddles

SADDLES ASSEMBLY

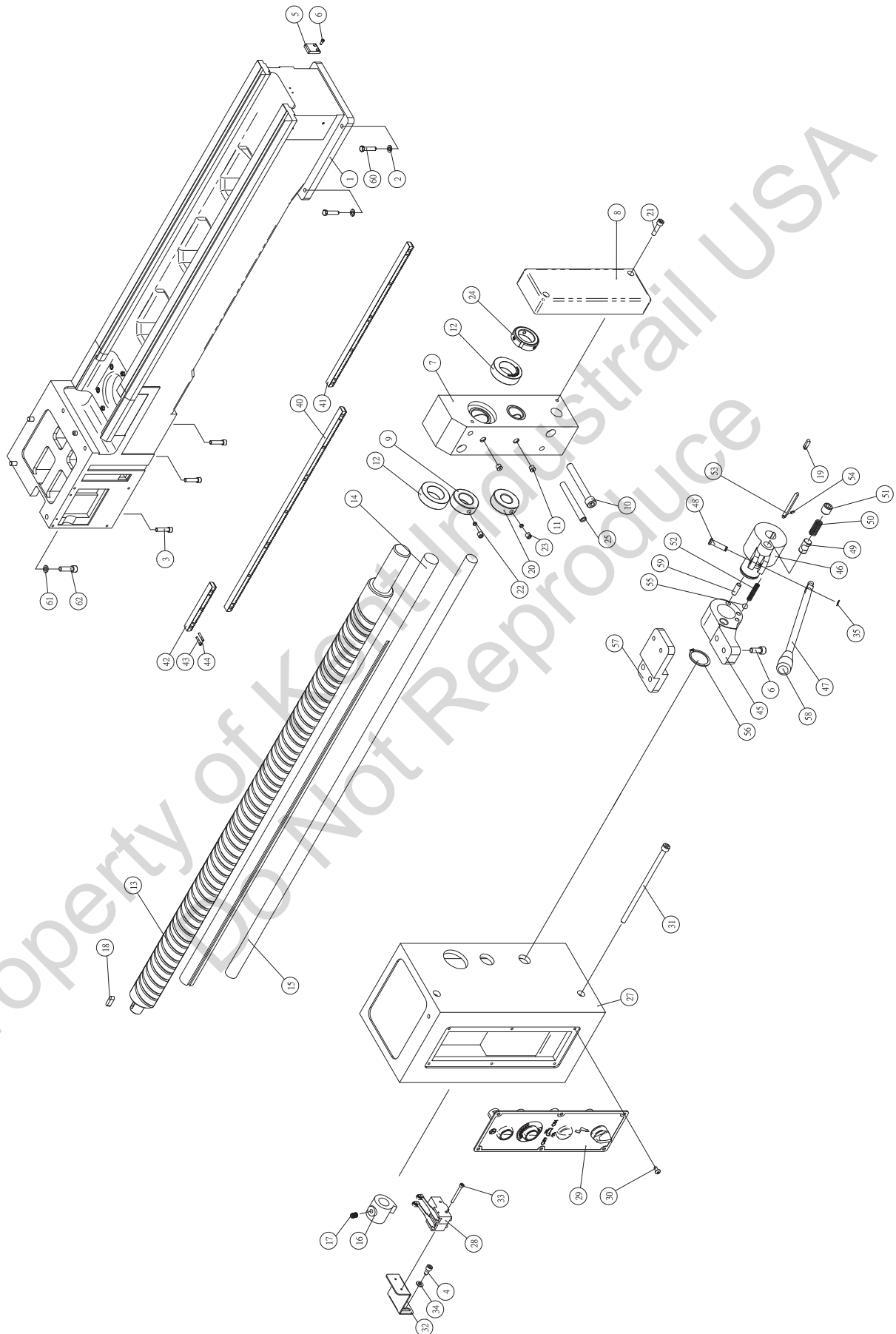
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NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	50025	Stopper	1		43		Oil seal	1	TC152507
2	50001	Saddle	1		44		Spring pin	2	ψ5 x 28
	50001-T	Saddle			45		Hex. cover head cap screw	2	M10 x 35
3	50032	Plate	2	PHL-18-50048	46		Lock washer	2	M10
	50070	Plate		TRL-13-50049	47		Washer	2	M10
4	50034	Wiper	2	PHL-18-50047	48	50013-P	Packing	1	
	50071	Wiper		TRL-13-50048	49		Hexagon nut	2	M14x 1.5
5		Hex. cover head cap screw	4	M12 x 60	50	50009-M	Front bracket	1	
6		Hex. cover head cap screw	2	M8 x 60		50009-I			
7		Hex. socket set screw	2	M8 x 40	51	50011-M	Screw	1	RL-14-50021
8		Hex. socket set screw	2	M12 x 12		50011-I	Screw		
9		Hex. cover head cap screw	11	M8 x 25		50026-M	Nut (MET)	1	
10		Hexagon nut	5	M8 x 1.25		50026-I	Nut (ENG)		
11		Hex. socket set screw	5	M8 x 35		50035	Wedge	1	
12		Spring pin	2	ψ5 x 25	52	50010	Gear	1	
13	50022	Gib-Z	1		53		Double round key	1	5x5x20
14	50023	Rear anti-floater	1		54		Lock washer	2	M8
15		Oil seal	1	TC243507	55	50007-M	Dual	1	
16	50021	Baffle	1			50007-I	Dual		
17		Plunger	11	PT 3/8"x0.38	56	50004	Bush	1	
18		Hex. roundhead bolt	8	M5 x 16	57	50002	Handwheel	1	
19	50024	Flow control valve assembly	1		58	50005	screw	1	
20		O ring	1	P12	59	50008	screw	1	
21		Plunger	2	PT 1/8"	60		Oil ball	1	5/16"
22	50033	Push button	1	PHL-18-50063	61	50003	Cross slide	1	
23		Hex. roundhead bolt	8	M4 x 10	62	50057	T bolt	4	
24		Hex. cover head cap screw	1	M10 x 80	63	50016	Plate -X	1	
25	50028	Wiper V	2	NL-17-50045	64	50017	Wiper -X	1	
26	50027	Plate V	2	NL-17-50046	65	50019	Adjust screw	2	PHL-18-50054
27		Steel ball	3	1/4"	66		Hex. roundhead bolt	6	M6 x 16
28	50036	Compressing spring	2	PHL-18-40016	67	61006	Protection cover	1	
29		Hex. socket set screw	1	M10 x 35	68	50018	Gib-X	1	
30		Elbow adapter	3		69	50014	Shield	1	
31		Elbow adapter	4		70	ψ4 x M8x1.0P	Hex. socket set screw	1	M6 x 10
32		Tee joint	1	PKD-4	71	ψ6 x 1/8	Hex.socket flat head cap screw	1	M6 x 10
33		Hex. cover head cap screw	1	M5 x 20	72	50015-P	anti-chip cover	1	
35		Hex. socket set screw	2	M8 x 12	73	50081	Inclined copper pillar	1	
36	50031	Plate	1		74		Hex. socket set screw	1	M8 x 16
37	50038	Idler gear shaft	2		75	61011	Switch case	1	
38	50037	Gear	2	16T	76	61012	Plate	1	
39		Dry bearing	2	DU141612	77		Hex. roundhead bolt	4	M5 x 10
40		C-Type snap ring(external)	8	S14	78	50072	Handle	1	
41	50012	Rear bracket	1		79	50073	Bolt	1	
42		thrust bearing	2	51202					

Bed & Shafts - 60"



Bed & Shafts - 60"



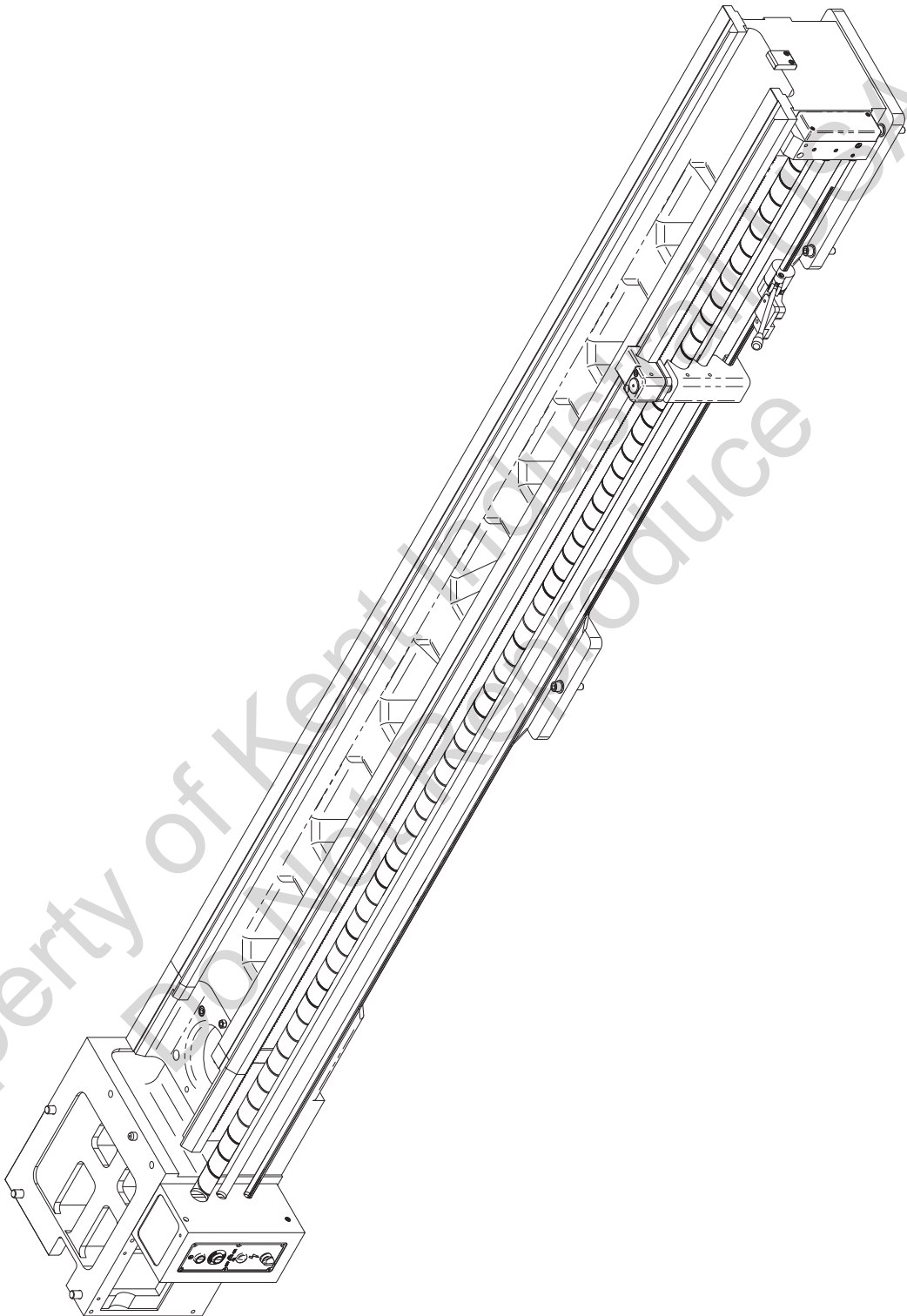
Bed & Shafts - 60"

DIAL INDICATOR ASSEMBLY(60")

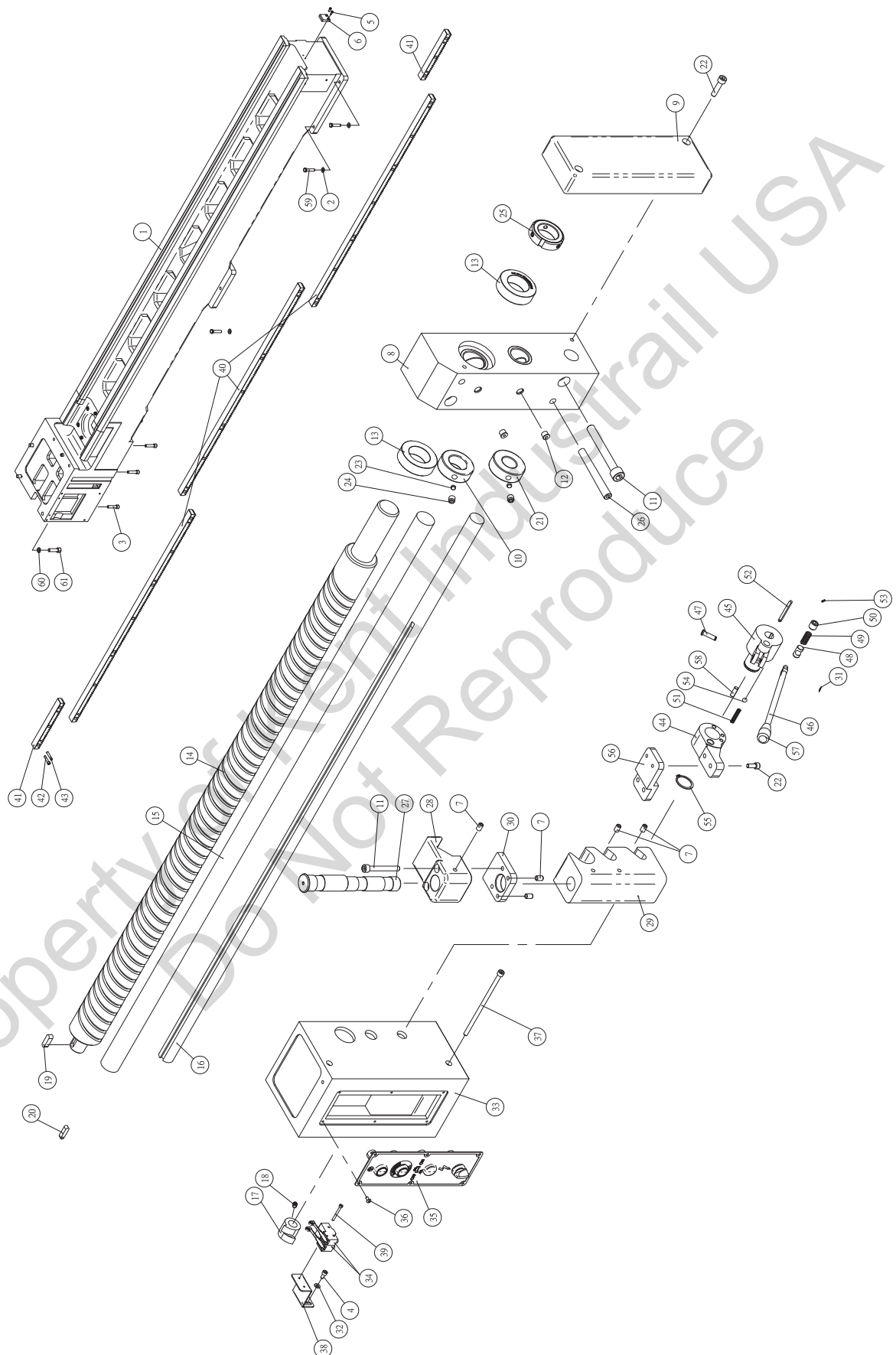
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NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	63001-60	Bed table	1		42	63044-M	Rack	1	
2		Washer		M16		63044-I			
3		Hex. cover head cap screw	6	M16 x 70	43		Hex. cover head cap screw	15	M6 x 30
4		Hex. cover head cap screw	2	M6 x 12	44		Spring pin	9	φ 6 x 36
5	63053	Tailstock block	1		45	63031	Handle bar seat brack	1	
6		Hex. cover head cap screw	4	M8 x 20	46	63022	Handle bar seat	1	
7	63013	Lead screw bracket	1		47	63019	Switch grip	1	
8	63014	Bracket cover	1		48	63025	Switch grip pin	1	
9	63020	Axle collar	1		49	63026	Locating pin	1	
10		Hex. cover head cap screw	2	M10 x 80	50	63027	Compressing spring	1	
11		oil ball	2	5/16"	51		Hex. socket set screw	1	M16 x 16
12		thrust bearing	2	2906	52	63030	Compressing spring	1	
13	63009-M-60	Lead screw	1	(MM x P6)	53	63029	Special key	1	
	63009-I-60			(IN x 4TPI)	54		Spring pin	1	φ 3 x 8
14	63010-60	Feed rod	1		55		Steel ball	1	φ 8.5mm
15	63011-60	Starting rod	1		56		C-Type Snap ring (external)	1	S35
16	63021	Switch cam	1		57	63104	Connect bracket	1	
17		Hex. socket set screw	1	M8 x 12	58	63017	Handle grip	1	TRL-13-63030
18		Sun key	1	6x6x20	59	63050	Pin	1	TRL-13-70040
19	63018	Special key	1		60		Hex. Head screw	4	M16 x 70
20	63015	Axle collar	1		61	10005	Gasket	3	
21		Hex. cover head cap screw	2	M6 x 25	62		Hex. cover head cap screw	3	M20 x 70
22	63052	Copper pin	2						
23		Hex. Socket Set screw	2	M8 x 8					
24		Nut	1	YSR M30x1.5P					
25		Pin	2	#7					
26		Hex. Socket Set screw	1	M10 x 16					
27	63005	Switch box	2						
28		Micro switch	1	Z-15GW255-B					
29	63150	Switch box name plate	6						
30		Hex. roundhead bolt	2	M5 x 10					
31		Hex. cover head cap screw	1	M8 x 180					
32	61010	Bracket cover	2						
33		Hex. cover head cap screw	2	M4 x 40					
34		Washer	1	M6					
35		E-Type snap ring (external)	1	E6					
36	63095	Shaft							
37	63092	Block							
38	63094	Beracket	1						
39	63093	Block	1						
40	63041-M	Rack	15						
	63041-I								
41	63042-M	Rack							
	63042-I	Rack	1						

