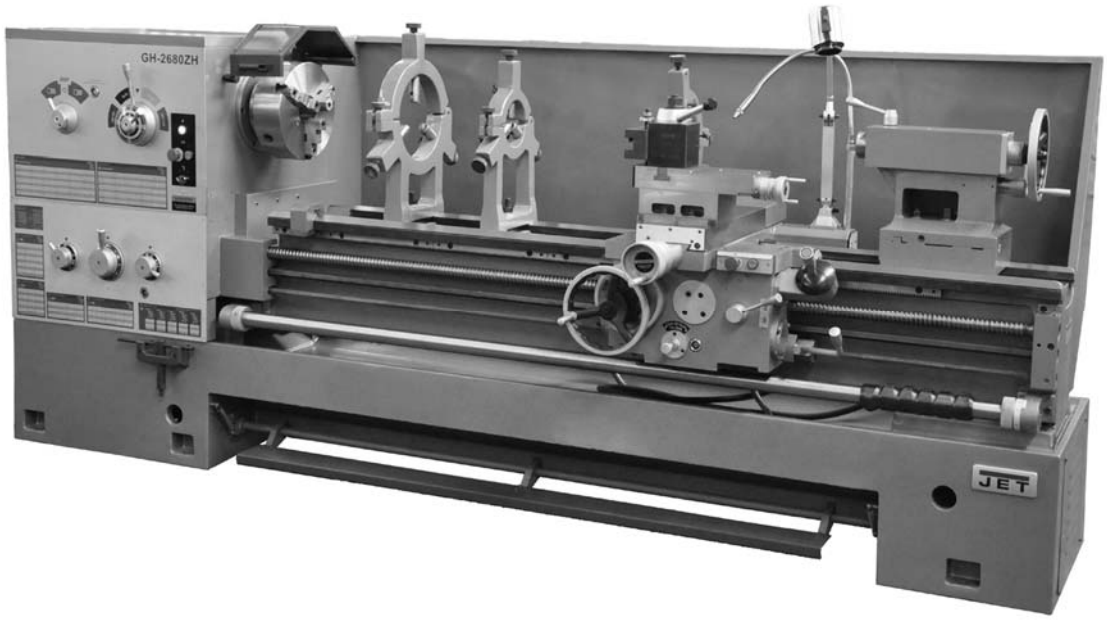
Operation and Maintenance Instructions

ZH Series Large Bore Lathes

Models GH-2680ZH; GH-26120ZH



Model GH-2680ZH shown

For ZH-Series Lathes Parts List and Electrical Diagrams, see document M-321860-1

1.0 IMPORTANT SAFETY INSTRUCTIONS

1. Read and understand the entire owner's manual before attempting assembly or operation.
2. Read and understand the warnings posted on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury.
3. Replace the warning labels if they become obscured or removed.
4. This lathe is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a lathe, do not use until proper training and knowledge have been obtained.
5. Do not use this lathe for other than its intended use. If used for other purposes, JET disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear approved safety glasses/face shields while using this lathe. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
7. Before operating this lathe, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended. Do **not** wear gloves.
8. Wear ear protectors (plugs or muffs) during extended periods of operation.
9. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
10. Make certain the switch is in the **OFF** position before connecting the machine to the power supply.
11. Make certain the machine is properly grounded.
12. Make all machine adjustments or maintenance with the machine unplugged from the power source.
13. Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
14. Keep safety guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately after maintenance is complete.
15. Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
16. Provide for adequate space surrounding work area and non-glare, overhead lighting.
17. Keep the floor around the machine clean and free of scrap material, oil and grease.
18. Keep visitors a safe distance from the work area. **Keep children away.**
19. Make your workshop child proof with padlocks, master switches or by removing starter keys.
20. Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.
21. Maintain a balanced stance at all times so that you do not fall or lean against moving parts. Do not overreach or use excessive force to perform any machine operation. Never force the cutting action.
22. Maintain a balanced stance at all times so that you do not fall or lean against moving parts. Do not overreach or use excessive force to perform any machine operation. Never force the cutting action.
23. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and more safely.
24. Use recommended accessories; improper accessories may be hazardous.
25. Maintain tools with care. Keep cutting tools sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
26. Do not attempt to adjust or remove tools during operation.
27. Never stop a rotating chuck or workpiece with your hands.
28. Choose a low spindle speed when working unbalanced workpieces, and for threading and tapping operations.
29. Do not exceed the maximum speed of the workholding device.
30. Do not exceed the clamping capacity of the chuck.

31. Workpieces longer than 3 times the chucking diameter must be supported by the tailstock or a steady rest.
32. Avoid small chuck diameters with large turning diameters.
33. Avoid short chucking lengths and small chucking contact.
34. Turn off the machine and disconnect from power before cleaning. Use a brush to remove shavings or debris — do not use your hands.
35. Do not stand on the machine. Serious injury could occur if the machine tips over.
36. Never leave the machine running unattended. Turn the power off and do not leave the machine until moving parts come to a complete stop.
37. Remove loose items and unnecessary work pieces from the area before starting the machine.
38. Do not operate the lathe in flammable or explosive environments. Do not use in a damp environment or expose to rain.

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

- lead from lead based paint
- crystalline silica from bricks, cement and other masonry products
- arsenic and chromium from chemically treated lumber

Familiarize yourself with the following safety notices used in this manual:

⚠CAUTION This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.

⚠WARNING This means that if precautions are not heeded, it may result in serious injury or possibly even death.

4.0 **Specifications**

	GH-2680ZH	**GH-26120ZH**
Model Number		
Stock Number	321860	321890

General Capacities:

Maximum Swing over Bed	26” (660mm)	26” (660mm)
Maximum Swing over Cross Slide	16-1/2” (420mm)	16-1/2” (420mm)
Maximum Swing Through Gap	34” (870mm)	34” (870mm)
Length of Gap	7-7/8” (200mm)	7-7/8” (200 mm)
Distance between Centers	80” (2030mm)	120” (3050mm)
Width of Bed	16” (405mm)	16” (405mm)

Motors and Electrical:

Main Motor	TEFC Induction	TEFC Induction
Horsepower	10 HP (7.5kW)	10 HP (7.5kW)
Phase	3 PH	3 PH
Voltage	230/460V (prewired 230V)	230/460V (prewired 230V)
Full Load Amps	25.4/12.7A	25.4/12.7A
Cycle	60 Hz	60 Hz
Feed Motor	Induction	Induction
Horsepower	1/2 HP	1/2 HP
Phase	3 PH	3 PH
Voltage	230/460V (prewired 230V)	230/460V (prewired 230V)
Full Load Amps	2.85/1.65A	2.85/1.65A
Cycle	60 Hz	60 Hz
Coolant Pump Motor	Induction	Induction
Horsepower	1/8 HP	1/8 HP
Phase	3 PH	3 PH
Voltage	230/460V (prewired 230V)	230/460V (prewired 230V)
Full Load Amps	0.54/0.27A	0.54/0.27A
Cycle	60 Hz	60 Hz
Power Transmission	v-belt (x 4)	v-belt (x 4)
Controls circuit	110V A.C.	110V A.C.
Lamp circuit	24V A.C.	24V A.C.
Indicators circuit	110V A.C.	110V A.C.

Headstock and Spindle:

Spindle Bore	4-1/8” (105mm)	4-1/8” (105mm)
Spindle Mount	D1-8 Camlock	D1-8 Camlock
Spindle Taper with Sleeve	113mm Dia. 1:20 / MT-5	113mm Dia. 1:20 / MT-5
Number of Spindle Speeds	12	12
Range of Spindle Speeds	36 to 1600 RPM	36 to 1600 RPM
Distance Floor to Spindle Center (approx.)	46”	46”
3-Jaw Scroll Chuck:		
Load Capacity	661 lb (300 kg)	661 lb (300 kg)
Inside Diameter	5-11/16” (145mm)	5-11/16” (145 mm)

Carriage:

Maximum Compound Rest Travel	5-1/2” (140 mm)	5-1/2” (140 mm)
Maximum Compound Rest Swivel	+/- 90 deg.	+/- 90 deg.
Maximum Cross Slide Travel	14-1/16” (358 mm)	14-1/16” (358 mm)
Maximum Carriage Travel	65” (1650mm)	106-1/4” (2700 mm)

	GH-2680ZH	GH-26120ZH
Gearbox:		
Number of Longitudinal Feeds	51	51
Range of Longitudinal Feeds	0.0020 – 0.094 in./rev. (0.051-2.39mm/rev)	0.0020 – 0.094 (0.051-2.39mm)
Number of Cross Feeds	40	40
Range of Cross Feeds	0.0010 – 0.040 in/rev. (0.027-1.02mm/rev)	0.0010 – 0.40 (0.027-1.02mm)
Number of Inch Threads	48	48
Range of Inch Threads	30-2 T.P.I.	30-2 T.P.I
Number of Metric Threads	22	22
Range of Metric Threads	1-14 mm	1-14 mm
Number of Diametral Threads	24	24
Range of Diametral Threads	56-4 D.P.	56-4 D.P.
Number of Modular Threads	18	18
Range of Modular Threads	0.5-7mm	0.5-7mm
Leadscrew Pitch	1/2” (12.7mm)	1/2” (12.7mm)
Tailstock:		
Tailstock Spindle Travel	6” (150mm)	6” (150mm)
Tailstock Taper	MT-5	MT-5
Maximum Tailstock Cross Displacement	+/- 0.40” (10mm)	+/- 0.40” (10mm)
Other:		
Small Steady Rest Capacity	3/4” – 5” (20-125mm)	3/4” – 5” (20-125mm)
Large Steady Rest Capacity	4” – 9.5” (100-240mm)	4” – 9.5” (100-240mm)
Follow Rest Capacity	3/4” – 4” (20-100mm)	3/4” – 4” (20-100mm)
Coolant tank capacity	3.4 gal. (13L)	7.1 gal. (27L)
Overall Dimensions	137-13/16”L x 53-1/8”W x 58-1/16”H (3500 x 1350 x 1475 mm)	177-5/32”L x 48-1/32”W x 58-1/16”H (4500 x 1220 x 1475 mm)
Approximate Net Weight	7932 lbs. (3595 kg)	8010 lbs. (3630kg)

[1]Values are emission levels, not necessarily to be seen as safe operating levels. Since workplace conditions vary, this information is only intended to allow the user to make a better estimation of the hazards involved.