Bed & Shafts - 90" ~ 120"



Bed & Shafts - 90" ~ 120"



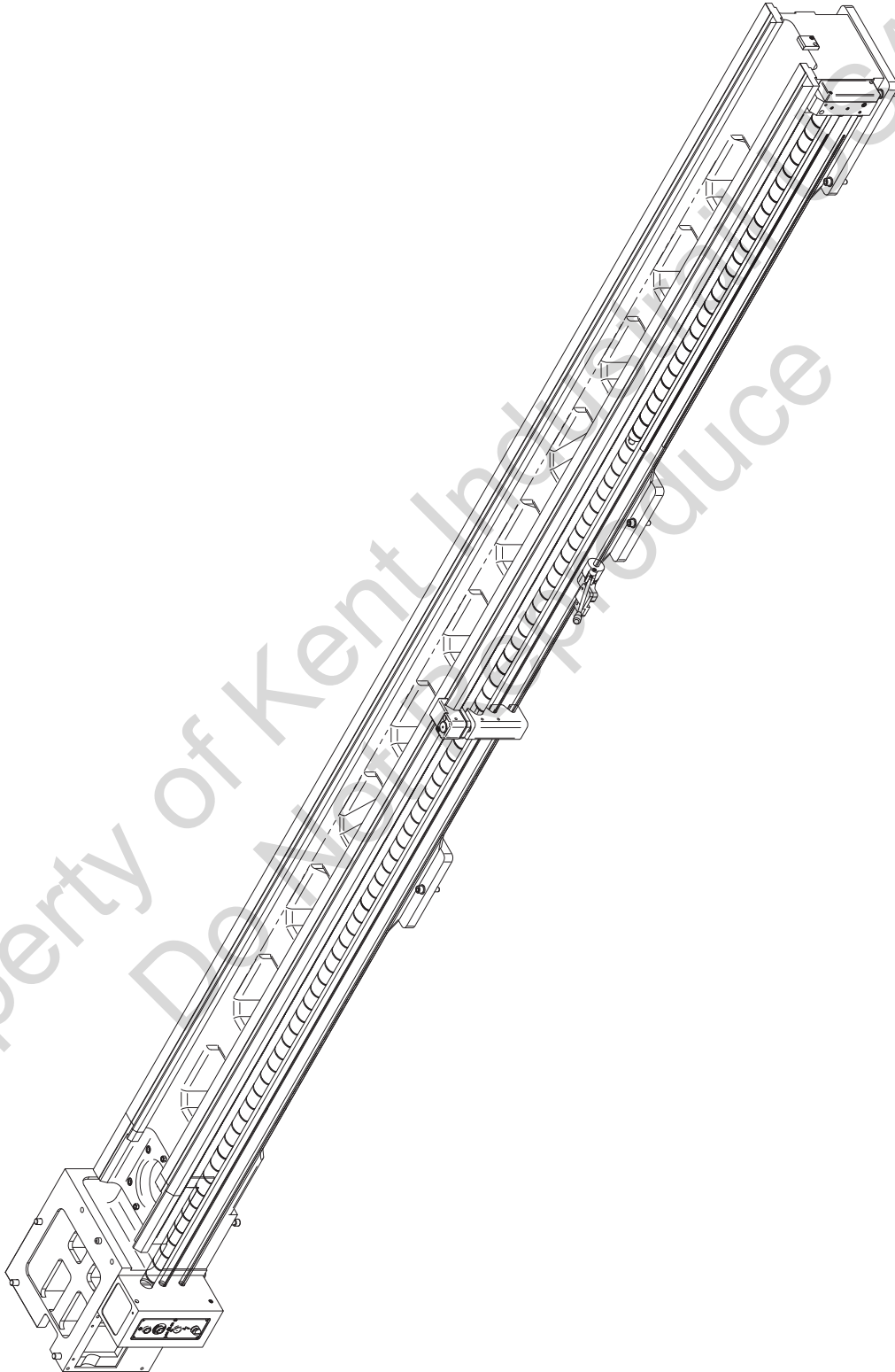
Bed & Shafts - 90" ~ 120"

DIAL INDICATOR ASSEMBLY(90"~120")

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NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK
1	63001-90	Bed table	1		32		Washer	2	M6
	63001-120				33	63005	Switch box	1	
2		Washer	6	M16	34		Micro switch	2	Z-15GW255-B
3		Hex. cover head cap screw	6	M16 x 70	35	63150	Switch box name plate	1	
4		Hex. cover head cap screw	2	M6 x 12	36		Hex. roundhead bolt	6	M5 x 10
5		Hex. cover head cap screw	2	M8 x 20	37		Hex. cover head cap screw	2	M8 x 180
6	63053	Tailstock block	1	FC-18-60051	38	61010	Bracket cover	1	
7	90"	Hex.socket fixing screws	5	M10 x 16	39		Hex. cover head cap screw	2	M4 x 40
	120"		10		40	63041-M	Rack	2	90"
8	63013	Lead screw bracket	1			63041-I			
9	63014	Bracket cover	1			63041-M	Rack	3	120"
10	63020	Axle collar	1			63041-I			
11	90"	Hex. cover head cap screw	4	M10 x 80	41	63044-M	Rack	1	90"
	120"		6			63043-M		1	
12		oil ball	2	5/16"		63044-I		1	
13		thrust bearing	2	2906		63043-I		1	
14	63009-M-90	Lead screw	1			63044-M	Rack	2	120"
	63009-I-90					63044-I			
	63009-M-120				42		Hex. cover head cap screw	34	M6 x 30
	63009-I-120				43		Spring pin	20	φ 6 x 36
15	63010-90	Feed rod	1		44	63031	Handle bar seat brack	1	
	63010-120				45	63022	Handle bar seat	1	
16	63011-90	Starting rod	1		46	63019	Switch grip	1	
	63011-120				47	63025	Switch grip pin	1	
17	63021	Switch cam	1		48	63026	Locating pin	1	
18		Hex. socket set screw	1	M8 x 12	49	63027	Compressing spring	1	
19		Sunk key	1	6x6x20	50		Hex. socket set screw	1	M16 x 16
20	63018	Special key	1		51	63030	Compressing spring	1	
21	63015	Axle collar	1		52	63029	Special key	1	
22		Hex. cover head cap screw	4	M6 x 25	53		Spring pin	1	φ 3 x 8
23	63052	Copper pin	2		54		Steel ball	1	φ 8.5mm
24		Hex.socket fixing screws	2	M8 x 8	55		C-Type snap ring (external)	1	S35
25		Nut	1	YSR M30x1.5P	56	63104	Connect bracket	1	
26		Pin	2	#7	57	63017	Handle grip	1	TRL-13-63030
27	63095	Shaft	1	90"	58	63050	Pin	1	TRL-13-70040
			2	120"	59		Hex. Head screw	4	M16 x 70
28	63092	Block	1	90"	60	10005	Gasket	3	
			2	120"	61		Hex. cover head cap screw	3	M20 x 70
29	63094	Beracket	1	90"					
			2	120"					
30	63093	Block	1	90"					
			2	120"					
31		E-Type snap ring (external)	1	E6					

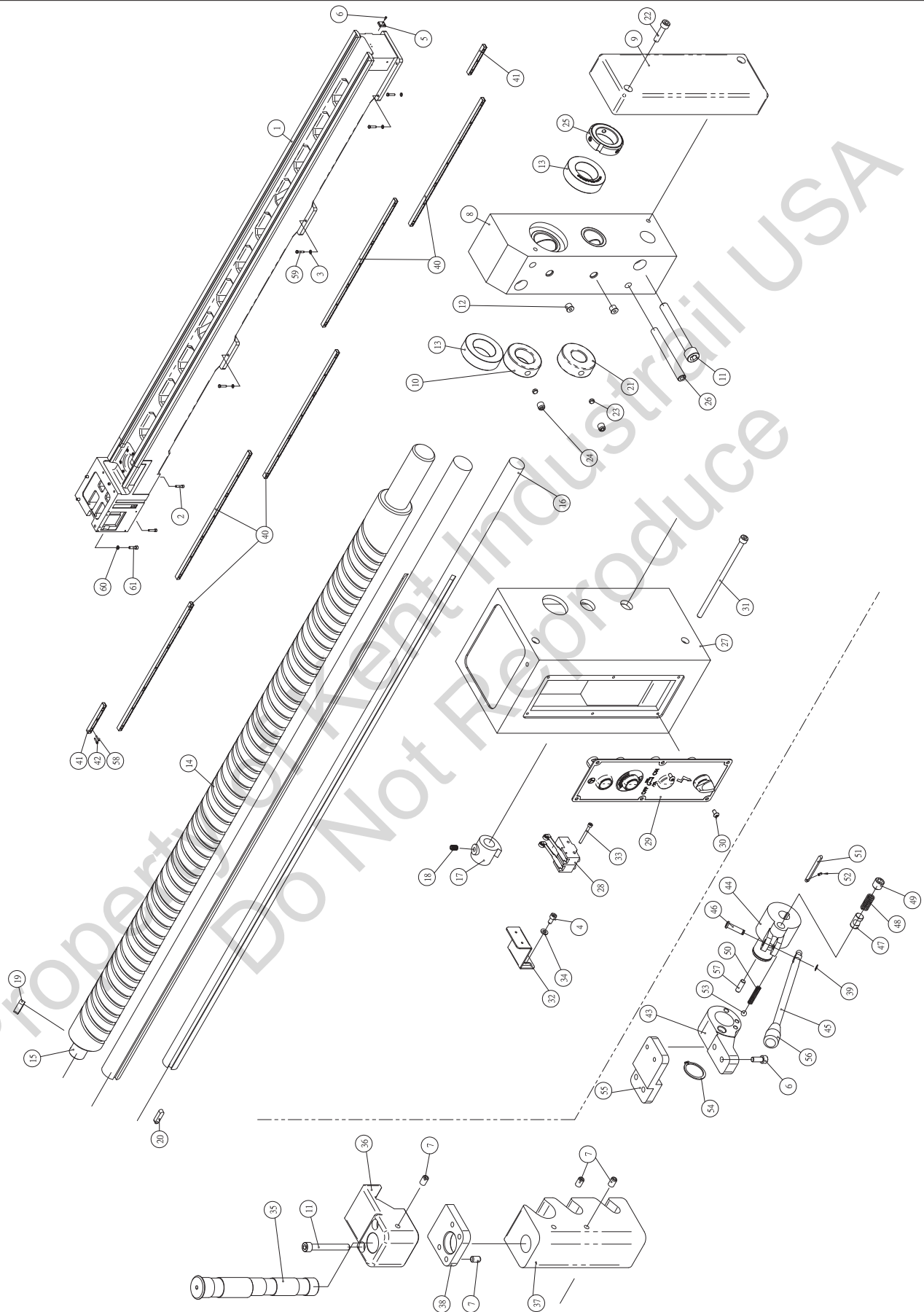
Bed & Shafts - 160" ~ 200"



This technical drawing is an exploded view of a mechanical assembly, likely a piece of industrial equipment. The diagram shows the following components and their assembly relationships:

- Main Frame (1):** The central rectangular structure.
- Top Cover (2):** Fits onto the top of the main frame.
- Bottom Cover (3):** Fits onto the bottom of the main frame.
- Internal Components:**
 - Motor/Actuator (4):** Connected to the main frame via a linkage (5).
 - Control Unit (6):** A small rectangular box with a handle (7) and a dial (8).
 - Electrical Components (9-12):** Various connectors and wiring.
 - Internal Assembly (13-16):** A complex internal mechanism with multiple parts.
 - Internal Assembly (17-20):** Another complex internal mechanism.
 - Internal Assembly (21-24):** A third complex internal mechanism.
 - Internal Assembly (25-28):** A fourth complex internal mechanism.
 - Internal Assembly (29-32):** A fifth complex internal mechanism.
 - Internal Assembly (33-36):** A sixth complex internal mechanism.
 - Internal Assembly (37-40):** A seventh complex internal mechanism.
 - Internal Assembly (41-44):** An eighth complex internal mechanism.
 - Internal Assembly (45-48):** A ninth complex internal mechanism.
 - Internal Assembly (49-52):** A tenth complex internal mechanism.
 - Internal Assembly (53-56):** An eleventh complex internal mechanism.
 - Internal Assembly (57-60):** A twelfth complex internal mechanism.
- Accessories (59-62):** Various small components and tools.

The diagram includes a large diagonal watermark reading "Property of Do Not Reproduce USA".



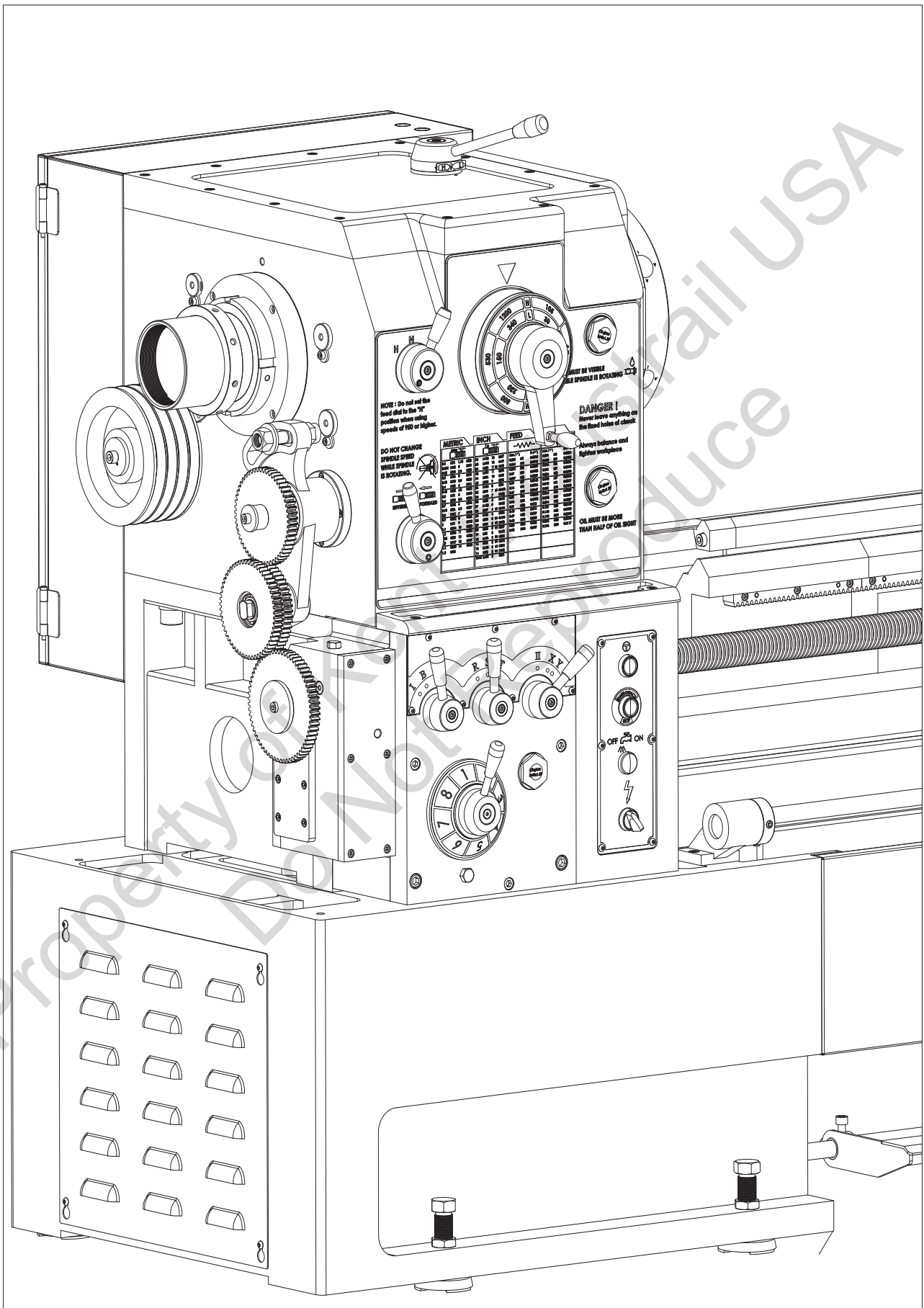
Bed & Shafts - 160" ~ 200"

DIAL INDICATOR ASSEMBLY(160"~200")

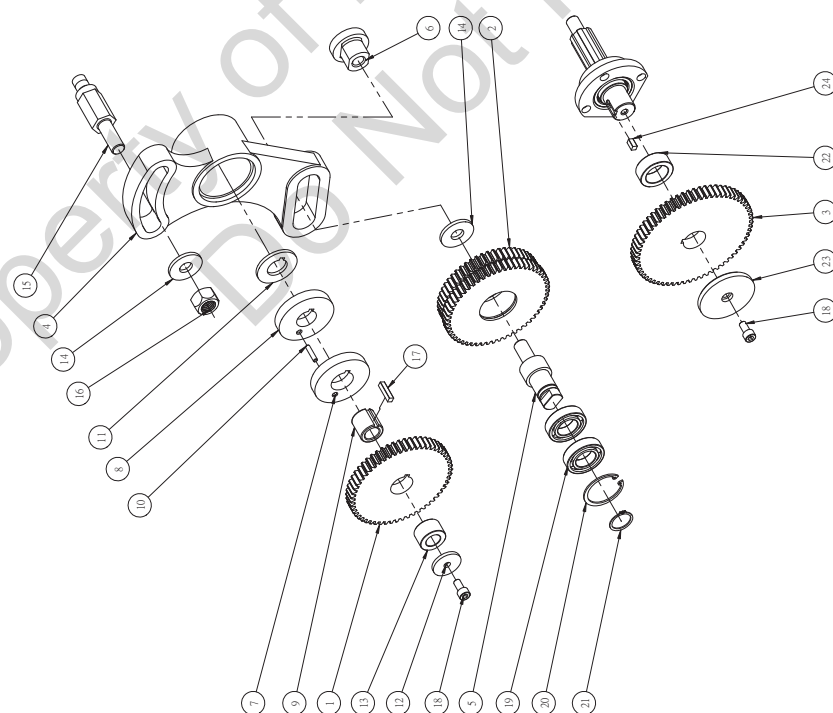
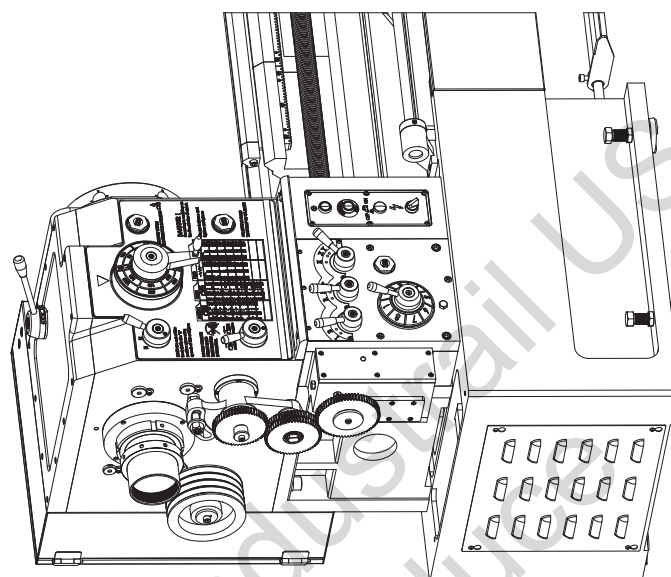
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NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK
1	63001-160	Bed table	1		38	63093	Block	2	
	63001-200				39		E-Type snap ring (external)	1	E6
2		Hex. cover head cap screw	6	M16 x 70	40	63041-M	Rack	4	160"
3		Washer	8	M16		63041-I			
4		Hex. cover head cap screw	2	M6 x 12		63041-M	Rack	5	200"
5	63053	Tailstock block	1			63041-I			
6		Hex. cover head cap screw	4	M8 x 20	41	63044-M	Rack	2	
7		Hex. socket set screw	10	M10 x 16		63044-I			
8	63013	Lead screw bracket	1		42		Hex. cover head cap screw	55	M6 x 30
9	63014	Bracket cover	1		43	63031	Handle bar seat brack	1	
10	63020	Axle collar	1		44	63022	Handle bar seat	1	
11		Hex. cover head cap screw	6	M10 x 80	45	63019	Switch grip	1	
12		oil ball	2	5/16	46	63025	Switch grip pin	1	
13		thrust bearing	2	2906	47	63026	Locating pin	1	
14	63009-M-160	Lead screw	1	160"	48	63027	Compressing spring	1	
	63009-I-160				49		Hex. socket set screw	1	M16 x 16
	63009-M-200			200"	50	63030	Compressing spring	1	
	63009-I-200				51	63029	Special key	1	
15	63010-160	Feed rod	1		52		Spring pin	1	3 x 8
	63010-200				53		Steel ball	1	8.5mm
16	63011-160	Starting rod	1		54		C-Type snap ring (external)	1	S35
	63011-200				55	63104	Connect bracket	1	
17	63021	Switch cam	1		56	63017	Handle grip	1	TRL-13-63030
18		Hex. socket set screw	1	M8 x 12	57	63050	Pin	1	TRL-13-70040
19		Sunk key	1	6x6x20	58		Spring pin	30	6 x 36
20	63018	Special key	1		59		Hex. Head screw	4	M16 x 70
21	63015	Axle collar	1		60	10005	Gasket	3	
22		Hex. cover head cap screw	2	M6 x 25	61		Hex. cover head cap screw	3	M20 x 70
23	63052	Copper pin	2						
24		Hex. socket set screw	2	M8 x 8					
25		Nut	1	YSR M30x1.5P					
26		Pin	2	#7					
27	63005	Switch box	1						
28		Micro switch	1	Z-15GW255-B					
29	63150	Switch box name plate	1						
30		Hex. roundhead bolt	6	M5 x 10					
31		Hex. cover head cap screw	2	M8 x 180					
32	61010	Bracket cover	1						
33		Hex. cover head cap screw	2	M4 x 40					
34		Washer	2	M6					
35	63095	Shaft	2						
36	63092	Block	2						
37	63094	Beracket	2						

End Gear METRIC



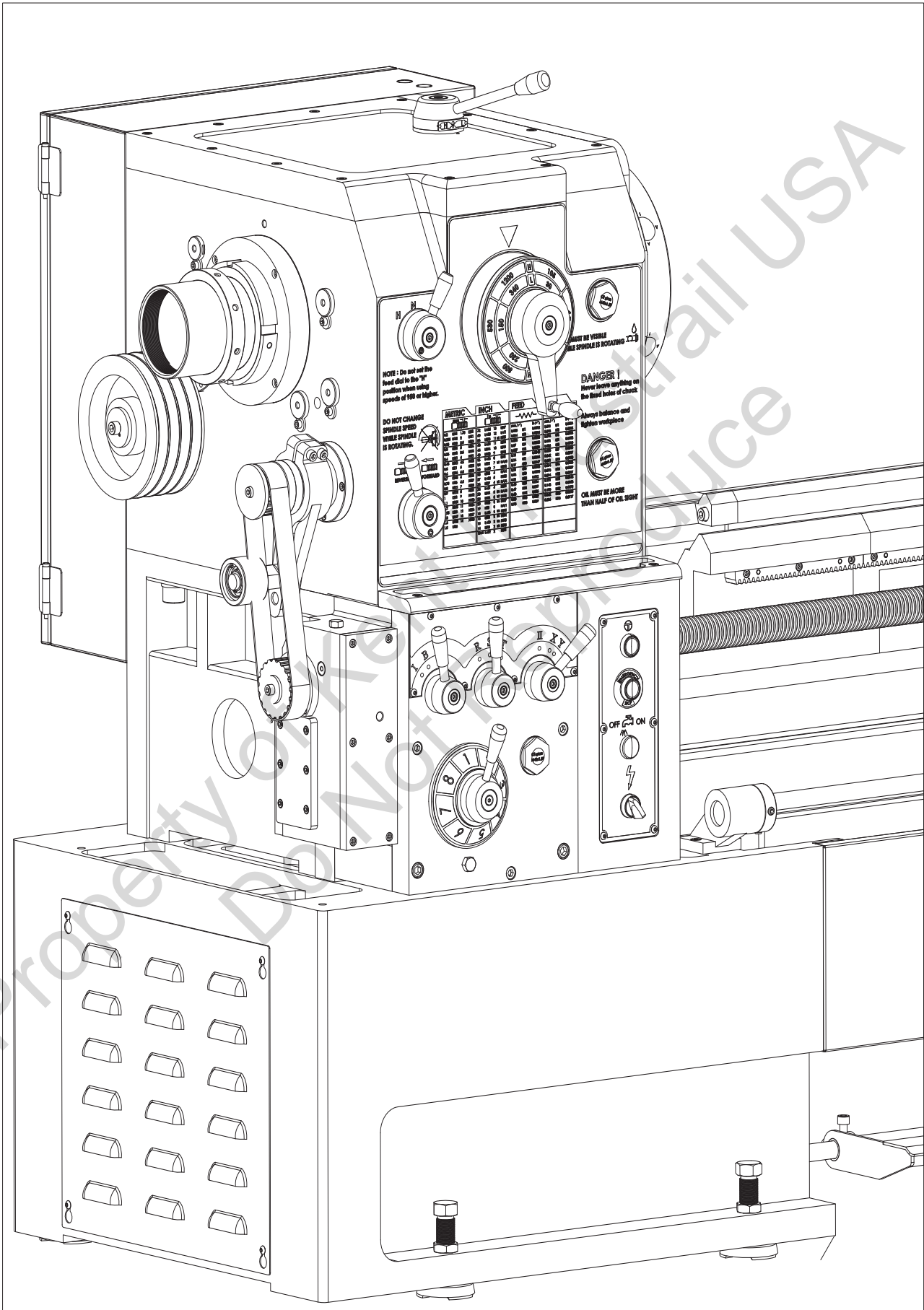
End Gear METRIC



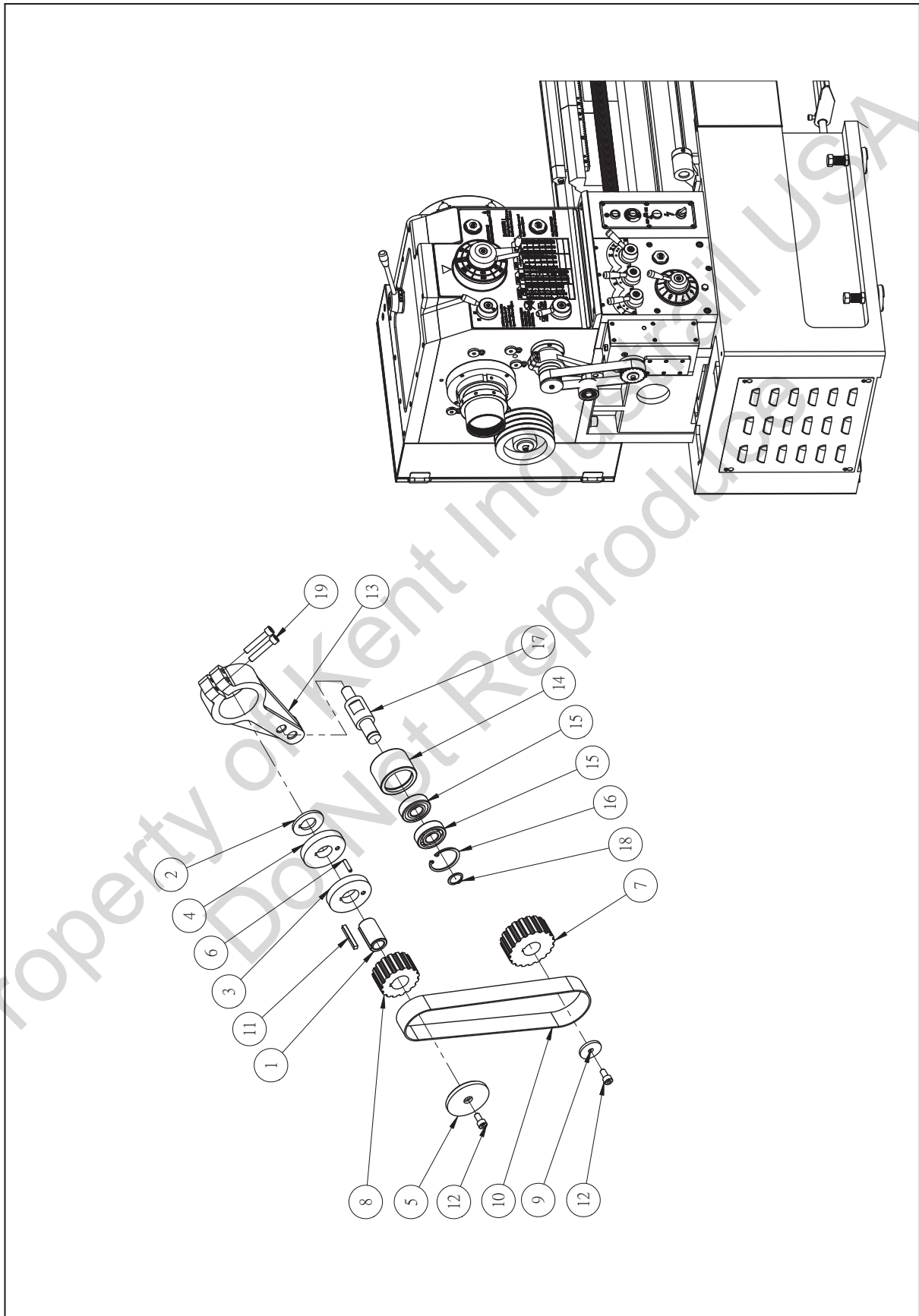
End Gear

[illegible]