The specifications in this manual were current at time of publication, but because of our policy of continuous improvement, JET reserves the right to change specifications at any time and without prior notice, without incurring obligations.

5.0 **Dimensions and mounting hole centers**

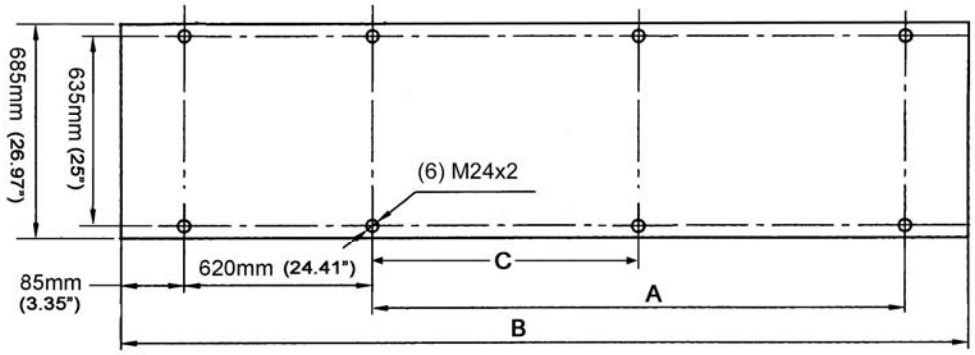


Figure 1

Lathe Size	80 inch (GH-2680ZH)	120 inch (GH-26120ZH)
A	2560mm(100.8 in.)	3565mm(140.4 in.)
B	3500mm(137.60 in.)	4500mm (177.2 in.)
C		1721.5mm (67.8 in)

Table 1

6.0 **General description and nomenclature**

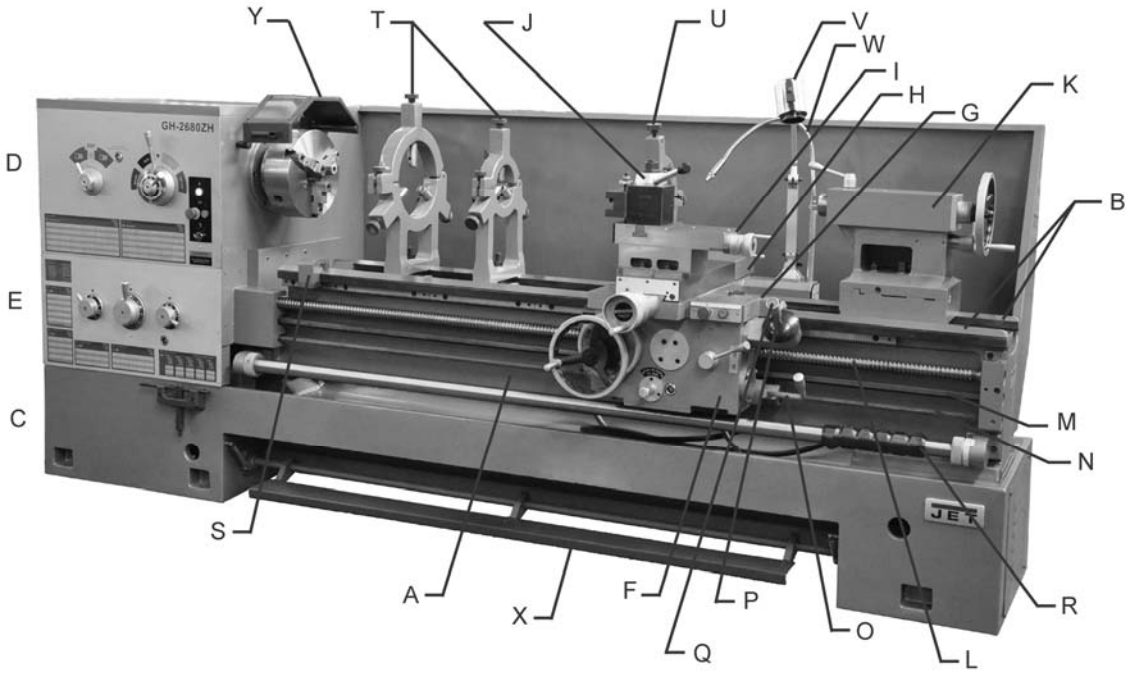


Figure 2 – General Description (GH-2680ZH shown)

The ZH series lathe operates on a centralized gear system. The motor power is transferred through four v-belts to a shaft, which in turn transmits the energy through a multi-disc friction clutch and various gear pairs, to the spindle. The clutch also controls the spindle's direction of rotation. Through clutch disengagement, the operator can stop the spindle without turning off the motor, which will prolong the life of the motor.

Bed and Stand

The lathe bed (A) is made of cast iron with low vibration and high rigidity. Two precision-ground v-slideways (B), reinforced by supersonic fre-quency hardening, offer precision guidance for the carriage. The main drive motor is mounted in the stand (C) below the gearbox.

(The GH-26120ZH model has three stands: left, center, and right).

Headstock

The headstock (D) is cast from high grade, low vibration cast iron. In the head, the spindle is supported at three points; by a cylindrical roller bearing at the front and a tapered roller bearing and ball bearing. See *section 11.0*for detailed explanation of controls. The electrical box is mounted to the rear of the headstock.

Feed Gearbox

The gearbox (E) is made from high quality cast iron and is mounted to the left side of the machine bed. This lathe adopts a three-axle sliding common gear mechanism, together with thread selection change mechanism, and doubling mechanism, which enable it to cut a comprehensive range of metric, modular and diametral pitch threads, thus eliminating the need for gear changes except where special threading is required.

Carriage

The carriage assembly is composed of the *Apron*, the *Saddle*, the *Cross Slide*, the *Compound Rest*, and the four-way *Tool Post*.

Apron (F). Quick travel of the Apron for positioning is accomplished by means of a bed-mounted rack and pinion, operated manually by the handwheel on the front of the apron, or automatically by the feed direction handle (P), which has a rapid traverse (Q).

Saddle (G). The saddle is made from high quality cast iron and rides along the v-ways.

Cross Slide (H). The cross-slide is mounted on the saddle and used for cross feed operations.It moves on a dovetailed slidewhich can be adjusted for play by means of the gibs.

Compound Rest. The compound rest (I), which is T-slotted and mounted on the cross slide, can be rotated 360°, allowing tapers to be turned. The compound rest travels on dovetailed ways, with adjustable gibs.

Quick Change Tool Post. The tool post (J) is a turret design, mounted to the compound rest. It holds up to one tool.

Tailstock

The tailstock (K) slides on a v-way and can be locked at any location by a clamping lever. The tailstock has a heavy duty quill with a No. 5 Morse Taper and etched graduation scale. The tailstock can be offset for taper cutting, and bearings can be adjusted for drag along the ways.

Leadscrew and Feed Rod

The leadscrew (L) and feed rod (M) are mounted on the front of the machine bed. They are connected to the gearbox at the left and are supported by bearings on both ends.

The leadscrew is used only for threading functions. This maintains its accuracy and prolonged service life.

Spindle Direction Control Axle(N)

Spindle rotation can be reversed by simply moving the control lever (O) mounted at the right of the carriage. (Allow spindle to come to a stop before reversing.)

Travel Stops

Six stops (R)can be moved to any position along the travel setting rod, and are secured in place using socket head screws. The convex surface of the stop contacts a limit switch on the underside of the apron. The travel setting rod can be rotated on an eccentric into six positions to modulate the contact between stops and limit switch.

A carriage stop (S) is also provided for manual carriage operation.

Steady Rest

The ZH series lathes are provided with small and large steady rests (T). A steady rest serves as a support for shafts on the free tailstock end. The steady rest is mounted on the bedway and secured from below with a bolt, nut and locking plate.

Follow Rest

The traveling follow rest (U) is mounted to the saddle, and thus follows the movement of the turning tool. Only two fingers are required as the place of the third is taken by the turning tool. The follow rest is used for turning operations on long, slender work pieces. It prevents the work piece from flexing under the pressure of the cutting tool.

Work Lamp

Adjustable halogen lamp (V) with independent on/off switch.

Coolant Nozzle(W)

Fully adjustable gooseneck; flow is regulated through a valve lever at its base.

Foot Brake(X)

Activates a braking strap at the motor for emergency stopping of all lathe functions.

Chuck Guard (Y)

7.0 **Unpacking**

Open shipping container and check for shipping damage. Report any damage immediately to your distributor and shipping agent. Do not discard any shipping material until the Latheis set up and running properly.

Compare the contents of your container with the following parts list to make sure all parts are intact. Missing parts, if any, should be reported to your distributor. Read the instruction manual thoroughly for set up, maintenance and safety instructions.

7.1 **Contents of the Shipping Container**

(Refer to Figure 3)

1 Lathe
2 Steady Rests (mounted on Lathe)
1 Follow Rest (mounted on Lathe)
1 Three Jaw Scroll Chuck, 12-25/32" (mounted on Lathe) **– A**
1 Drive Plate – **B**
4 Tool Holder – **C**
1 Face Plate, 24-25/32" (with 6 dogs) – **D**
1 Round Nut Spanner, 170-210 mm – **E**
4 Change Gears – 63T, 69T, 78T, 90T – **F**
1 Tool Box, containing the following:
  1 Morse Reduction Sleeve – **G**
  1 Live Center, MT-5 – **H**
  1 Dead Center, MT-5 – **I**
  2 Drive Pins – **J**
  1 Cam Wrench – **K**
  1 Chuck Wrench – **L**
  2 Hex Socket Head Cap Screw – **M**
  1 Gap Bridge Pin Driver – **N**
  1 Drift Key – **O**
  1 Round Nut Spanner (45-52 mm) – **P**
  1 Hex Key Set (2, 3, 4, 6,8,10,12 mm) – **Q**
  6 Leveling Bolts with Hex Nuts – **R** (qty. 8 for GH-26120ZH)
  6 Leveling Pads – **S** (qty. 8 for GH-26120ZH)
  1 Flat Blade Screwdriver – **T**
  1 Cross Point Screwdriver – **U**
  2 Open End Wrenches (17/19,19/22) – **V**
  1 White Touch-up Paint Can – **W**
  1 Oil Gun – **X**
  1 Operating Instructions Manual
  1 Parts List Manual
  1 Warranty Card
  1 Test Record
  1 Packing List

NOTE: Optional accessories are available for JET Lathes, such as Taper Attachment, Collet Closer and Digital Read Out. Contact your dealer or JET for more information.