End Gear IMPERIAL



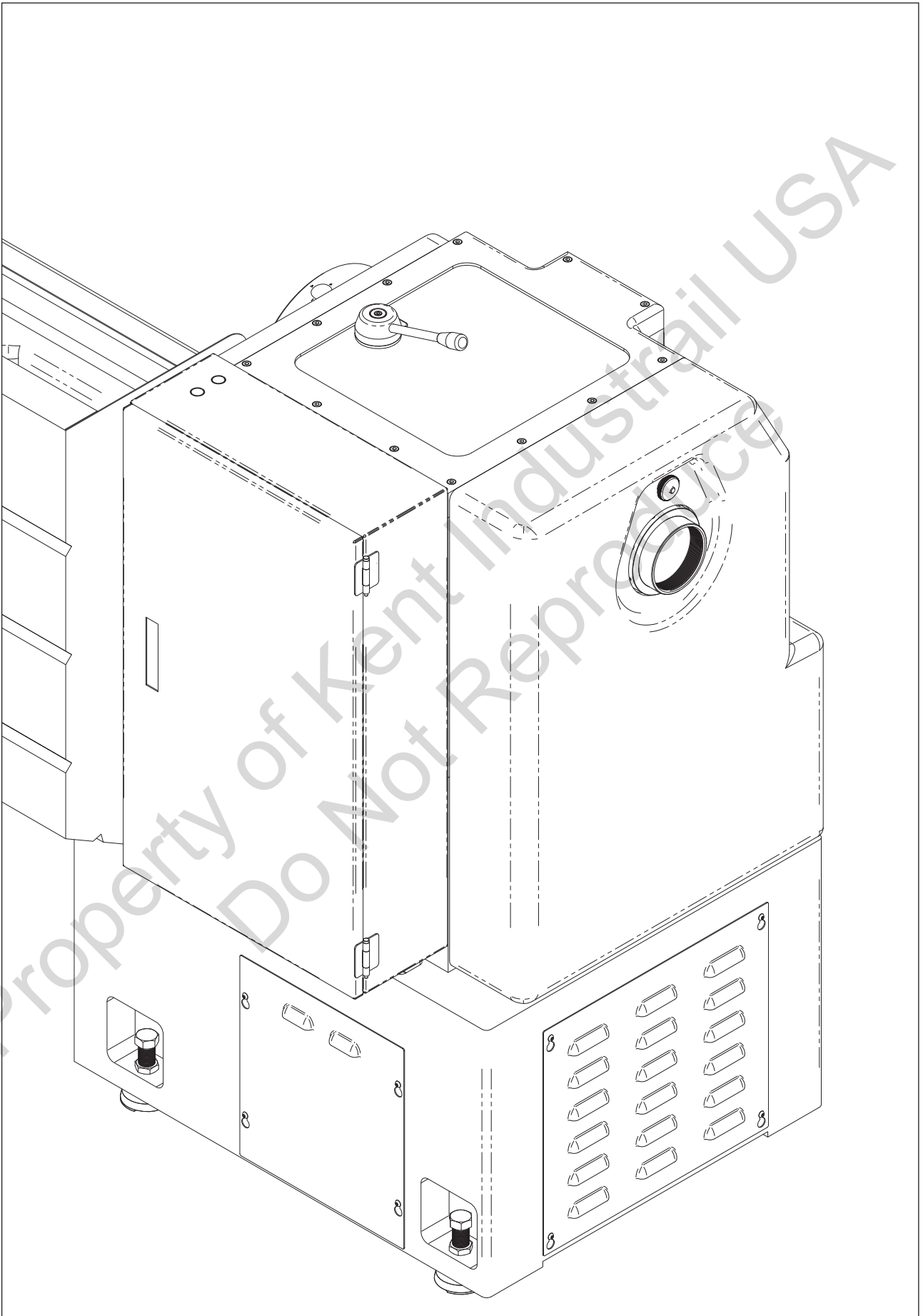
End Gear IMPERIAL



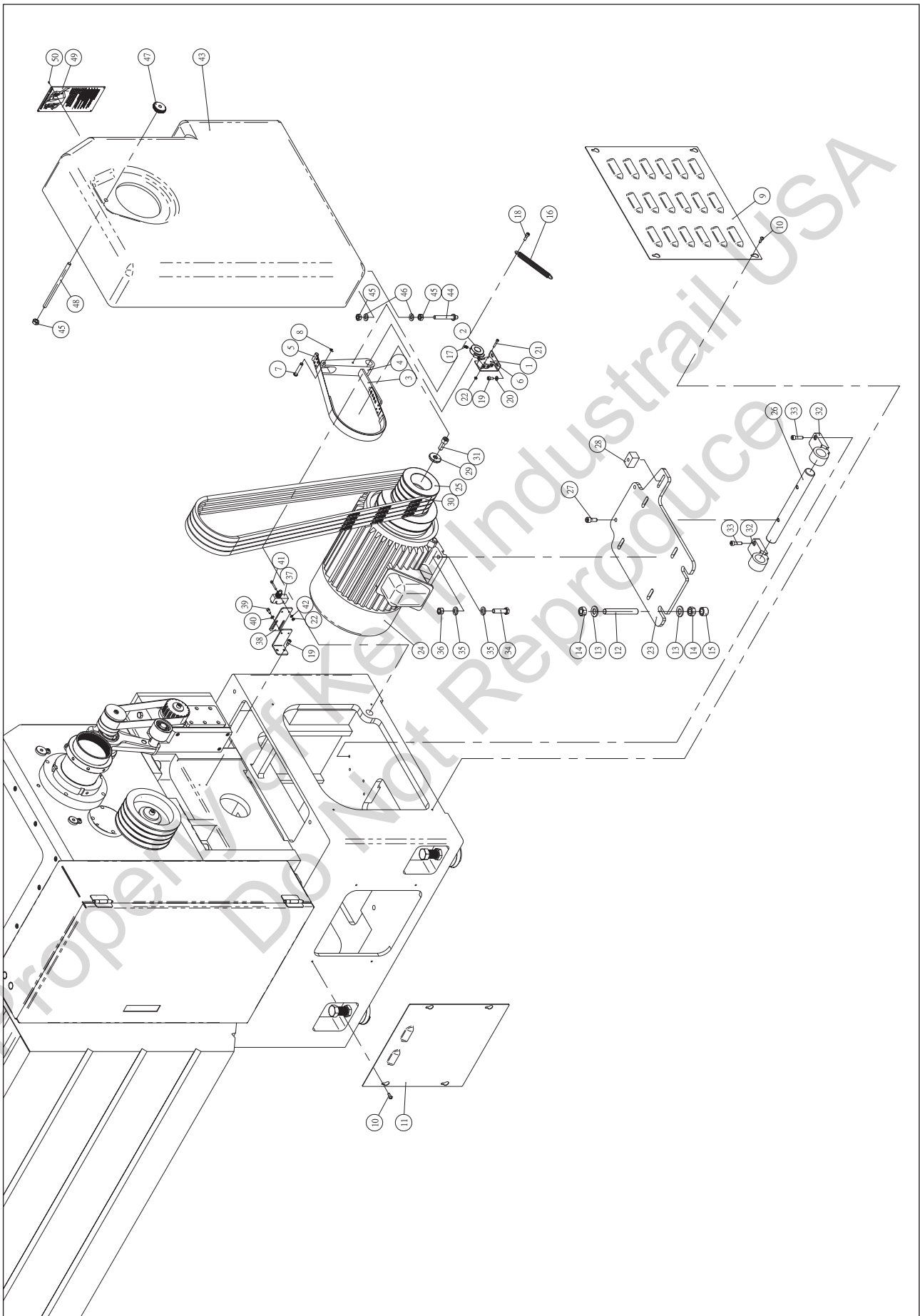
End Gear

QUADRANT (INCH SYSTEM)