Figure 3
ZH Series Lathes – Contents of Shipping Container

8.0 **Installation**

1. Finish removing all crate material from around lathe.
2. Unbolt lathe from shipping pallet.
3. Choose a location for the lathe that is dry and has sufficient illumination.
4. Allow enough room to service the lathe on all four sides, and to load and off-load work pieces. In addition, if bar work is to be performed, allow enough space for stock to extend out the headstock end. If used in production operations, leave enough space for stacking unfinished and finished parts.
5. The foundation must be solid to support the weight of the machine and prevent vibration, preferably a solid concrete floor.
6. The lathe's center of weight is near the headstock. Before lifting, move the tailstock and the carriage *(release carriage lock, section 11.0)* to the right end of the bed and lock them.
7. Sling the lathe using steel rods or pipes of sufficient strength inserted through the holes in the stand (see Figure 4). **Do not lift lathe by the spindle.** With properly rated lifting equipment, slowly raise the lathe off the shipping pallet.

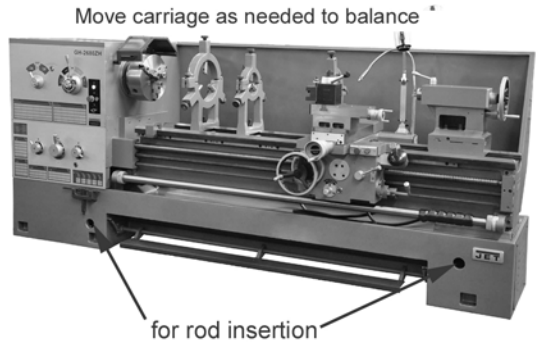


Figure 4 – Lifting preparation

⚠CAUTION Confirm that all suspension equipment is properly rated and in good condition for lifting the lathe. Do not allow anyone beneath or near the load while lifting.

8. The lathe can be placed upon the cast iron leveling pads under each foot hole, and adjusted using the adjusting bolts with hex nuts. Or, it may be secured to the floor usingboltsplaced head-down in the concrete, and using shims where needed to level the machine.

8.1 **Leveling the lathe**

It is imperative that the lathe be on a level plane; that is, where headstock and tailstock center points remain aligned throughout the tailstock travel, with the bed ways absent of twist and thus parallel to the operational center line.

A lathe which is not properly leveled will be inaccurate, producing tapered cuts. Also, the center point of the tailstock will vary as it is positioned along the bed, thus requiring constant readjustment of the set of the tailstock.

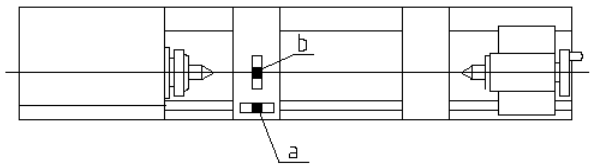


Figure 5 – Leveling

9. Use a machinist's precision level on the bed ways both front to back and side to side, as shown in Figure 5. Take the reading in one direction every 10 inches. Make sure the ways are clean and free of any debris before placing a level upon them.
10. Deviation over bed length*(see Figure 5)*:
    (a) Maximum 0.02/1000mm
    (b) Maximum 0.04/1000mm
11. Tighten foot screw nuts evenly to avoid distortion.
12. Leveling should be inspected occasionally, and especially if the accuracy of the lathe beings to diminish.

8.2 **Completing installation**

13. Exposed metal surfaces have been coated with a rust protectant. Remove this using a soft rag and mild commercial solvent or kerosene. Do not use paint thinner, gasoline, or lacquer thinner, as these will damage painted surfaces. Cover all cleaned surfaces with a light film of ISO68/SAE-20W machine oil, such as Mobil DTE Oil Heavy Medium.
14. Open the end gear cover. Clean all components of the end gear assembly and coat all gears with a heavy, non-slinging grease. Close the end gear cover. (Note: A limit switch prevents the lathe from operating when the end gear cover is open.)

8.3 **Chuck Preparation**

WARNING **Read and understand all directions for chuck preparation. Failure to comply may cause serious injury and/or damage to the lathe.**

The three-jaw scroll chuck is shipped pre-installed on the lathe. It can be used for clamping cylindrical, triangular and hexagonal stock, and has reversible jaws.

Note: An optional 4-jaw chuck is available (part no. ZH-2504). See your dealer to order.

WARNING **Use an assistant or hoist to help remove a chuck.**

Before removing a chuck, place a flat piece of thick plywood across the bedways under the chuck to prevent damage to the bedways should the chuck fall from your hands. Alternatively, many users make a wood chuck cradle that sits atop the ways and accepts the specific diameter of chuck. Figure 6 shows an example.

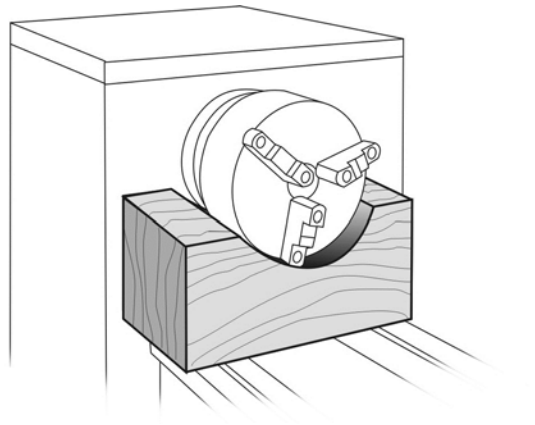


Figure 6 – Chuck cradle (not included)

To remove a chuck from the spindle:

1. Support the chuck while turning six camlocks 1/4-turn counterclockwise, using the chuck wrench from the tool box. See Figure 7.
2. Carefully remove the chuck from the spindle and place on a firm work surface. If the spindle seems stuck, use a mallet at various points on the back side to help free it from the spindle.
3. Inspect the camlock studs. Make sure they have not become cracked or broken during transit. Clean all parts thoroughly with solvent. Also clean the spindle and camlocks.
4. Cover all chuck jaws and the scroll inside the chuck with #2 lithium tube grease. Cover the spindle, camlocks, and chuck body with a light film of 20W oil.
5. Lift the chuck up to the spindle nose and press onto the spindle. Tighten in place by turning the camlocks 1/4 turn clockwise. The index mark (A, Figure 7) on the camlock should be between the two indicator arrows (B) when tight, as shown in Figure 7.
   - If the index mark (A) is *not* between the two arrows, i.e. the cam turns beyond the indicator arrows, then remove the chuck and turn the camlock stud IN one full turn.
   - If a camlock will not engage, remove the chuck and turn the camlock stud OUT one full turn.
6. Make sure chuck is secure on the spindle with the camlocks correctly engaged.

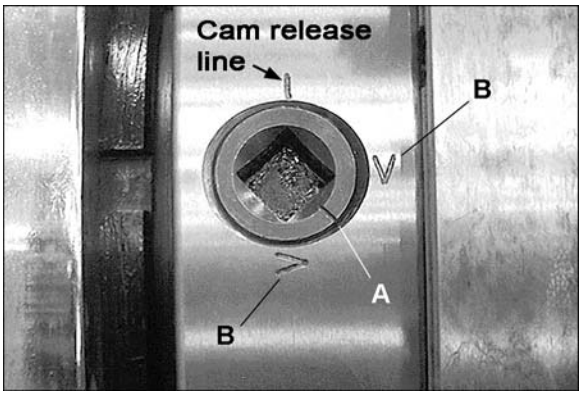


Figure 7 – Camlocks

8.4 **Break-In Period**

Do not run the lathe above 560 RPM for the first six hours of operation, to allow gears and bearings to adapt and run smoothly.

9.0 **Maintenance/Lubrication**

⚠CAUTION **Lathe must be serviced at all lubrication points and all reservoirs filled to operating level before the lathe is put into service. Failure to comply may cause serious damage to the lathe.**

The ZH series lathe is shipped with oil in the reservoirs. Coolant is not included.

Use clean lubricants and check levels often, including before each working shift. To ensure proper lubrication, oil levels should not be less than the center of the oil sight glass. Try not to overfill, as this may cause leakage.

A chart is supplied in *section 15.0* for quick reference to all lubrication points.

Unless specified otherwise, the lubrication points require a non-detergent, ISO 68, SAE 20W oil. The recommended brand for this lathe is Mobil DTE® Oil Heavy Medium.

1. **Headstock** – Oil must be up to indicator mark in oil sight glass at the *rear* of the headstock. [NOTE: The sight glass on the *front* of the headstock (A, Figure 8) verifies operation of the oil pump, the one at *rear* of headstock (not shown) indicates oil level]. Top off with SAE 20W oil. Fill by removing the rubber mat and unscrewing the plug (B) on top of the headstock.
2. To drain the headstock, remove the nut on the drain pipe (C, figure 9). Drain oil completely and clean out all metal shavings, then rinse the casting case with kerosene. During the breaking-in process for the lathe, the first oil change should be after 10 days; the second after 20 days. Then change the oil in the headstock every three months.