Main Motor



Main Motor



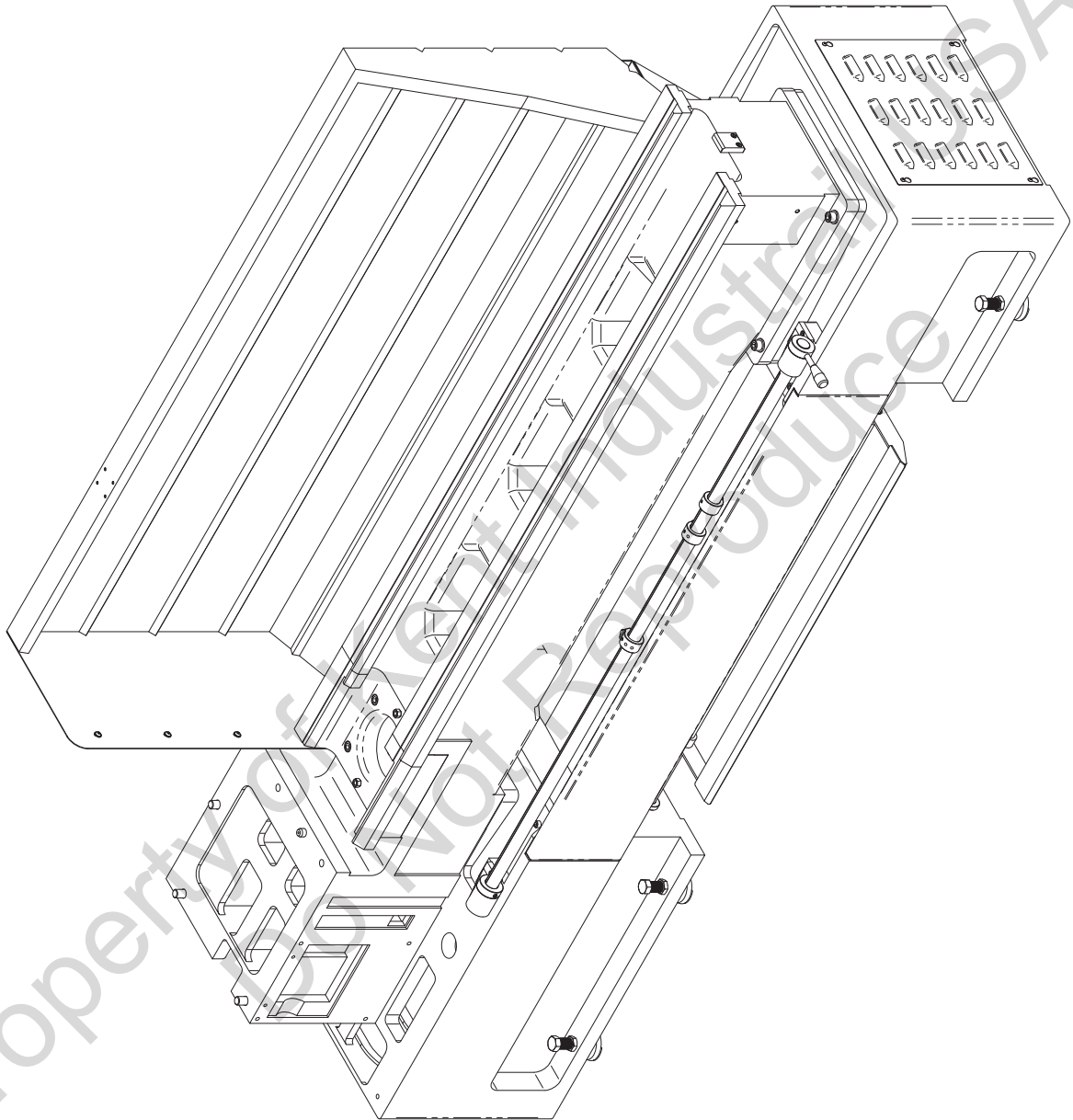
Main Motor

MAIN MOTOR ASSEMBLY

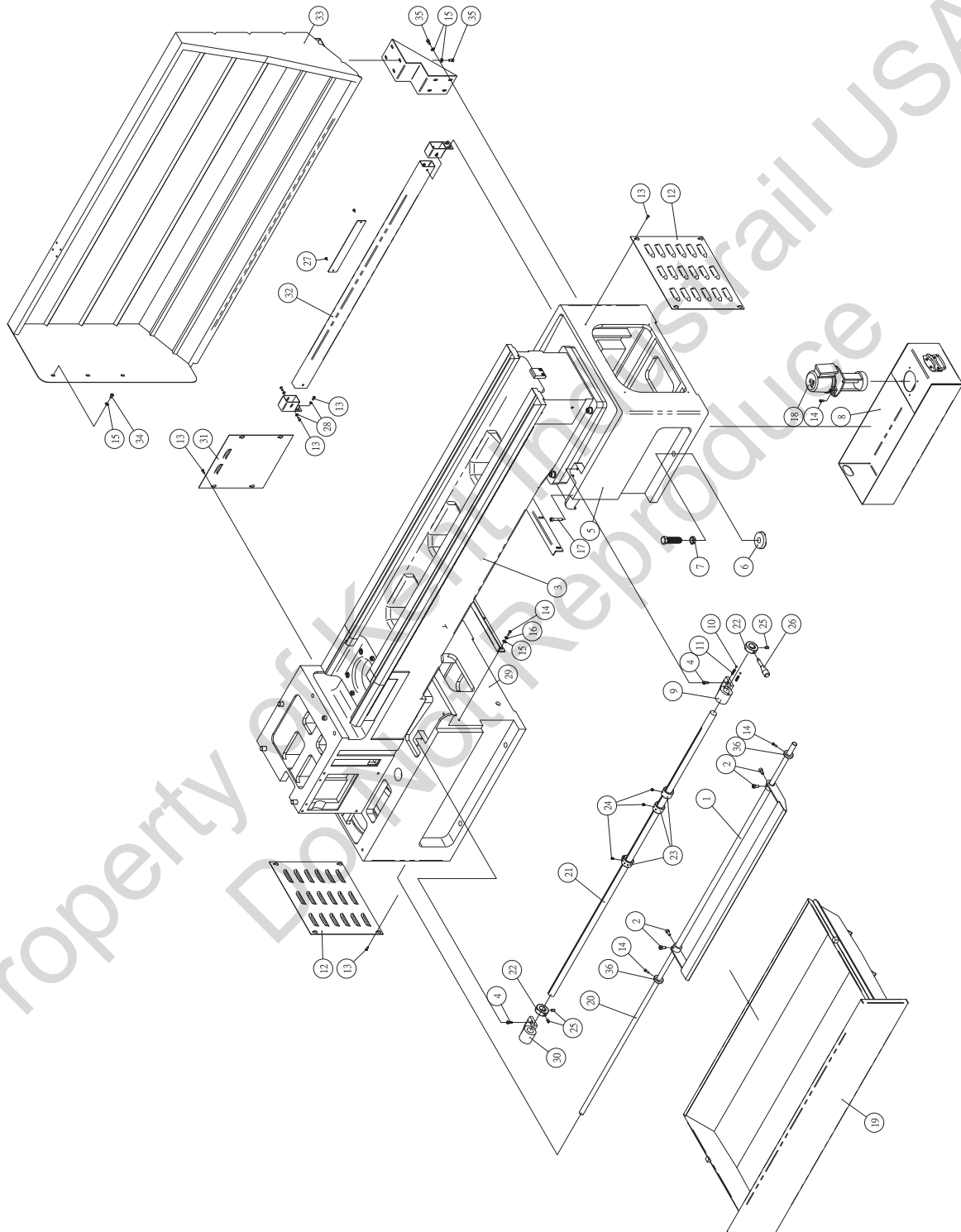
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NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK	NO.	PARTS NO.	PARTS NAME	Q'TY	REMARK
1	63033	Bracket	1		43	22-61004	Cover	1	
2	63102	Cam	1			26-61004			
3	61013	Fixed plate	1			30-61004			
4	63103	Lever	1		44	63006	Pin	2	
5	63023	Brake belt	1		45		Nut		M10 x 1.5
6		Limit switch	1	TM-1704	46		Washer		M10
7	63024	Pin	1		47	63007	Nut	1	TRL-13-60056
8		E-Type snap ring (external)	1	E6	48	63008	Bolt	1	TRL-13-60055
9	61014	Cover	2		49	60034	Nameplate	1	
10		Hex. roundhead bolt		M6 x 16	50		Rivet	4	φ 2X6
11	61017	Cover	1						
12	60027	Screw	2						
13		Washer		M16					
14		Nut		M16 x 2					
15	63049	Spacer ring	2						
16	63045	Spring	1						
17		Hex. socket set screw		M6 x 10					
18		Hex. cover head cap screw		M6 x 20					
19		Hex. cover head cap screw		M6 x 12					
20		Washer		M6					
21		Hex. cover head cap screw		M4 x 25					
22		Nut		M4 x 0.7					
23	61005	Plate	1						
24		Motor	1	7.5HP-4P					
25	60029	Motor pully	1						
26	60024	Shaft	1						
27		Hex. cover head cap screw		M10x25					
28	63004	Block	1						
29	60030	Washer	1						
30	V-belt	4		B78					
				B82					
				B86					
31		Hex. cover head cap screw		M12 x 30					
32	63046	Support	2						
33		Hex. cover head cap screw		M8 x 30					
34		Hex.head bolt		M12 x 45					
35		Washer		M12					
36		Nut		M12 x 1.75					
37		Limit switch	1	Z-15GQ-B					
38	61007	Braclet	1						
39		Hex. cover head cap screw		M5 x 12					
40		Washer		M5					
41		Hex. cover head cap screw		M4 x 30					
42		Washer		M4					

Cabinet & Panel - 60"



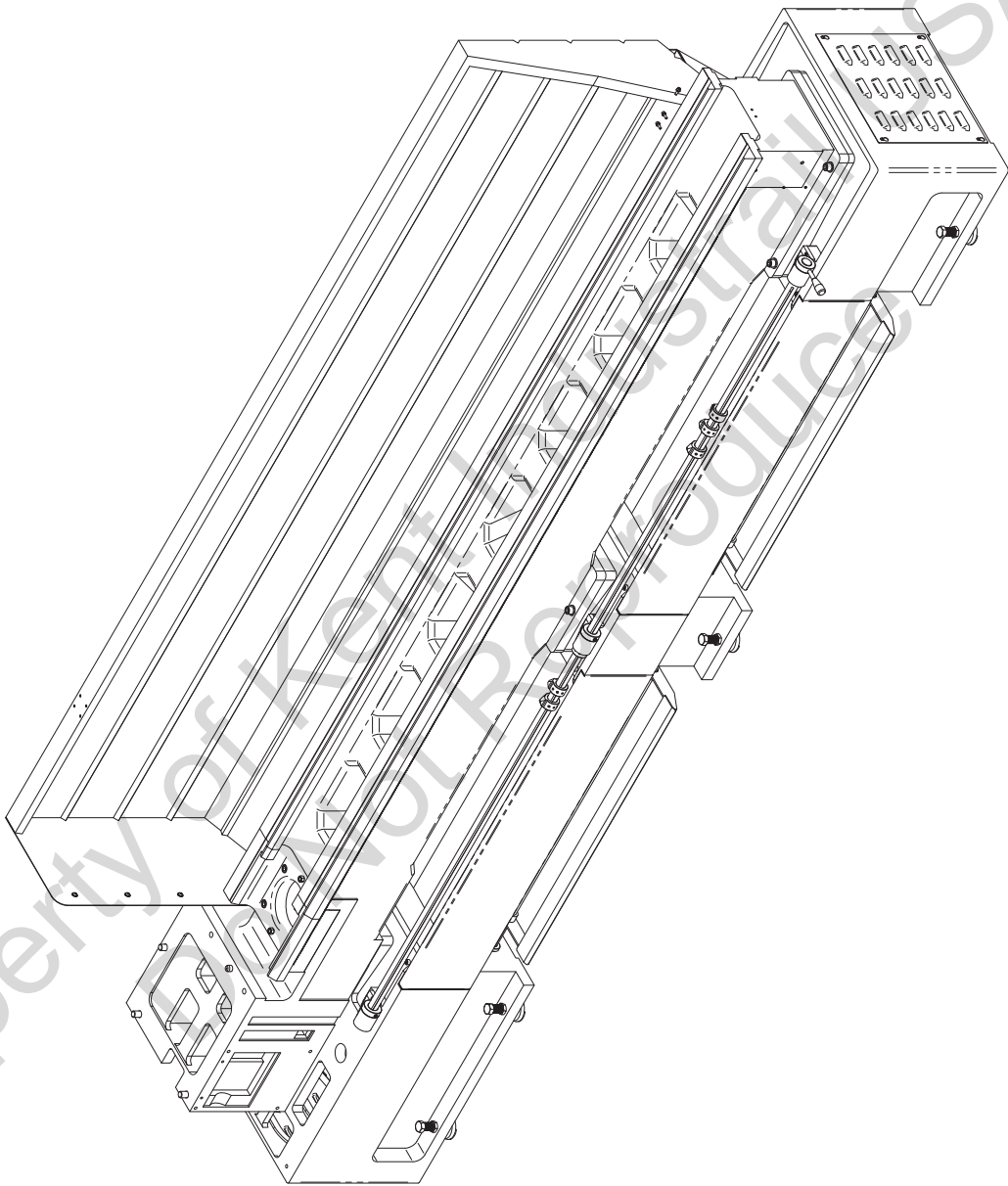
Cabinet & Panel - 60"



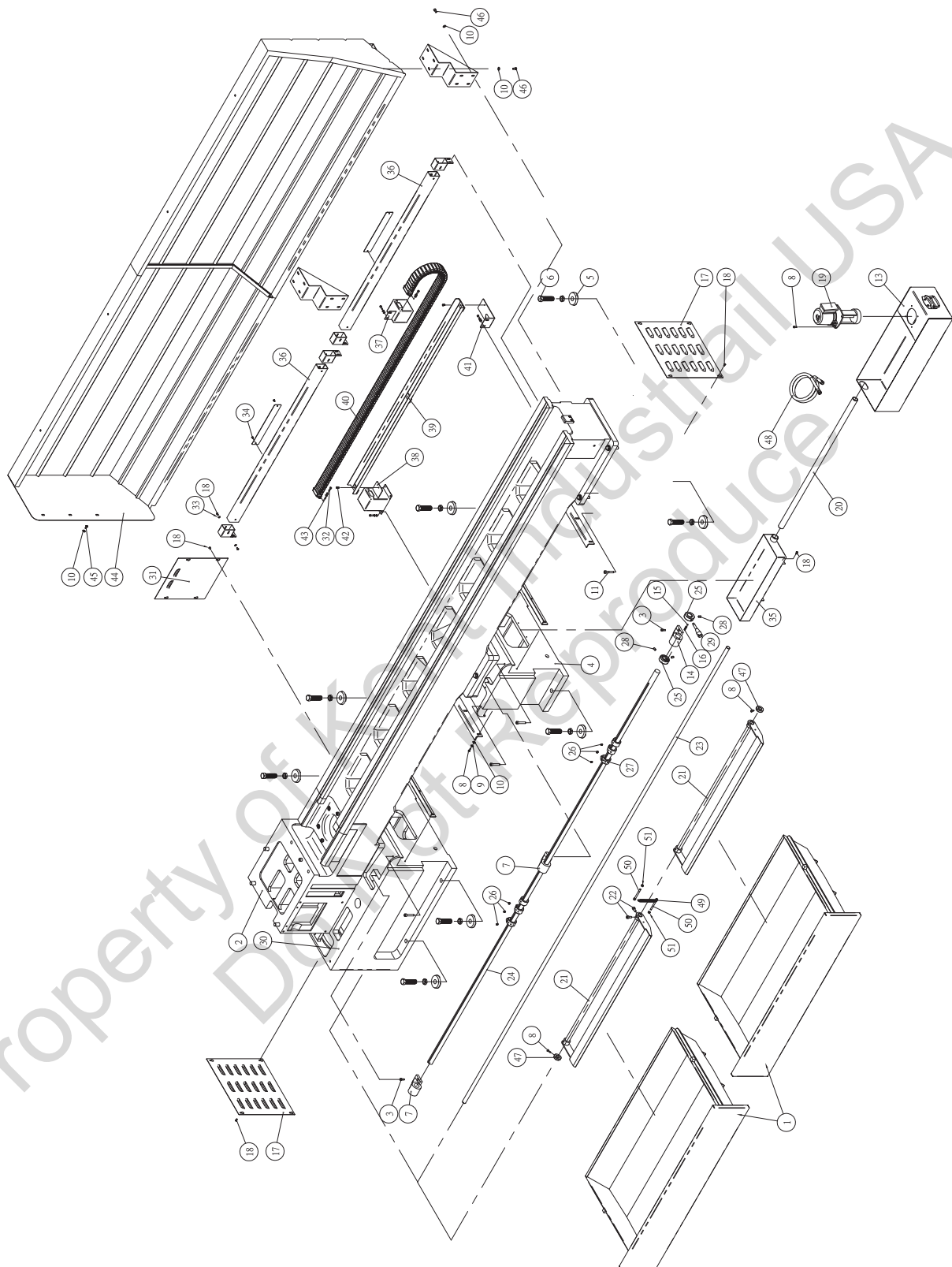
Cabinet & Panel - 60"

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Cabinet & Panel - 90" ~ 120"



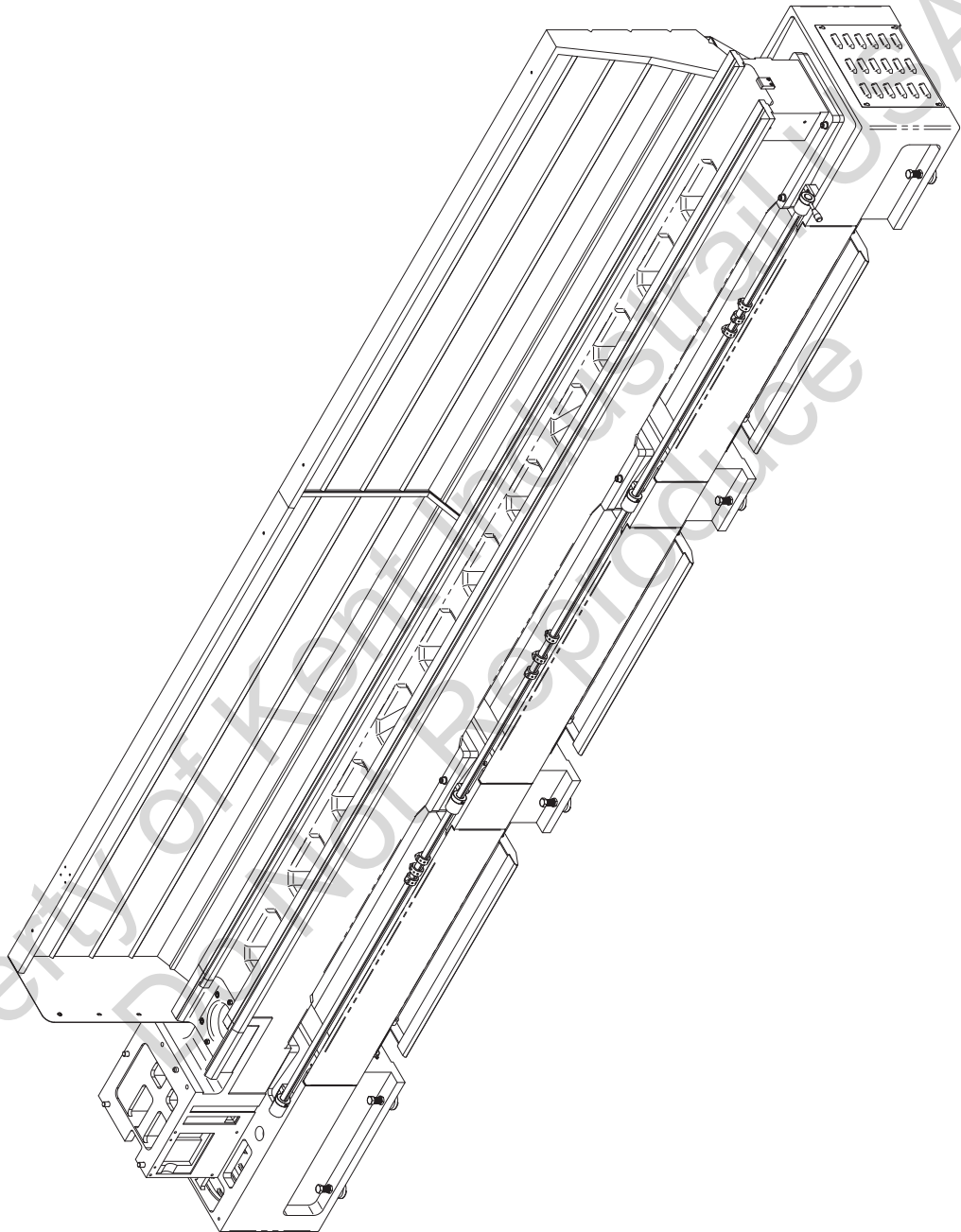
Cabinet & Panel - 90" ~ 120"



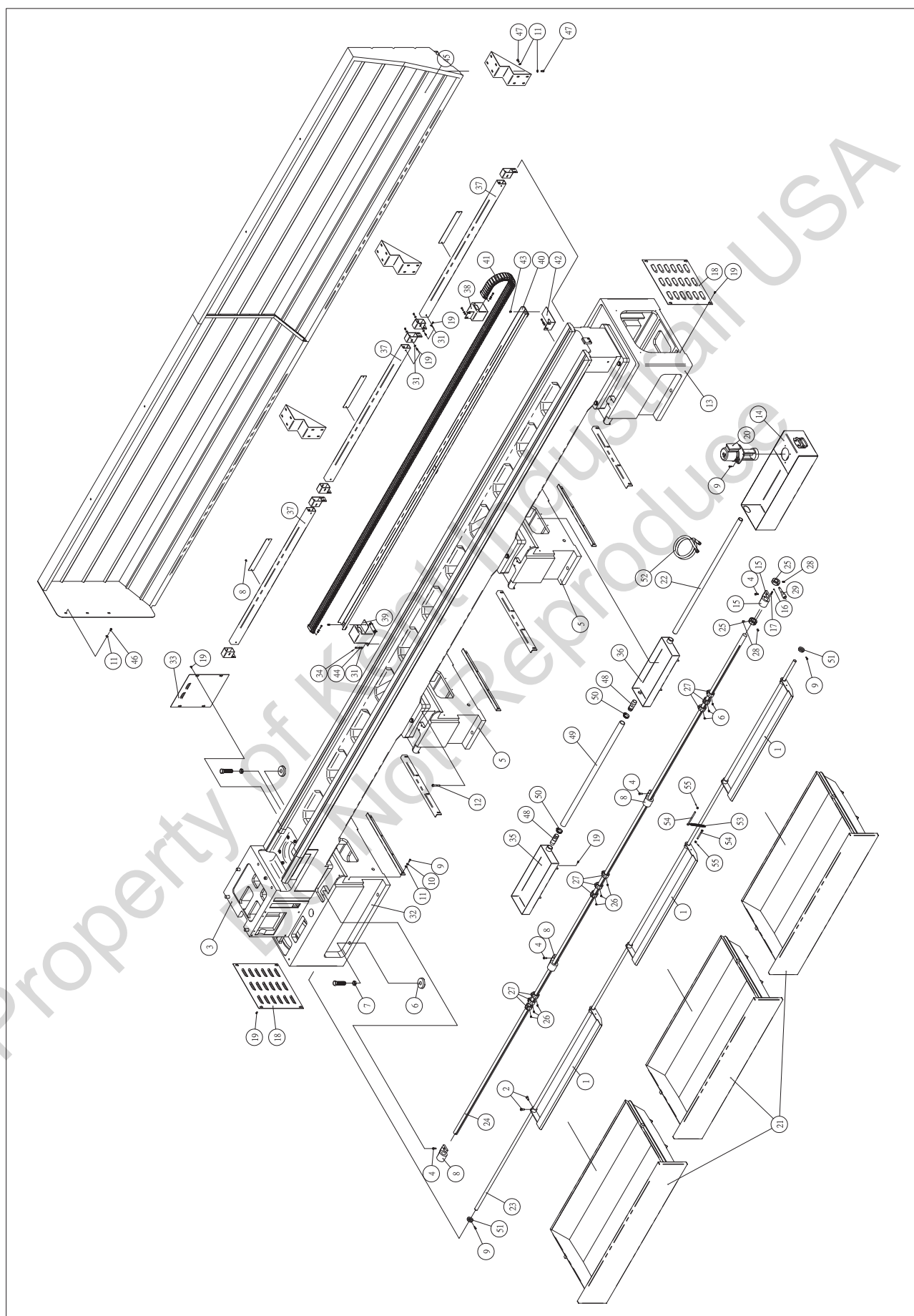
Cabinet & Panel - 90" ~ 120"

CABINET AND PANEL(90"~120")									
Page 1/1									
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	61009-90R	Oil tank	2	90"	38	61023	Towline fixing frame	1	
	61009-120R			120"	39	61026-90	Towline fixing frame	1	
2	63001-90	Bed table	1	90"		61026-120			
	63001-120			120"	40		Cable chain (Alum) (90")	1	1x100x1950xNO.8
3		Hex. socket head bolt	6	M8 x 20			Cable chain (Alum) (120")		1x100x2200xNO.8
4	63091	Mid foundation seat	1		41	61024	Towline fixing frame	1	
5	63032	Block	8	18-63042	42		Hex. socket head bolt	2	M6 x 10
6	63039	Hexagon nut	8	17-63055	43		Lock washer	12	M6
7	63034	Left bracket	2		44	61055-90	Big damper	1	
8		Hex. socket head bolt	22	M6 x 16		61055-120			
9		Lock washer	16	M6	45		Hex. roundhead bolt	3	M8 x 16
10		Washer	35	M6	46		Hex. socket head bolt	16	M8 x 16
11		Hex. socket head bolt	4	M10 x 55	47	61002	Spacer ring	2	
12	63048	Right foundation seat	1		48		Coolant conduit (90")	1	3/8" x
13	61016	Coolant tank	1					1	3/8" x
14	63035	right bracket	1				Coolant conduit (120")	1	3/8" x 145"
15		Steel ball	2	φ 8mm				1	3/8" x 80"
16	63040	Compressing spring	2		49	63045	Tension spring	1	13-60046
17	61014	Cover	2		50	90"	Hex. socket head bolt	2	M8 x 70
18		Hex. roundhead bolt	28	M6 x 16		120"		2	M8 x 80
19		Coolant pump	1	MC-8150	51		Hex nut	2	M8
20	61015-90	Tube	1						
	61015-120								
21	61043-60	Brake pedal	2						
22		Hex. socket head bolt	2	M10 x 20					
23	61001-90	Shaft	1						
	61001-120								
24	63012-90	5-Step shaft	1						
	63012-120								
25	63036	Left axle collar	3						
26	63028	Fixing screws	6	17-63038					
27	63003	Locator	6						
28		Hex. socket set screw	5	M10 x 16					
29	63038	Handle grip	1						
30	63047	Left foundation seat	1						
31	61017	Electric appliance box cover	1						
32		Hex. socket head bolt	12	M6 x 20					
33		Washer	16	M6					
34		Hex. roundhead bolt	4	M5 x 10					
35	61018	Box	1						
36	61021-90	Cable protective carrier	2						
	61021-120								
37	61025	Towline fixing frame	1						

Cabinet & Panel - 160" ~ 200"



Cabinet & Panel - 160" ~ 200"



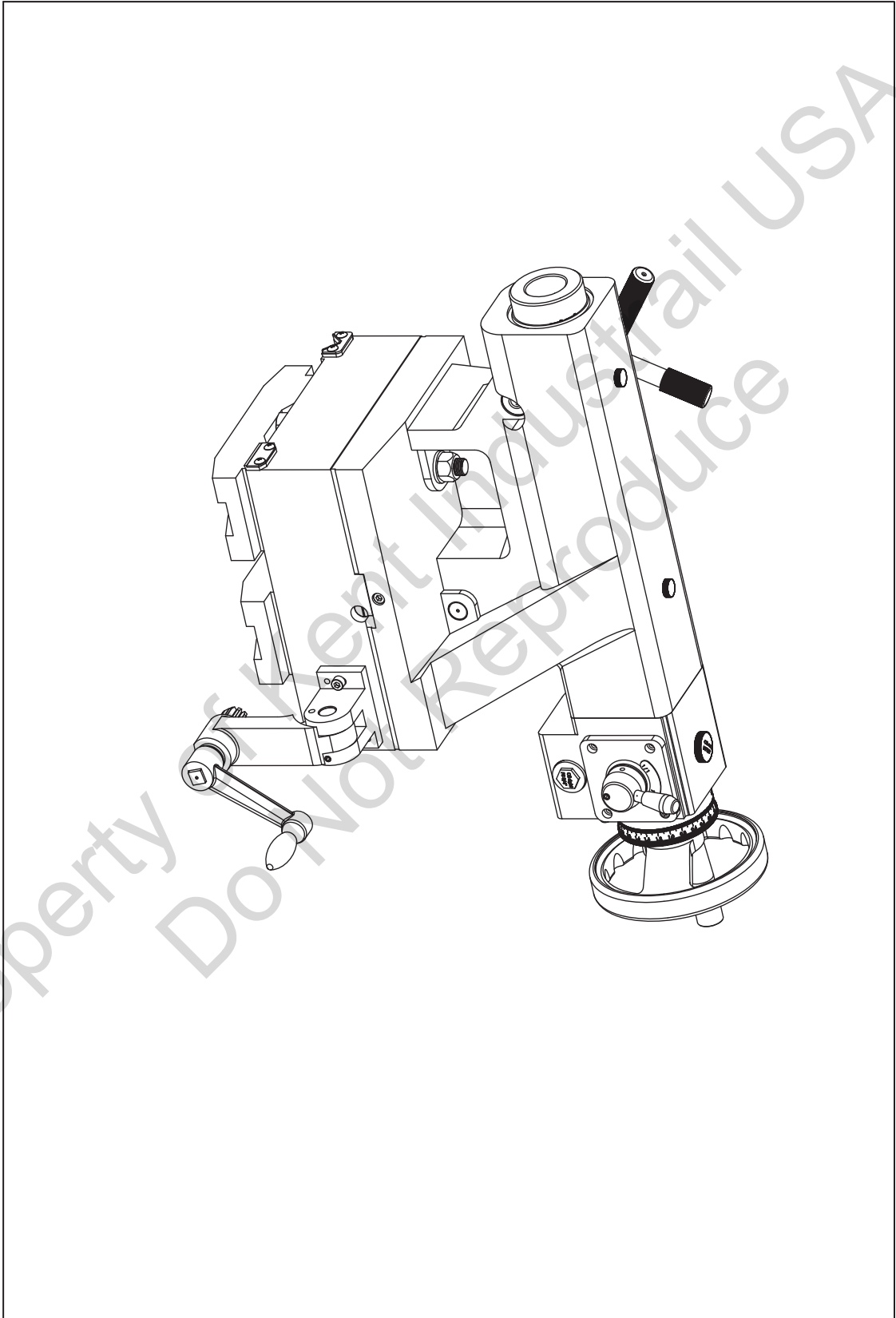
Cabinet & Panel - 160" ~ 200"

CABINET AND PANEL(160"~200")

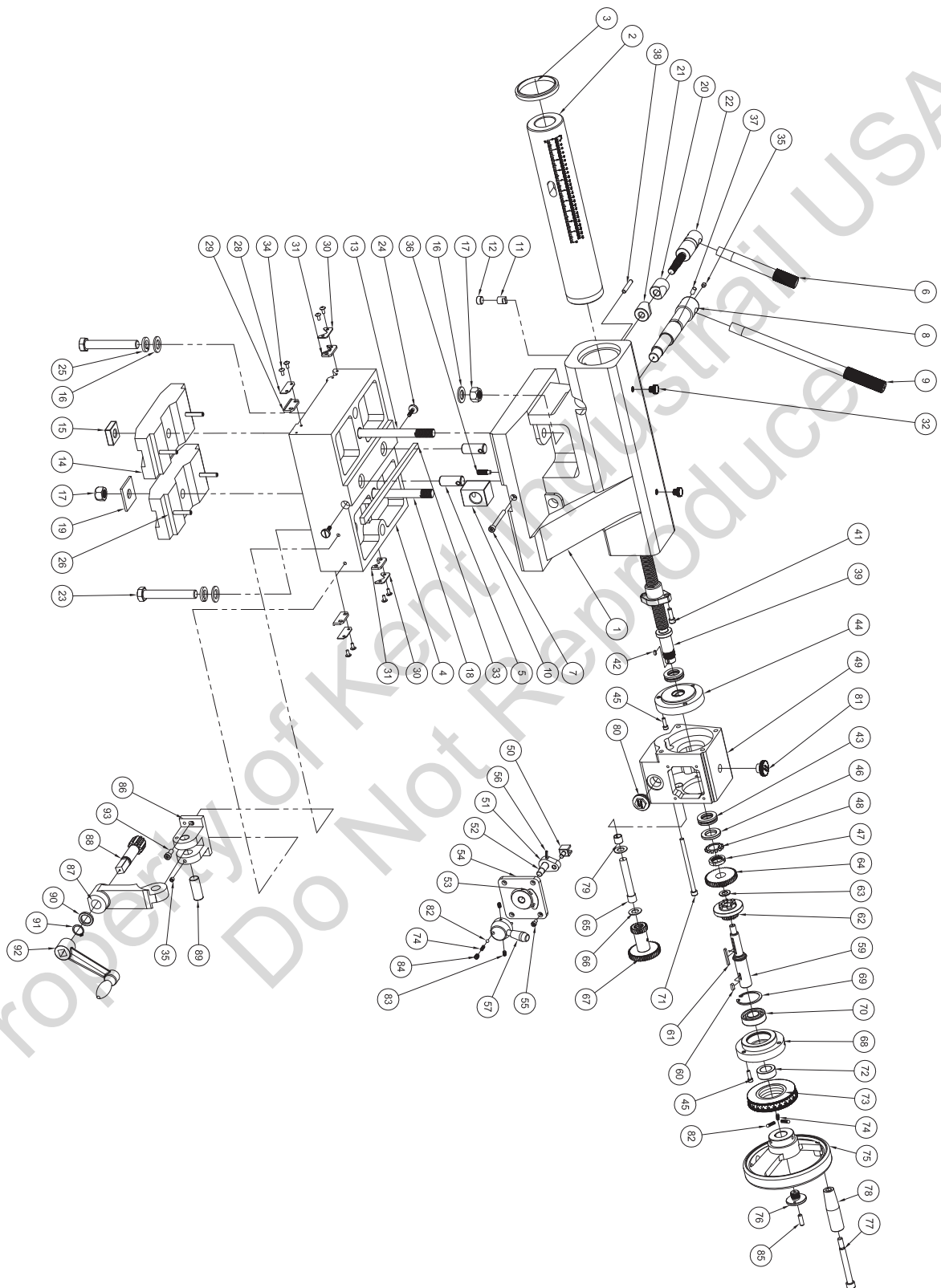
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NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	61043-60	Brake pedal	3		38	61025	Towline fixing frame	1	
2		Hex. socket head bolt	12	M10 x 20	39	61023	Towline fixing frame	1	
3	63001-160 63001-200	Bed table	1		40	61026-160 61026-200	Towline fixing frame	1	
4		Hex. socket head bolt	9	M8 x 20	41		Cable chain (Alum) 160")	1	1x100x3500xNO.8
5	63091	Mid foundation seat	2				Cable chain (Alum) 200")		1x100x4130xNO.8
6	63032	Block	10	18-63042	42	61024	Towline fixing frame	1	
7	63039	Hexagon nut	10	17-63055	43		Hex. socket head bolt	2	M6 x 10
8	63034	Left bracket	3		44		Lock washer	12	M6
9		Hex. socket head bolt	30	M6 x 16	45	61055-160 61055-200	Big damper	1	
10		Lock washer	24	M6	46		Hex. roundhead bolt	3	M8 x 16
11		Washer	51	M6	47		Hex. socket head bolt	24	M8 x 16
12		Hex. socket head bolt	6	M10 x 55	48	61008	Oil pipe fitting	2	
13	63048	Right foundation seat	1		49		Six-point hose	1	4米用 5米用
14	61016	Coolant tank	1		50		Hose clamp	2	7分
15	63035	right bracket	1		51	61002	Spacer ring	2	
16		Steel ball	2	φ 8mm	52		Coolant conduit (160")	1	3/8" x
17	63040	Compressing spring	2				Coolant conduit (160")	1	3/8" x
18	61014	Cover	2				Coolant conduit (200")	1	3/8" x
19		Hex. roundhead bolt	44	M6 x 16			Coolant conduit (200")	1	3/8" x
20		Coolant pump	1	MC-8150	53	63045	Tension spring	1	13-60046
21	61009-160R 61009-200R	Oil tank	3		54	160" 200"	Hex. socket head bolt	2 1 1	M8 x 70 M8 x 80 M8 x 130
22	61015-160 61015-200	Tube	1		55		Hex nut	2	M8
23	61001-160 61001-200	Shaft	1						
24	63012-160 63012-200	5-Step shaft	1						
25	63036	Left axle collar	4						
26	63028	Fixing screws	9	17-63038					
27	63003	Locator	9						
28		Hex. socket set screw	9	M10 x 16					
29	63038	Handle grip	1						
30		Hex. roundhead bolt	48	M5 x 10					
31		Washer	1	M6					
32	63047	Left foundation seat	1						
33	61017	Electric appliance box cover	12						
34		Hex. socket head bolt	1	M6 x 20					
35	61018	Box	1						
36	61018-160	Box	1						
37	61021-160 61021-200	Cable protective carrier	3						