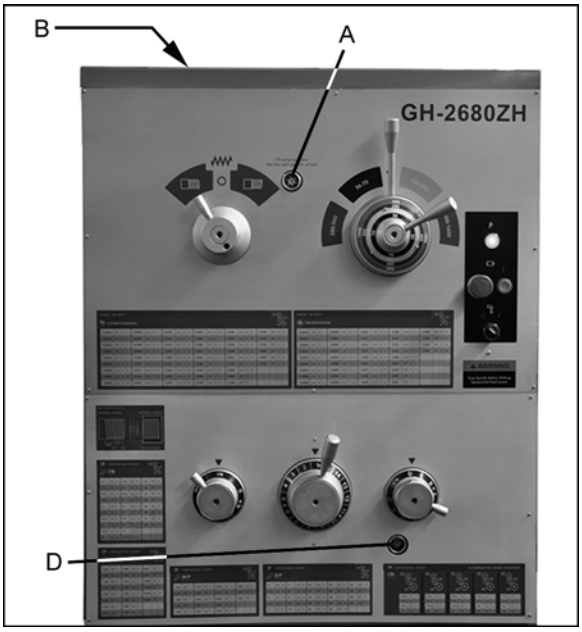


Figure 8 – Headstock lubrication

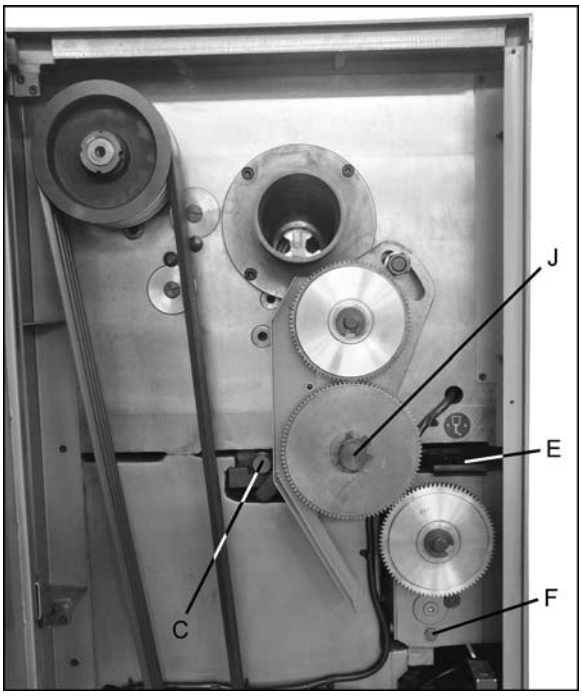


Figure 9 – Lubrication points

3. **Oil Filter** – The filter should be cleaned once a month. To access, open the top cover on the headstock, unscrew the nut on the oil line, and pull up the oil line to bring the filter up. See Figure 10. Use a brush to clean.

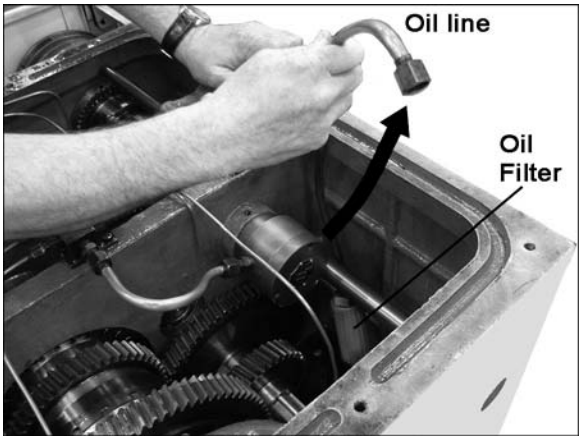


Figure 10 – Oil filter access

4. **Change Gea**r Axle – Periodically remove end plug (J, Figure 9) and press #2 lithium grease into the axle to lubricate the gear axle and sleeve. Coat all gears with non-slinging grease.

5. **Gearbox** – Oil must be up to indicator mark in oil sight glass (D, Figure 8). Top off with SAE 20W oil. To add oil to the gearbox, pour it into the pan (E, Figure 9). To drain, remove drain plug (F, Figure 9). Drain oil completely and refill after the first three months of operation. Then change oil in the gearbox every six months.

6. **Apron** – Oil must be between indicator marks in the oil sight glass (G, Figure 11). Top off with SAE 20W oil. Unscrew oil plug (H, Figure 11) to fill. To drain, remove drain plug on the underside of apron. Drain oil completely and refill after the first three months of operation. Then, change oil in the apron annually.

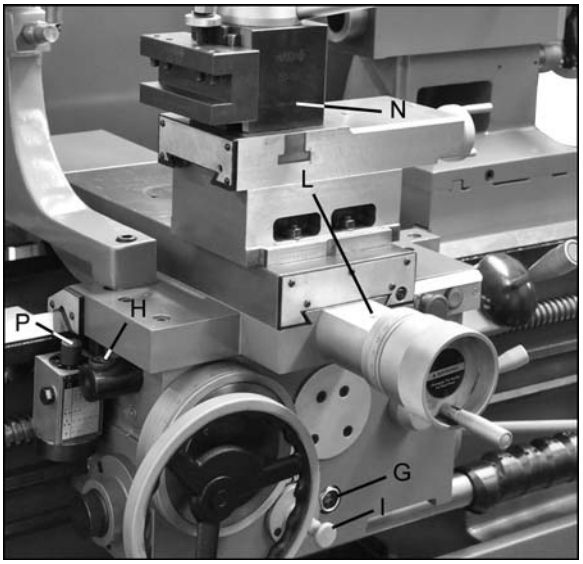


Figure 11 – Lubrication points

7. *One-shot Lube System:*Pull knob (I, Figure 11) and hold for several seconds to allow oil to fill the pump from the apron reservoir. Then release the knob which will push the oil through various oil lines to lubricate the ways below the saddle. Perform this several times daily.

8. Threading Dial – Frequently lubricate via one ball oiler (P, Figure 11) on top of the dial with SAE 20W oil.

9. Cross Slide – Daily lubricate one ball oiler on the handwheel housing (L, Figure 11)and three ball oilers on the platform (K, Figure 12), with SAE 20W oil.

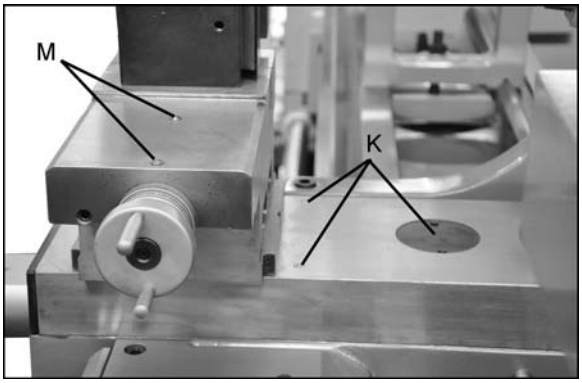


Figure 12 – Lubrication points

10. **Saddle** – The anti-dust felt on both ends of the v-guide ways (Figure 13) should be cleaned weekly with kerosene. If the felt becomes damaged, replace it.

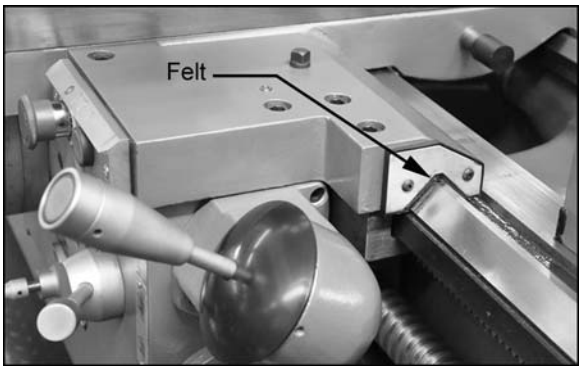


Figure 13 – Anti-dust felt

11. **Compound Re**st – Daily lubricate two ball oilers (M, Figure 12) on top of compound rest with SAE 20W oil.

12. **Tool Post** – Regularly clean dirt and coolant from around the tool post to maintain its re-positioning accuracy(N, Figure 11).

13. **Leadscrew, Feed Rod, and Direction Control Axle** – Slide the cover on the right side bracket (Figure 14) to expose the oil port and fill with SAE 20W oil daily. The oil is distributed to all three elements by a woolen line.

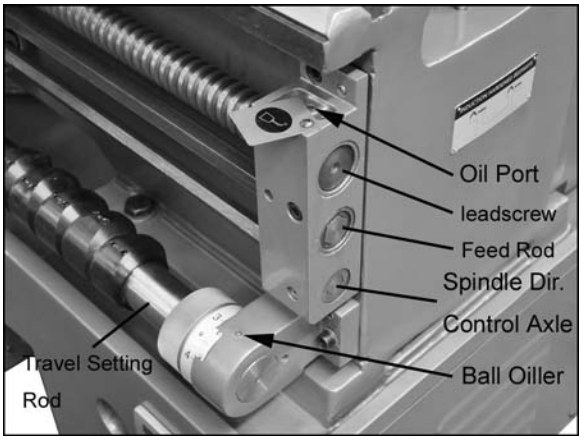


Figure 14 – Lubrication points

14. **Travel Setting Rod** – Periodically insert SAE 20W oil into the ball oiler on each end of the rod (Figure 9).

15. **Tailstock** – Daily lubricate two ball oilers (Figure 15) on top of tailstock with SAE 20W oil.

    The anti-dust felt beneath the tailstock that runs along the ways should be cleaned weekly with kerosene. If the felts become damaged, replace them.

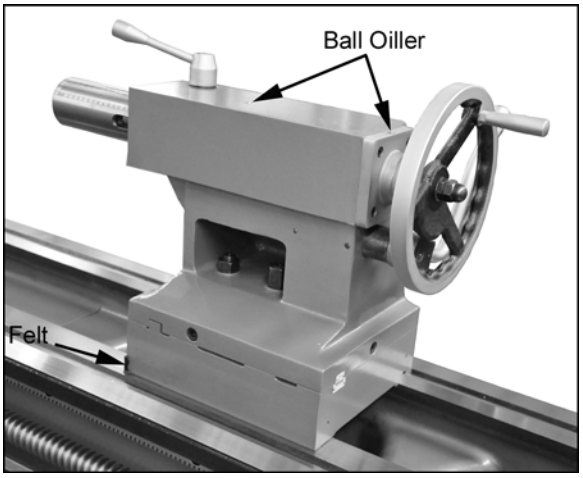


Figure 15 – Tailstock lubrication

16. **V-Belts** – Regularly check and adjust the tightness of the v-belts to prolong their service life. See *section 13.5*.

9.1 Coolant Preparation

⚠CAUTION Follow local regulations and/or coolant manufacturer's recommend-dations for use, care and disposal.

1. *GH-2680ZH:* Remove access cover on the tailstock end of the lathe stand. Make sure coolant pump has not shifted during transport. Pour four gallons (approximate) of coolant mix into the reservoir.

   GH-26120ZH: Pour coolant (approx. four gallons) into one of the chip trays (Figure 16). Or, slide out one of the chip trays and pour directly into the side trough on the center stand.

2. After machine has been connected to power, turn on coolant pump and check to see that coolant is cycling properly. Flow is controlled by the tap at the base of the nozzle.

3. Reinstall access cover or chip tray.

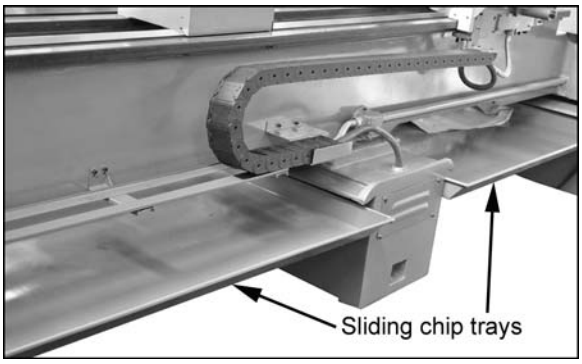


Figure 16 – GH-26120ZH chip trays

10.0 Electrical Connections

⚠WARNING Electrical connections must be made by a qualified electrician in compliance with all relevant codes. This machine must be properly grounded while in use to help protect the operator from electrical shock and possible fatal injury.

The main motor is rated for 230/460V and comes from the factory prewired at 230V. Confirm that power available at the lathe's location is the same rating as the lathe.

A minimum 10-gauge wire should be used for incoming power leads.

IMPORTANT: The lathe must be wired properly and phased correctly. *The spindle must rotate counterclockwise* (as viewed from the tailstock end) while the *feed rod must rotate clockwise* (as viewed from the tailstock end). If the motor runs and the lathe operates, but the *rapid traverse does not function*, this signals that the machine has been incorrectly phased. If this occurs, disconnect lathe from power source and switch any two of the three power leads (not the green ground wire).

Main Power Switch (Figure 17).

Power Source Cable Receiver (Figure 17).

Make sure the lathe is properly grounded.

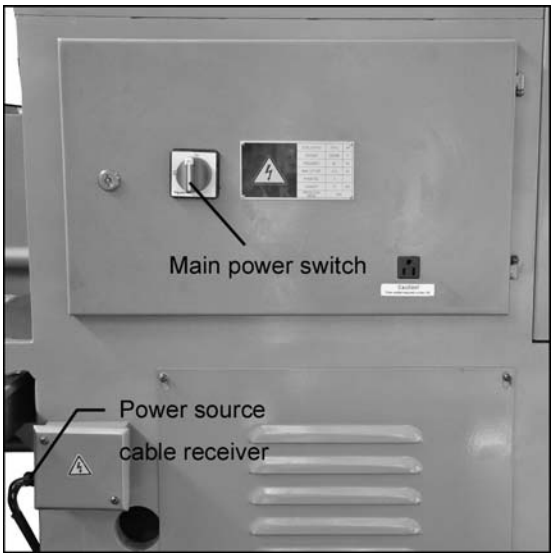


Figure 17 – Power input

10.1 **Conversion to 460 Volt Operation**

⚠WARNING Disconnect machine from power source. Failure to do so may cause serious or fatal injury.

Wiring diagrams are located at the relevant areas on the machine; each diagram is also provided in *section 17.0*. Should discrepancies exist, the diagrams on the machine take precedence.

There are four steps involved in converting to 460 volt power:

1. **Main Motor:** Open lower panel at rear of lathe beneath the gearbox, and change the wires in the junction box on the main motor, according to the diagram on the junction box cover.
2. **Rapid Feed Motor:** Remove the control panel on the saddle (Figure 18) to rewire the rapid feed motor. Change the leads according to the wiring diagram in *sect. 17.0.***It is not necessary to pull out the rapid feed motor for voltage conversion.**

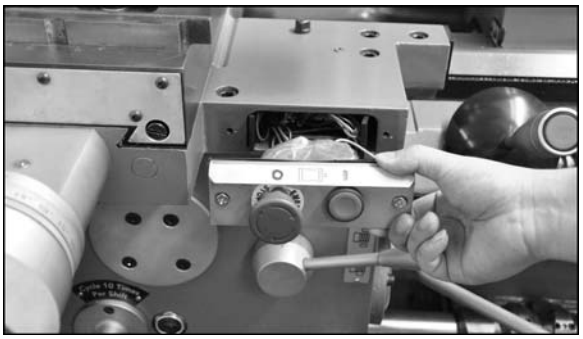


Figure 18 – Rapid feed motor wire access

3. **Coolant Pump:**

   *GH-2680ZH:*Open access panel on the base at the tailstock end. Change wires in coolant pump junction box according to diagram on the junction box cover.

   GH-26120ZH:

   1) Remove top panel inside the bed (Figure 19).
   2) Remove rear panel on center stand then remove the two socket head screws (Figure 20) that secure the plate on which the coolant pump is mounted.

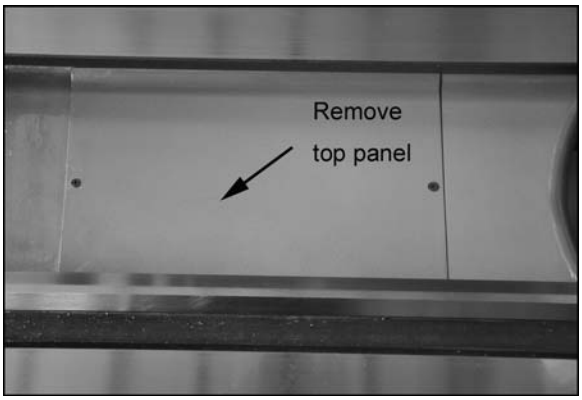


Figure 19 –Coolant pump access (GH-26120ZH)

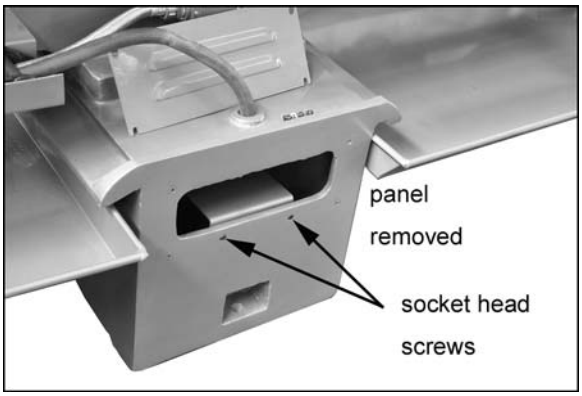


Figure 20 – Coolant pump access (GH-26120ZH)

   3) Tilt the plate until you can reach the coolant pump junction box through the top opening in the bed. Follow the diagram on the coolant pump to change the leads.
   4) Properly orient the pump, and secure the plate with the two screws.
   5) Close both covers.

4. **Transformer:** Open electrical box on rear of machine on the headstock side. Switch wire from 230V terminal to 460V terminal as outlined on the transformer label. See Figure 21.

Voltage conversion is now complete. Close the electrical box before operating the lathe.

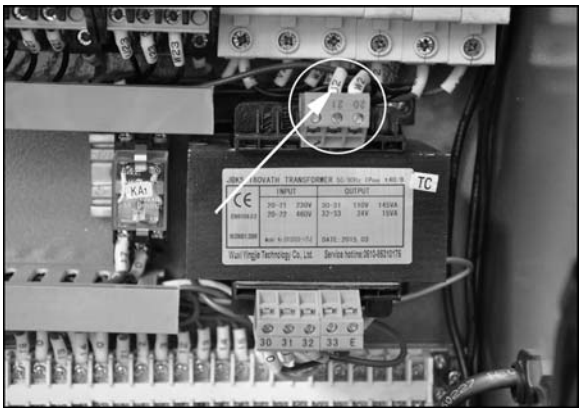


Figure 21 – Transformer rewiring

11.0 **Basic Controls**

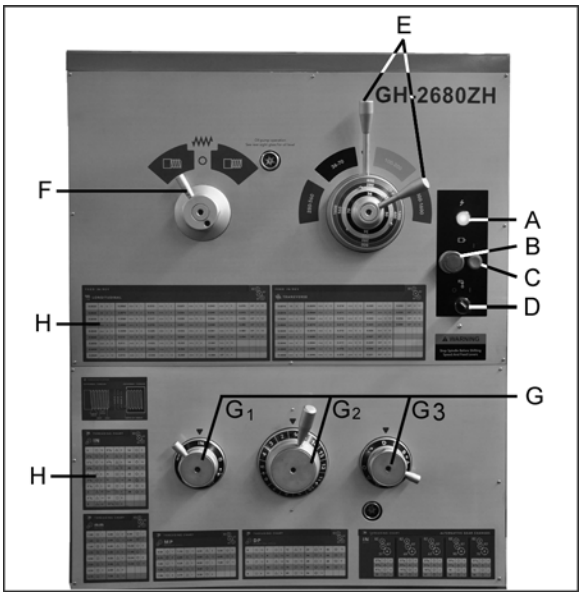


Figure 22 – Headstock Controls

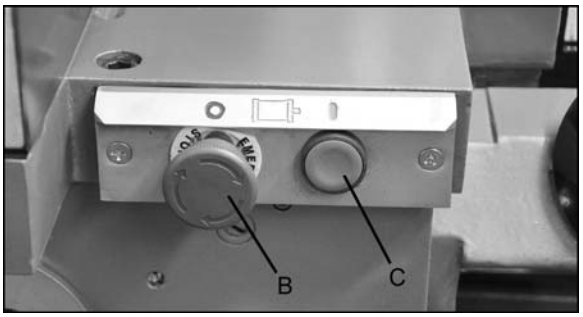


Figure 23 – Alternate controls

1. **Control Panel:** Located on front of headstock. An abbreviated control panel is also mounted to front of carriage.

   - **Power Indicator Light** (A, Figure 22). Illuminates whenever lathe is receiving power.

   - **Emergency Stop Button** (B, Figure 22 and 23). Shuts down all machine functions. ***NOTE:*** *Lathe will still have power.* Twist button clockwise to reset.

   - **ON Button** (C, Figure 22 and 23). Activates motor.

   - **Coolant On-Off Switch** (D, Figure 22). Activates coolant pump.

2. **Speed Selection Levers** (E, Figure 22): Located on front of headstock. Move levers left or right to desired spindle speed, according to accompanying chart on the dial.

3. **Feed Direction Lever** (F, Figure 22): Located on front of headstock. Moving the lever changes direction of feed. Center position is neutral.

   ⚠CAUTION Do not move feed direction lever while machine is running.

4. **Thread Pitch and Feed Selector Levers** (G, Figure 22): Located on front of headstock, are used conjunctively to set up for threading or feeding, according to the accompanying chart (H).

   Lever G_1 is used to control/change between the different thread styles, and is also used for altering the feed setting.

   The symbols on the dial are identified as follows:

   mm = metric threads
   IN = inch threads
   MP = module pitch
   DP = diametral pitch
   ⊓ = when this position is selected, the input shaft of the gearbox is directly connected to the lead screw, and will bypass the gearbox.
   This function is available for cutting special thread forms or nonstandard thread forms, which are not covered by the standard gearbox drive train set-up.
   Note: Control dial **G_3** must be set to position ○ for this operation.