Two-Step Tailstock



Two-Step Tailstock



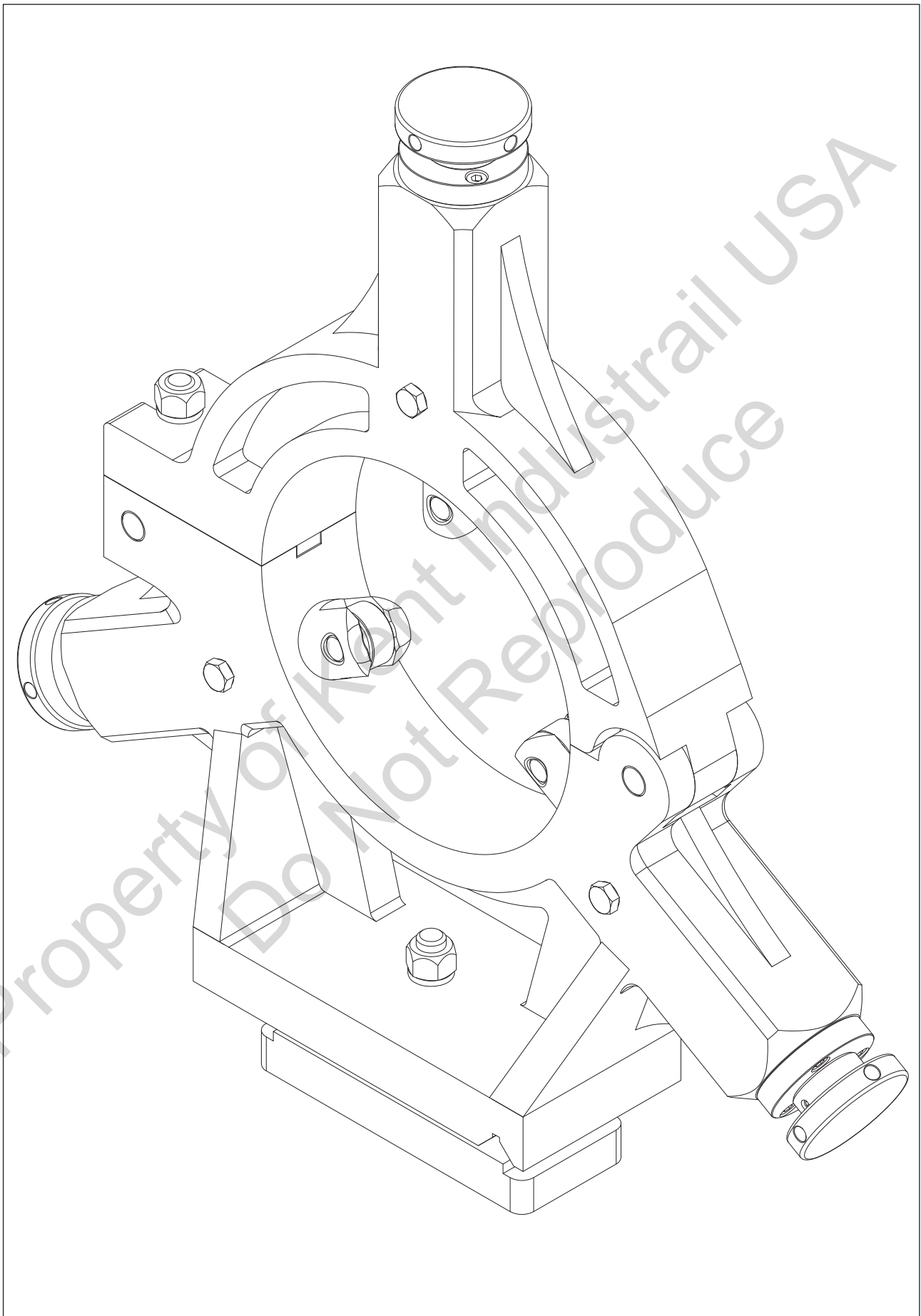
Two-Step Tailstock

TAILSTOCK ASSEMBLY									
					Page 1/2				
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	70001	Tailstock body	1		43		Thrust bearing	2	51105
2	70003	Tailstock Sleeve	1		44	70006-DF	Flange	1	PHL-18共用
3		Oil seal	1	DKB80948/11	45		Hex. cover head cap screw	6	M6x20
4	22-70002	Tailstock seat	1		46	70065-DF	Spacer ring	1	PHL-18共用
	26-70002	Tailstock seat	1		47	70066-DF	Nut	1	PHL-18共用
	30-70002	Tailstock seat	1		48		Locking washer	1	
5	70020	Pin nut	2	PHL-18共用	49	70064-DF	Small gear box	1	PHL-18共用
6	70017	Handle lever	1		50	70079-DF	Fork block	1	PHL-18共用
7		Hex. cover head cap screw	2	M8x70	51	70076-DF	Lever	1	PHL-18共用
8	70023	Eccentric shaft	1		52	70077-DF	Short shaft	1	PHL-18共用
9	70024	Handle lever	1		53	70080-DF	Curve plate	1	PHL-18共用
10	70022	Pivot block	1	PHL-18共用	54	70078-DF	Box cover	1	PHL-18共用
11	70018	Elastic block	1		55		Hex. cover head cap screw	4	M6x12
12		Plunger	1	PT3/8	56		Spring pin	1	ø4x25
13	70014	Bolt	1		57	70081-DF	Handle	1	PHL-18共用
14	70016	Clamp block	2			70082-DF	Hub	1	PHL-18共用
15	70015	Nut	1	PHL-18共用			Spring pin	1	ø4x25
16		Washer	3		59	70067-DF	Handweel shaft	1	PHL-18共用
17		hexagonal nut	2	M18	60		Sunk key	1	5x5x15
18	70013	Bolt	1		61		Sunk key	1	4x4x40
19		Square washers	1		62	70069-DF	Gear	1	PHL-18共用
20	70031	Adjusting nut	1		63	70070-DF	Washer	1	PHL-18共用
21	70030	Adjusting nut	1		64	70068-DF	Gear	1	PHL-18共用
22	70019	Adjusting screw rod	1		65	70071-DF	Fixed shaft	1	PHL-18共用
23		Hexagon head bolt	2	M8x120	66	70073-DF	Washer	2	PHL-18共用
24	70034	Adjusting screw	2	18-50054共用	67	70072-DF	Gear	1	PHL-18共用
25		Anti-loose washers	2		68	70075-DM	Flange	1	PHL-18共用
26		Spring pin	4	ø8x56		70075-DI	Flange	1	PHL-18共用
28	70048	Plate	2	18-50048共用	69		C-Type snap ring(Internal)	1	R52
29	70047	Wiper	2	18-50047共用	70		Deep groove ball bearing	1	6205Z
30	70049	Plate	2	13-50049共用	71		Hex. cover head cap screw	4	M8x130
31	70050	Wiper	2	13-50048共用	72	70074-DF	Collar	1	PHL-18共用
32	70060	Oil cup	2	17-70091共用	73	70007-M	Index ring	1	PHL-18共用
33	70033	Wedge	1			70007-I	Index ring	1	PHL-18共用
34		Dome cross screw	8	M5x12	74	70008	Spring	4	13-70054共用
35		Hex. socket set screw	2	M8x8	75	70010	Handweel	1	PHL-18共用
36	70062	Screw	1	PHL-18共用	76	70009	Fixed screw	1	THL-15共用
37	70025	Stop Pin	1	PHL-18共用	77	70012	Bolt	1	15-40012共用
38	70029	Positioning Pin	1		78	70011	Handle HW	1	15-40011共用
39	70063-M	Guide screw	1		79		Dry bearing	1	U151715
	70005-M	Nut	1		80		Oil sight	1	PS3/4"
	70063-I	Guide screw	1		81		Oil cover	1	NF3/4"
	70005-I	Nut	1		82		Steal ball	4	1/4"
41		Hex. cover head cap screw	2	M8x25	83		Hex. socket set screw	2	M6x10
42		Sunk key	1	4x4x10	84		Hex. socket set screw	1	M8x10