   Example: The current standard set of gears installed with the machine are 82, 97, and 81. This will give a thread pitch equal to 0.506” (12.857mm).

   Calculating pitch:

   $$P=\frac{(82/97) \times (97/81)}{2} = 0.6061\text{”} \ (12.857\text{mm})$$

   Nonstandard threads are attained by changing gears in the gear train, based on this calculation.

   Lever G_2 selects the pitch of the thread and the feed/revolution.

   Lever G_3 doubles the thread pitch or feeddependent on the following positions:

I/II/III/IV = The leadscrew is used to cut thread forms.
A/B/C/D = The feed rodis used to control the feed/revolution.

The ratios between them are:

I: II: III: IV: = A:B:C:D = 1:2:4:8

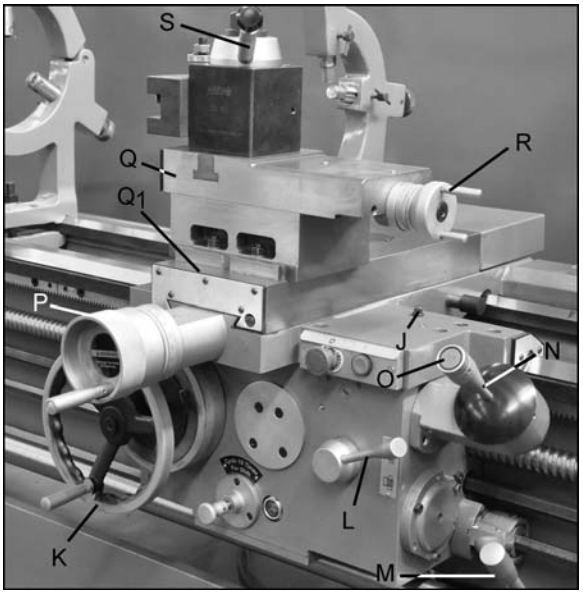


Figure 24 – Carriage controls and settings

5. **Carriage Lock** (J, Figure 24): Located on top right of carriage. Turn clockwise to lock, counterclockwise to unlock.

   ⚠CAUTION Carriage lock must be loose before moving carriage or damage to lathe may occur.

6. **Carriage Handwheel** (K, Figure 24): Located on the apron. Rotate handwheel clockwise to move carriage assembly toward tailstock (right). Rotate the wheel counterclockwise to move carriage assembly toward headstock (left). A scale is mounted to the ring, graduated in 0.05 inch increments, and can be calibrated by loosening the thumb screw lock and rotating the ring as needed. Always re-tighten ring before using the feed.

7. **Half Nut Lever** (L, Figure 24): Located on front of apron assembly. Engages the leadscrew for threading operations.

8. **Threading Dial** (Figure 25):Indicates the point on the leadscrew where the half nut can be re-engaged to continue inch threading.

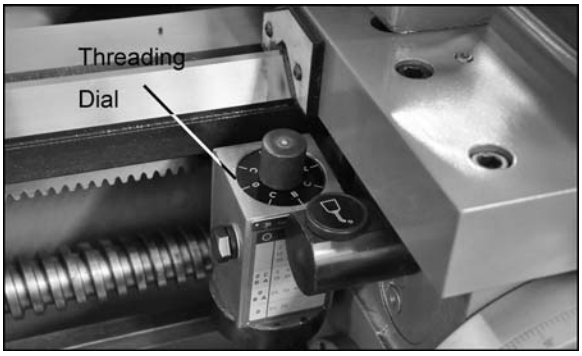


Figure 25

9. **Spindle Direction Control Lever** (M, Figure 24). Move lever to the right so that its tab clears the notch, then down for forward spindle rotation, or up for reverse spindle rotation. *Allow spindle to come to a stop before changing directions.*

   Position lever in neutral position (tab in notch) before shutting off the lathe.

10. **Feed Direction Lever** (N, Figure 24): Left and right moves the carriage in the corresponding directions (longitudinal feed); up and down moves the cross slide (cross feed).

11. **Rapid Traverse Button** (O, Figure 24). Push for rapid movement in the direction set by the feed direction lever. Rapid longitudinal movement disengages the carriage handwheel. **However, the cross slide handwheel should be disengaged (pull it out) before using rapid feed.**

    IMPORTANT:*The rapid traverse button* is not used for actual feeding of the tool, only for initial positioning. Also, be aware that engaging the rapid traverse will override automatic feed.

12. **Cross Slide Handwheel** (P, Figure 24): Located above apron assembly. Clockwise rotation moves cross slide toward rear of machine. The accompanying scale is graduated in 0.002 inch increments. Before using rapid feed, disengage this handle by pulling it outward.

13. **Compound Rest** (Q, Figure 24): Located on top of the cross slide and can be rotated 360° by loosening four nuts (two in front, two in back). There are calibrations in degrees (Q1, Figure 24) to assist in placement of the compound rest to the desired angle.

14. **Compound Rest Handle** (R, Figure 24): Rotate clockwise or counterclockwise to position. The accompanying scale on the collar is graduated in 0.001 inch increments.

15. **Tool Post Clamping Lever** (S, Figure 24): Rotate counterclockwise to loosen and clockwise to tighten. Always use minimum of two clamping screws to secure a cutting tool.

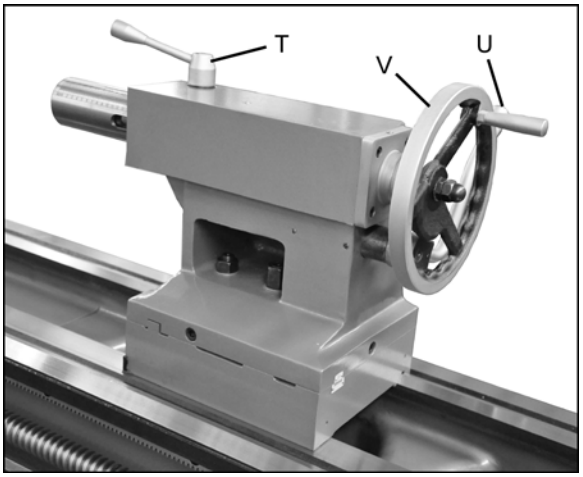


Figure 26 – Tailstock controls

16. **Tailstock Quill Clamping Lever** (T, Figure 26): Rotate clockwise to lock the sleeve. Rotate counterclockwise to unlock.
17. **Tailstock Clamping Lever** (U, Figure 26): Lift up to lock. Push down to unlock.
18. **Tailstock Quill Traverse Handwheel** (V, Figure 26): Rotate clockwise to advance the quill and counterclockwise to retract it. Fully retract it to eject a center or drill chuck.

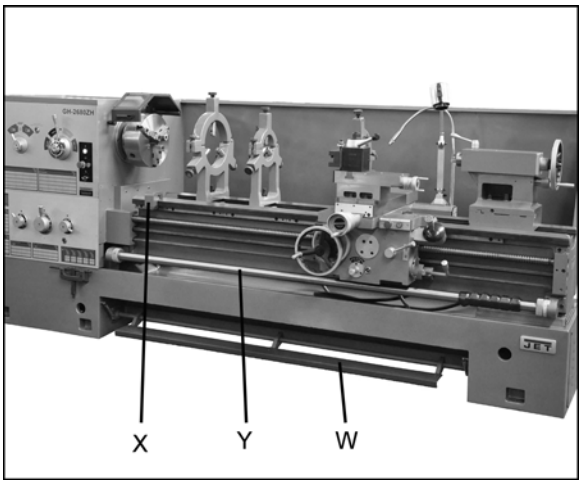


Figure 27 – Other controls

19. **Foot Brake** (W, Figure 27): For emergency shutdown of all lathe functions. The connecting rod mechanism is in the bed stand, and activates a brake strap at the main motor. (**Caution:** Lathe still has power.)

    The foot brake is not intended for normal stopping of the lathe. Overuse can result in hastened wear of brake parts.
20. **Manual Carriage Stop** (X, Figure 27): Can be used during manual feed operation to limit carriage travel. *NOTE: It is not intended to stop the carriage during automatic feed.* The carriage stop can be repositioned along the bed by loosening the two screws underneath the stop.
21. **Travel Setting Rod** (Y, Figure 27): Up to six pre-set configurations are possible for repetitive operations, without having to re-position the stops each time. Use the knurled knob at the right end of the rod to set the rod at one of six positions shown on the dial. Then move the desired number of eccentric stops into position for that particular operation and tighten them securely to the rod with the screws beneath them. When the apron trip lever contacts a stop, the clutch will disengage.

12.0 **Operation**

The operator should consult shop manuals such as "Machinery's Handbook" for cutting speeds and feeds appropriate to specific workpieces. Correct feed depends upon the material to be cut, cutting operation, tool type, chucking rigidity, depth of cut, and desired surface quality.

IMPORTANT: Allow a break-in period for the new lathe so that gears and bearings can adapt; do not run the lathe above 560 RPM for the first six hours of operation.

⚠CAUTION The following points must be observed when operating the lathe:

- Never turn any handles or levers when the spindle is at high speed.
- Change spindle speed only after the spindle stops.
- Change feed rate only when the spindle is at low speed or is stopped.
- Never exceed the maximum speed limitation of the work holding device.
- Before starting the spindle, always verify that the oil pump is working (there should be oil in the sight glass on the *front* of the headstock).
- Before starting spindle, check that each handle or lever is at correct position to ensure normal engagement of the gears. The spindle direction control lever should be at neutral position.
- If the brake becomes ineffective, turn off the machine and adjust the brake immediately. Never reverse the friction clutch for braking.
- When operating spindle direction control lever, always turn it to correct position; never use "pre-position" for cutting at a reduced speed.
- Jaw teeth and scroll must be fully engaged, to prevent the jaws from breaking and being thrown from the chuck (see Figure 28).

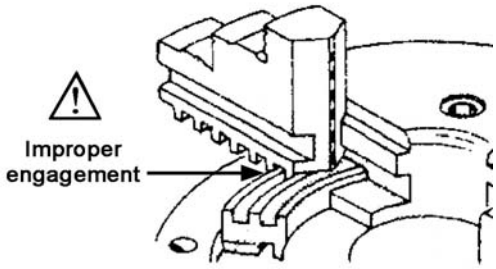


Figure 28 – Insufficient jaw tooth engagement

- Avoid long workpiece extensions, as parts may bend or fly off (see figure 29). Use rests or the tailstock for support.