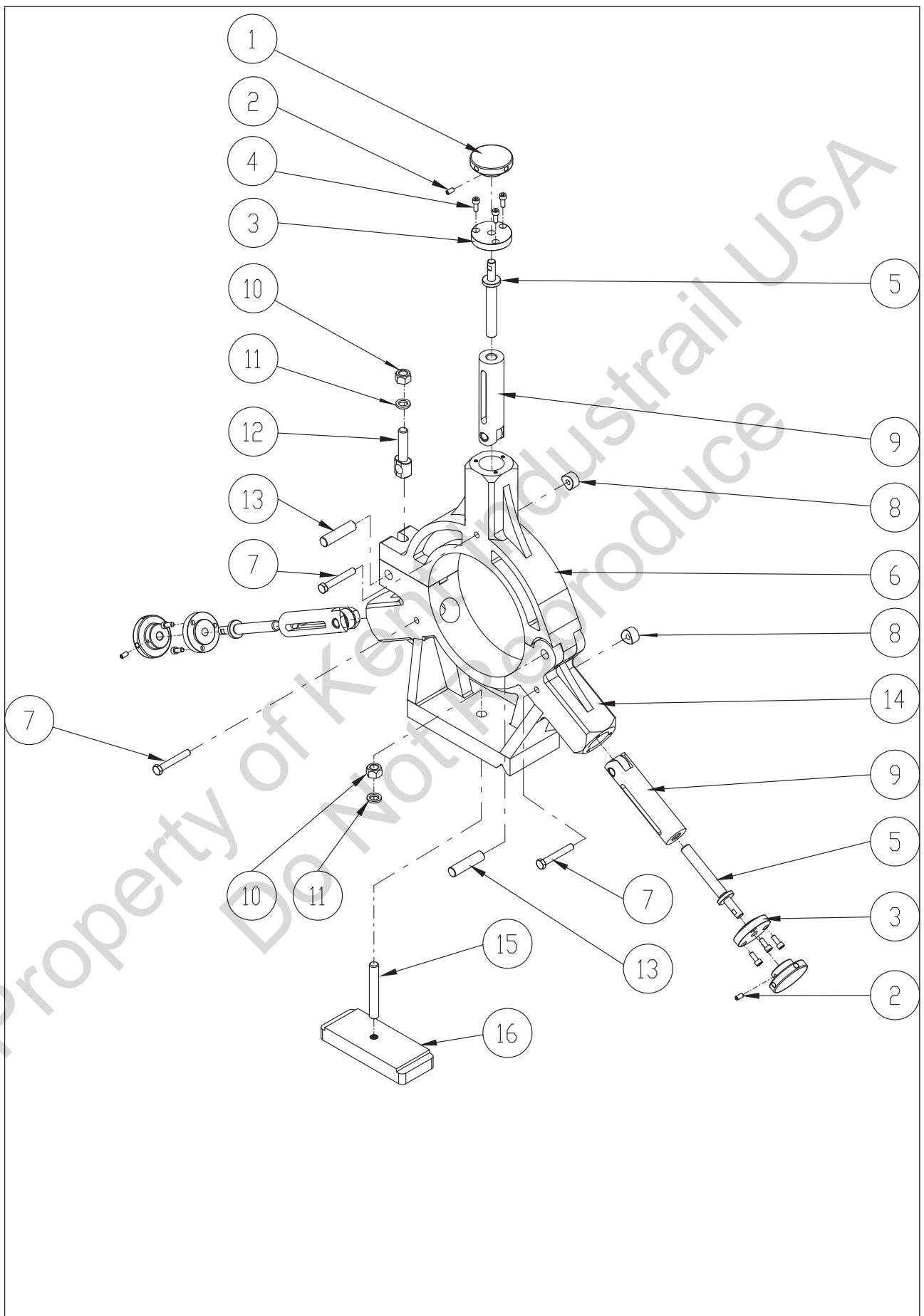
Two-Step Tailstock

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Steady Rest



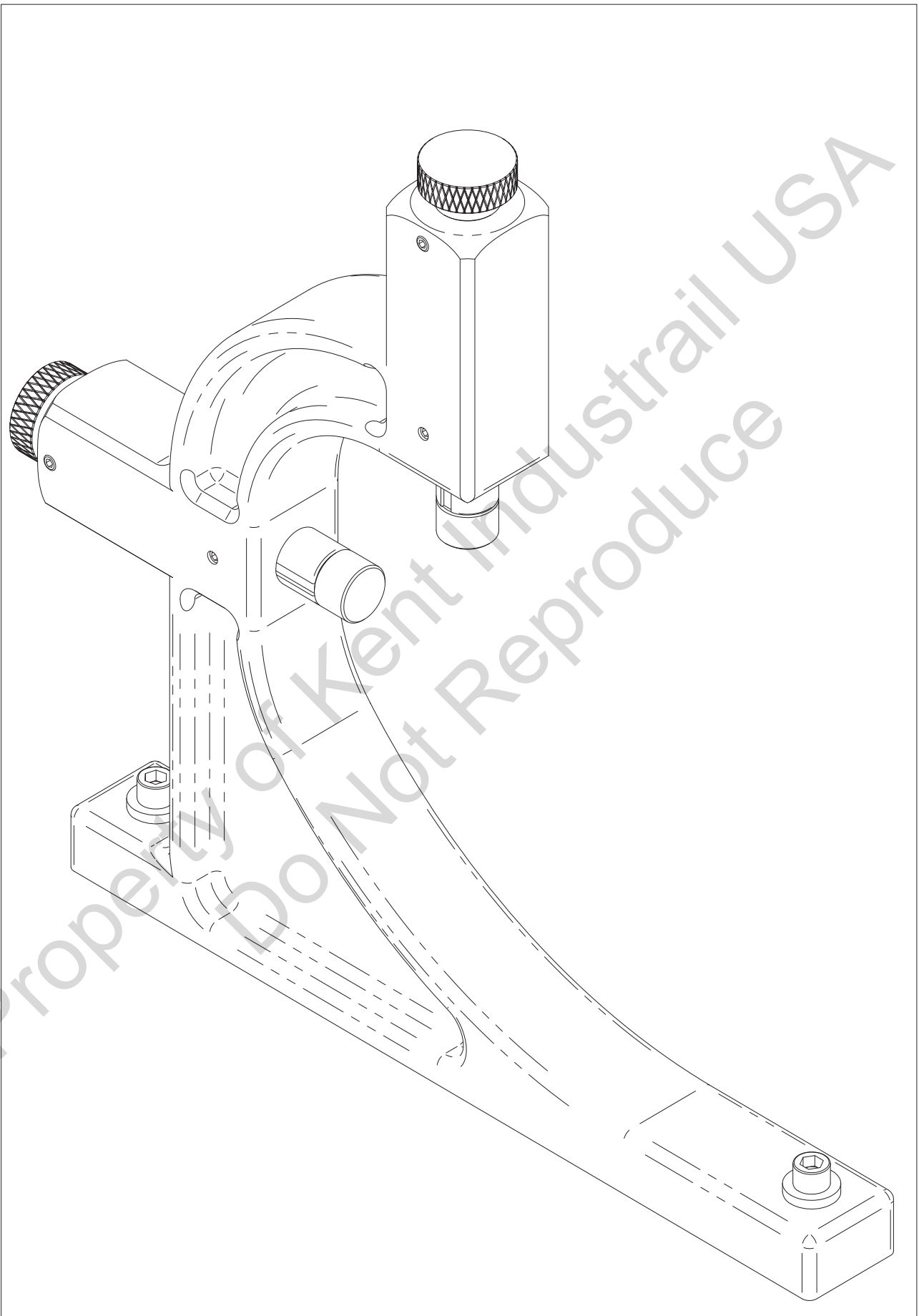
Steady Rest



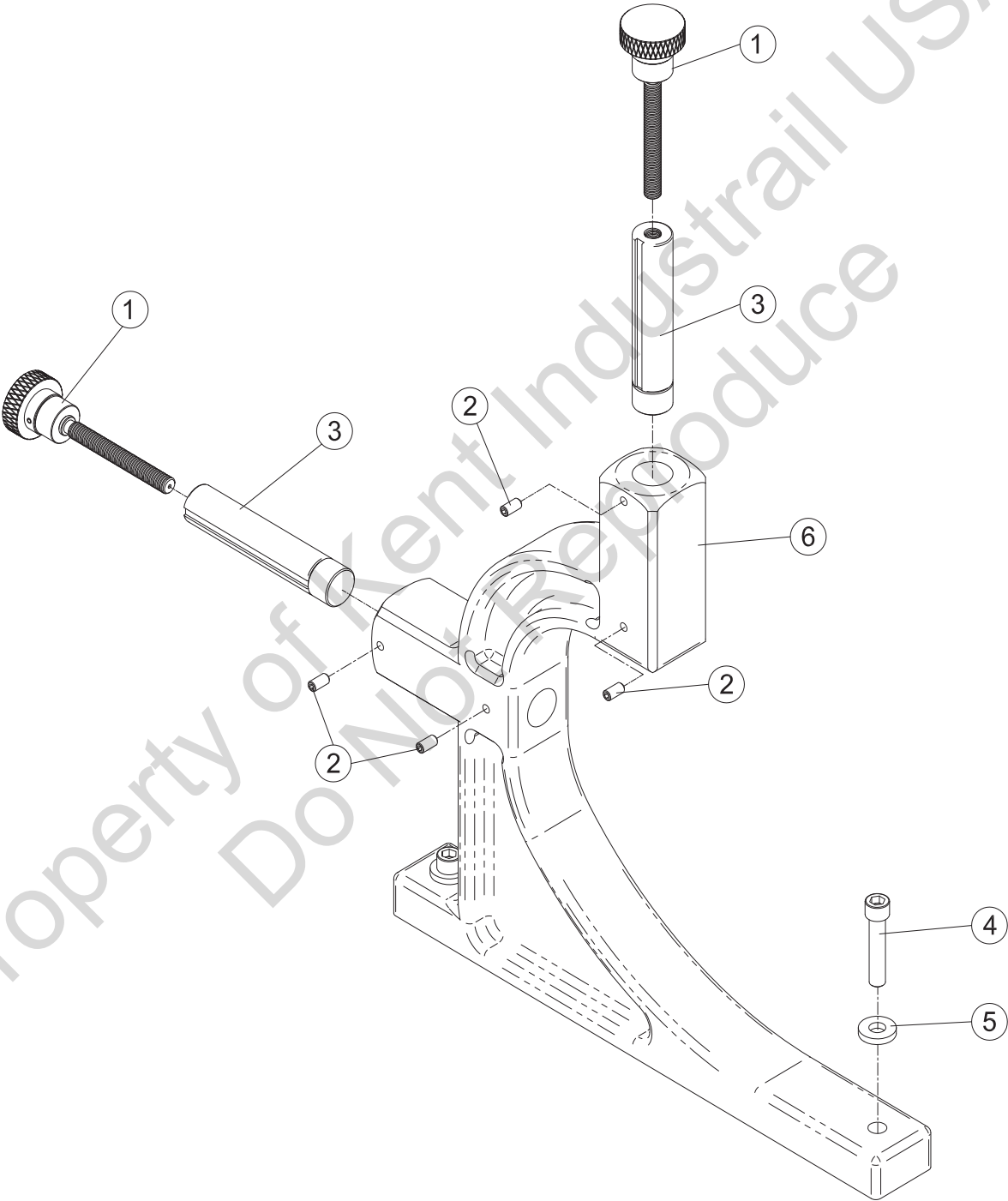
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Follow Rest



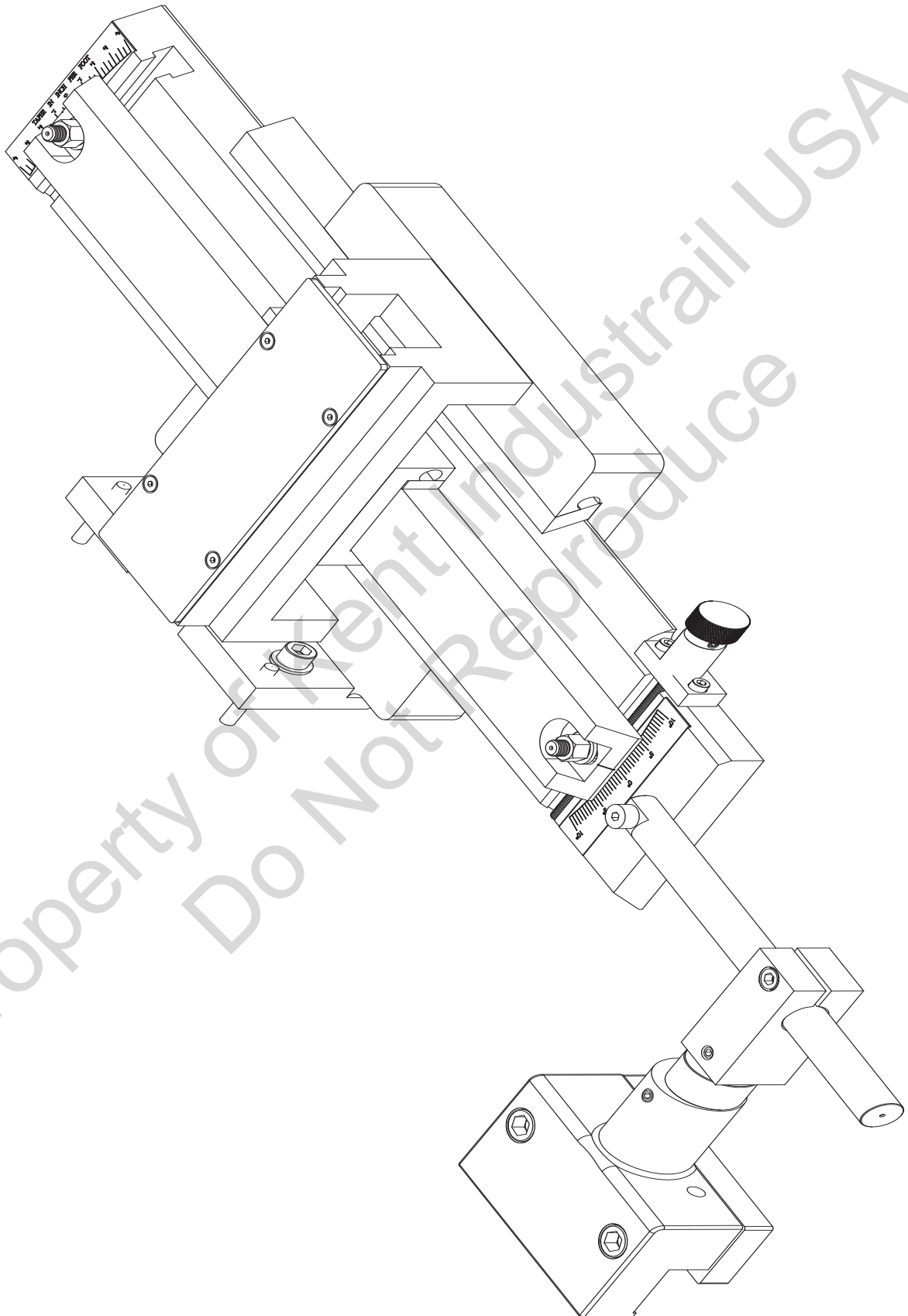
Follow Rest



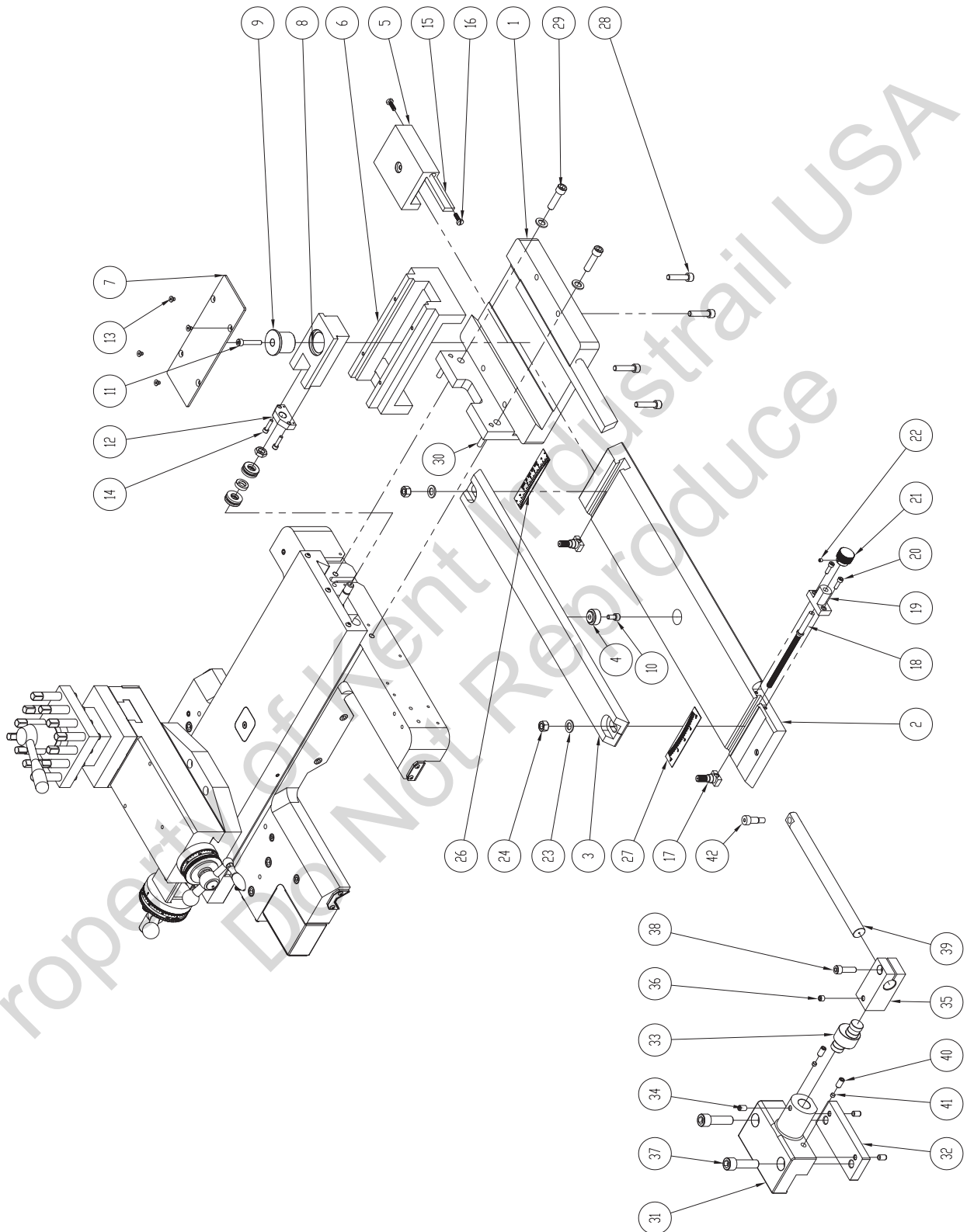
Follow Rest

FOLLOW REST									
Page 1/2									
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	70092	Adjustung knob	2						
		Spring pin	2	Ø4x30					
	70094	Collar	2						
	70093	Follow the tool post bolt	2						
2		Set	4	M8x16					
3	70095	Finger	2						
	70095-1	Copper	2						
4		Hex. cover head cap screw	2	M12x60					
5	70096	Spacer	2						
6	70091	Casting	1						
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TAPER ATTACHMENT



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TAPER ATTACHMENT

TAPPER TURNING ATTACHMENT									
					Page 1/1				
NO.	PARTS NO.	PARTS NAME	QTY	REMARK	NO.	PARTS NO.	PARTS NAME	QTY	REMARK
1	80001	Base	1						
2	80002	Longitudinal slide plate	1						
3	80003	Tapered guide board	1						
4	80004	Locating spindle	1						
5	80005	Rotation slide chair	1						
6	80006	Fixed base	1						
7	80009	Upper press cover	1						
8	80007	Cross slide	1						
9	80024	Upper locating sleeve	1						
10		Hex. cover head cap screw	1	M8x16					
11		Hex. cover head cap screw	1	M8x45					
12	80008	Thrust plate	1						
13		Flat head socket	4	M6x8					
14		Hex. cover head cap screw	2	M6x25					
15	80020	Wedge	1						
16	80023	Adjusting screw	4						
17	80012	Nut	2						
18	80010	Adjusting screw	1						
19	80011	Thrust seat	1						
20		Hex. cover head cap screw	2	M6x20					
21	80014	Hand wheel	1						
22		Hex. socket set screw	1	M6x6					
23		Washer	4	M12					
24		hexagonal nut	2	M12x1.75					
25	80015	Wedge	1						
26	80026	Taper sign	1						
27	80025	Angle sign	1						
28		Hex. cover head cap screw	4	M10x45					
29		Hex. cover head cap screw	2	M12x45					
30		Taper pin	2	# 6x1 1/2"L					
31	80019	Pull rod fixed seat	1						
32	80021	Locating press plate	1						
33	80018	Eccentric connecting lever	1						
34		Hex. cover head cap screw	1	M10x16					
35	80017	Pull rod clamp	3						
36		Hex. socket set screw	1	M10x10					
37		Hex. cover head cap screw	2	M16x55					
38		Hex. cover head cap screw	1	M10x35					
39	80013	Pull rod	1						
40		Hex. socket set screw	2	M10x20					
41	63051	Copper block	2						
42	80016	Contour screw	1						