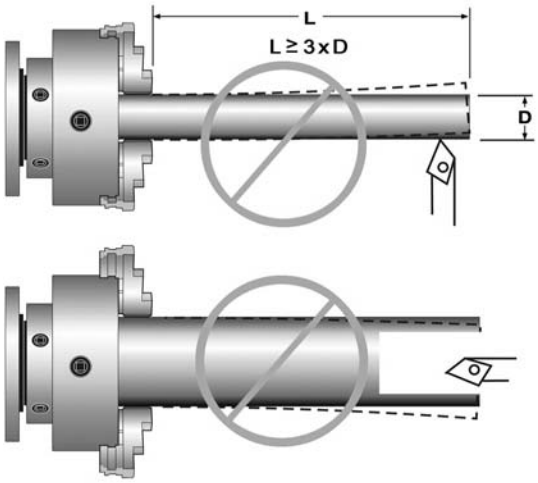


Figure 29 – Improper setups

- Avoid short clamping contact (Figure 30, A) or clamping on a minor part diameter (Figure 30, B). Face-locate the workpiece for added support.

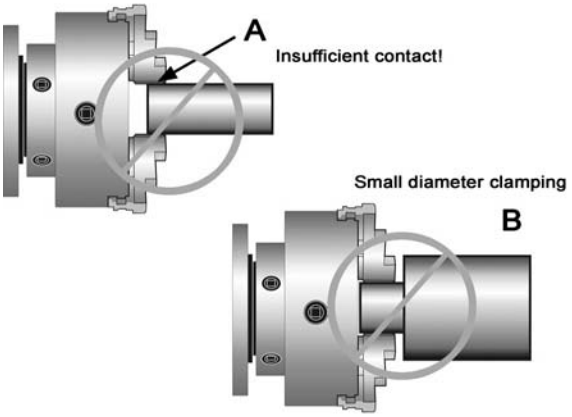


Figure 30 – Improper setups

12.1 **Tool Setup**

The cutting angle is correct when the cutting edge is in line with the center axis of the workpiece. Use the point of the tailstock center as a gauge and shims under the tool to obtain the correct center height.

Use a minimum of two clamping screws to secure each tool.

12.2 **Spindle Speed**

Twelve speeds are available by placing the first speed lever (E_1, Figure 31) in one of four positions, and placing second lever (E_2) in a position that matches the color for the range you desire. These selections are identified on the lever hub, as well as in Table 6, *section 16.3*.

You may need to turn the chuck by hand to assist engagement of the gears.

Never change speed while spindle is turning.

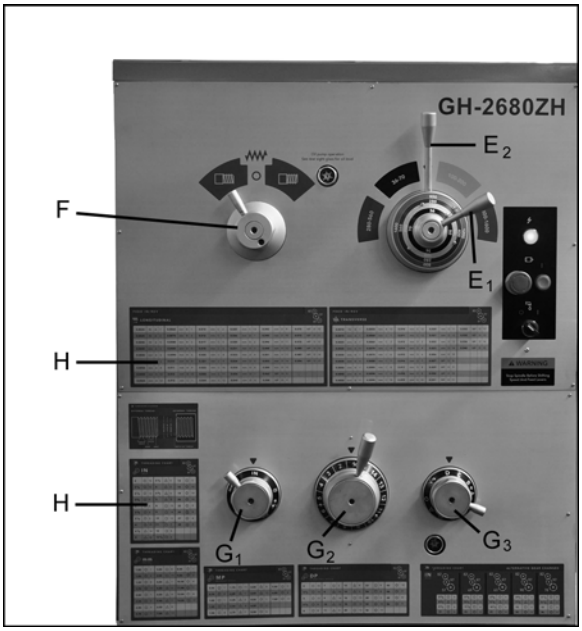


Figure 31

12.3 **Feed and Thread Selection**

To obtain various feed settings and thread pitches, the four levers (F,G_1,G_2,G_3) are used conjunctively.

1. Refer to the *Feed and Thread Chart*on the front of the headstock (H, Figure 31). The chart is also shown in *section 16.10* of this manual.
2. Any gear changes should be made in accordance with the chart.
3. Move levers (G_1,G_2,G_3, Figure 31) to the appropriate position according to the Feed and Thread Chart.

TIP: When selecting feed/speed correlations, remember the general principal that high speeds complement fine feeding, and low speeds are better for coarse feeding.

12.4 **Thread Cutting**

Threading is performed in multiple passes, with an initial cutting depth of about 0.2 mm, and decreasing depth in succeeding cuts. It is recommended that test cuts be made on scrap material and the results checked before proceeding with regular material.

1. Move **thread selection lever** (F, Figure 31) to desired direction, for right-hand or left-hand threads. *NOTE: The overrunning clutch in the apron will prevent the tool post from feeding for left-hand threads. It will only feed when right-hand threads are being cut.*

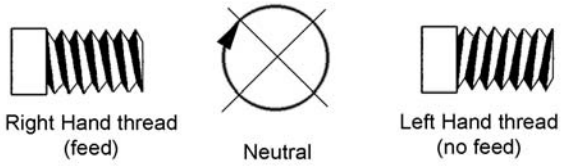


Figure 32

2. Set **speed levers** (E_1,E_2, Figure 31) to desired speed. Use the lowest speed possible when threading.
3. Select desired thread using **thread pitch levers** (G_1,G_2,G_3, Figure 31) in conjunction with the charts on the headstock. These charts are also included in *section 16.10* of this manual.
4. Engage the half nut (Figure 33). The half nut must be engaged during the entire threading process when doing metric, diametral, and modular threading.

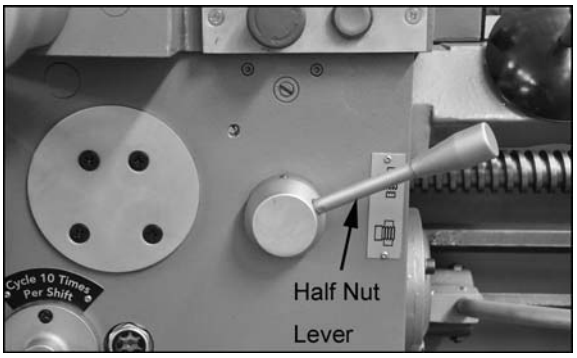


Figure 33

5. When tool reaches end of cut, disengage and back out the tool to clear the workpiece.
6. Reverse direction to allow cutting tool to return to its starting point.
7. Repeat the process until desired result is obtained.

NOTE: When a special thread must be cut that is not found on the chart, move thread change control lever (G_1, Figure 31) to ⊓⊓ position, and lever (G_3) to **IV**, then reset the change gears.

13.0 **Adjustments**

⚠CAUTION Adjustments to the lathe, especially those involving alignments of bearings, spindle, leadscrew, clutch, etc., should only be performed by qualified personnel, as improper alignments can damage the machine and/or create a safety hazard.

⚠WARNING Turn off main switch and press emergency stop button before making adjustments to the lathe.

13.1 **Chuck Jaw Reversal**

The three jaws on the scroll chuck are reversible, to hold stock with larger diameters. See Figure 34. Loosen the two screws with the provided hex key, remove the jaw, and rotate it 180-degrees. Re-install the jaw, and tighten each screw in increments until fully tightened.

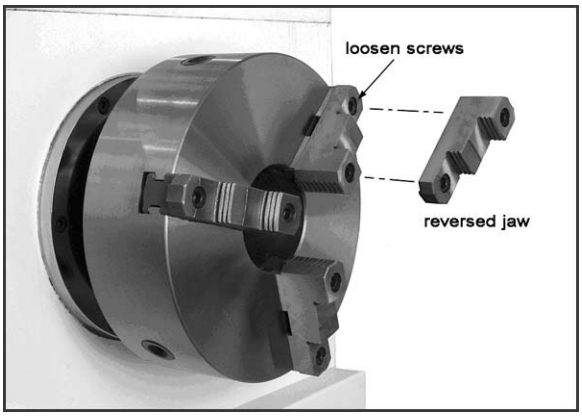


Figure 34 – Chuck jaw reversal

13.2 **Gib Adjustments**

After a period of time, some of the moving components may need adjustment for play due to wear.*Do not overtighten gib screws as this can hasten wear to components.*

Saddle – Turn screws (A, Figure 35) on either side of the saddle at the rear to adjust drag on the saddle.

Cross Slide – Gib screws are located at front and rear of slide opposite to one another (B, Figure 36). To adjust drag, loosen rear gib screw one turn, and tighten front gib screw a quarter turn. Rotate the handwheel to check the play. Repeat as needed until slide moves freely without play. Gently tighten rear gib screw.

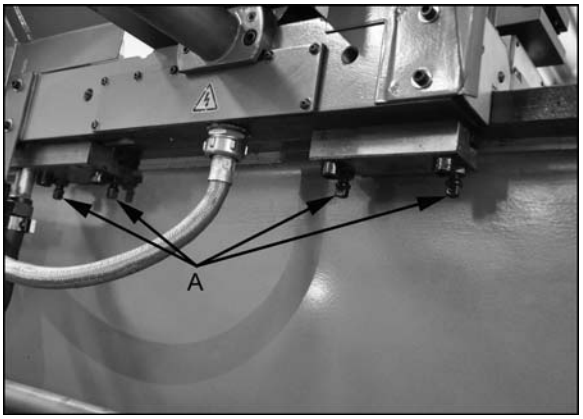


Figure 35– Saddle sliding plate adjustment

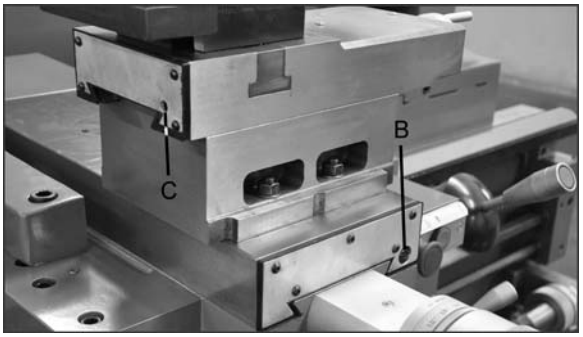


Figure 36 – Gib adjustments, slide and rest

Compound Rest – Gib screws are located at front and rear of the compound rest (C, Figure 36). To adjust, use the same method as for the Cross Slide.

Half Nut – Gib screws are located on the right side of the apron (D, Figure 37). Loosen the jam nuts and rotate the screws clockwise until any backlash is corrected. Then retighten nuts.

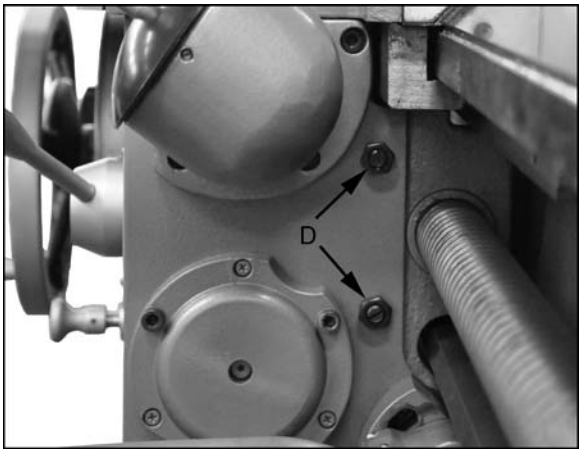


Figure 37 – Half Nut gib adjustment

13.3 **Tailstock Adjustments**

The tailstock can be offset to cut shallow tapers up to 5° angle. See Figure 38.

1. Loosen tailstock in position by lowering locking handle (A).
2. Loosen socket head cap screw (B).
3. Alternately loosen and tighten front and rear screws (C). (only front screw shown.)

The scale (D) on the end of the tailstock indicates amount of offset, and helps when re-centering.

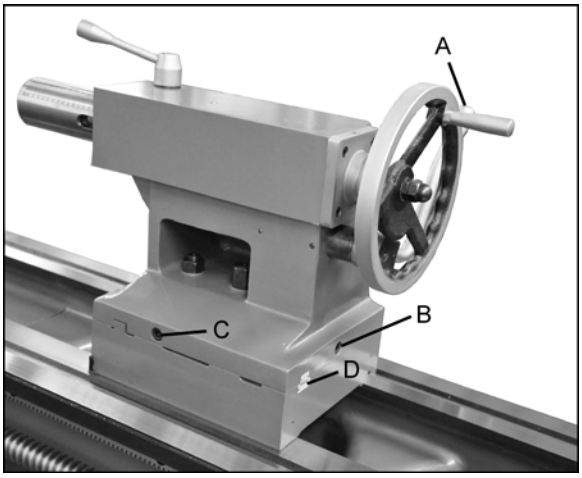


Figure 38 – Tailstock adjustments

If the clamping force needs to be adjusted, use the hex nut (E, Figure 39).

When the clamping lever is released, the tailstock "floats" upward approximately 0.05 to 0.15mm from the bed ways through four elastically supported bearings, which allows easy sliding of the tailstock. The float amount of these bearings can be adjusted by turning the set screws (F, Figure 39) at either end. **IMPORTANT:** This is a sensitive adjustment. Always clamp the tailstock to the bed before turning these set screws, to ensure rigidity and prevent the bearings from crashing.

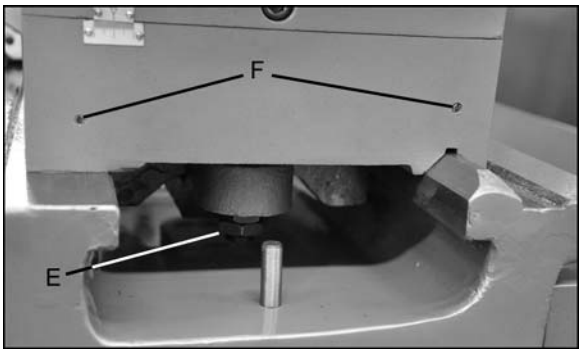


Figure 39 – Tailstock bearing adjustment

13.4 **Gap Section**

1. To remove the gap section (A, Figure 40), remove four socket head bolts (B) and two socket bolts at the ends of the rails (C).
2. Remove the two tapered alignment pins (D) by placing the provided gap bridge pin driver (E) over them and threading the screw (E_1) down into them, until the pins are loosened enough to be pulled out.
3. Remove the gap section.

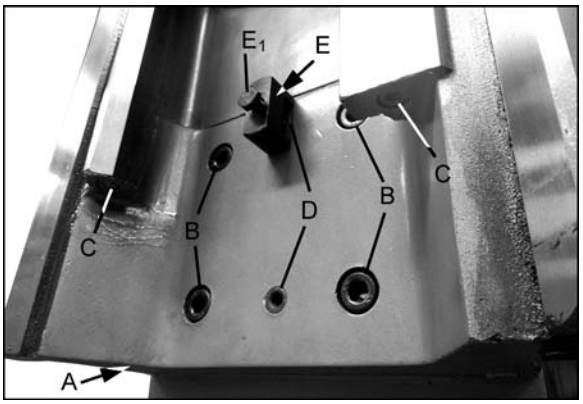


Figure 40 – Gap section

To reinstall the gap section:

4. Clean the bottom and the ends of the gap section thoroughly.
5. Set gap section in place and align the ends.
6. Insert the tapered pins into their holes through the gap and into the lathe bed.
7. Reinstall the six bolts (B/C), and tighten alternately until all are snug. Make sure gap remains aligned with the ways while tightening the screws.

13.5 **Belt Adjustment and Replacement**

The belts should be inspected periodically. New belts have a tendency to stretch slightly after a short period of use; and prolonged use will require that they be tightened to compensate for normal wear.

NOTE: If a worn, cracked or frayed belt needs replacing, replace *all three* as a matched set.

To adjust or replace belts:

1. Disconnect machine from power source.
2. Open end gear cover, remove lower rear cover and lower side cover. This will expose the motor and v-belts.
3. Loosen upper hex nut (A, Figure 41). Place scrap piece of wood under motor to act as lever. Lift motor up and block temporarily.
4. Remove belts. Install new belts onto pulleys.
5. Lift up on motor and remove temporary blocking.
6. Tension belts by loosening lower nut (B, Figure 41) and tightening down upper nut (A, Figure 41) until light finger pressure causes approximately 3/4" deflection on each belt.
7. Install covers and connect lathe to the power source.

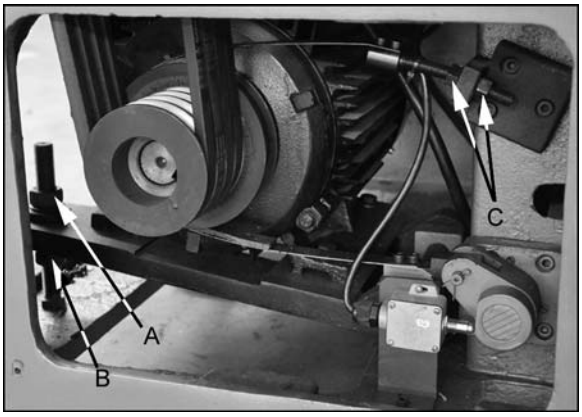


Figure 41 – Belt and brake strap adjustment

13.6 **Brake Strap**

After the clutch is disengaged, the main drive can be stopped by the brake. If the spindle does not stop rapidly, the brake strap may need adjustment. Use the two adjusting nuts (Figure 41) to tighten the strap. Do not overtighten the strap, which can cause it to distort.

13.7 **Friction Clutch Adjustment**

The lathe operates on a centralized gear drive. The power of the main motor is transferred through v-belts to an axle, then through a multi-disc friction clutch and various gear pairs to the spindle. The spindle's forward and reverse motion is controlled by the clutch; it also provides an overload protection.

The clutch must be in proper adjustment to ensure normal working of the spindle. If the clutch is too loose, its efficiency is reduced and it may slip or cause heat build-up; if too tight, it becomes difficult to operate the spindle direction control lever and the clutch will not properly engage.

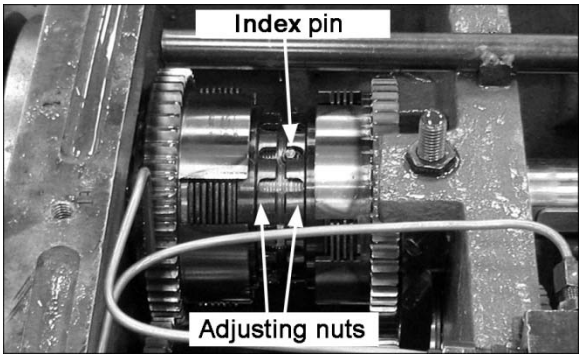


Figure 42 – Spindle Clutch Adjustment

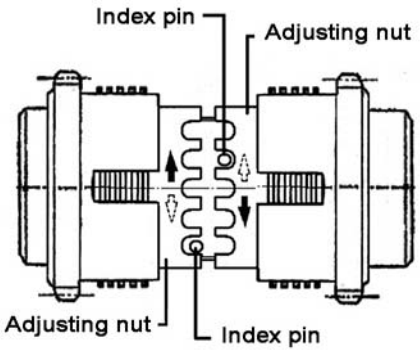


Figure 43 – Spindle Clutch Adjustment

1. Make sure the lathe is OFF at the master switch.
2. Remove the top cover of the headstock.
3. Determine the appropriate clutch.
4. Use a screwdriver to push in the index pin (Figures 42 and 43). The pin is spring loaded.
5. Rotate the adjusting nut to the next index position, which will be indicated by a “click.”

   NOTE: The clutch reacts quickly; adjust clutch nut by one division only. You must feel and hear the clutch engagement – a clicking sound. If clutch adjustment is too tight, it will not engage.

   If the spindle does not stop in the OFF position, the forward/reverse clutch adjustment is out of balance. (The spindle follows the direction with the tighter clutch adjustment).
6. Reinstall headstock cover, and test the clutch function.

NOTE: Never reverse the friction clutch for braking.

13.8 **Aligning Tailstock to Headstock**

Headstock and Tailstock have been aligned at the factory and should not require attention. If future adjustment should ever be needed, proceed as follows. (Make sure that twist in the lathe bed is not contributing to the problem – refer to*section 8.1,Leveling the Lathe*.)

1. Fit a 12” ground, center-drilled, steel bar between centers of the headstock and tailstock (Figure 44).
2. Fit a dial indicator to the top slide and traverse the center line of the bar. If it indicates a taper, adjustment is needed.
3. Align the tailstock using the off-set screws at front and back (see C, Figure 38) until the tailstock is aligned.

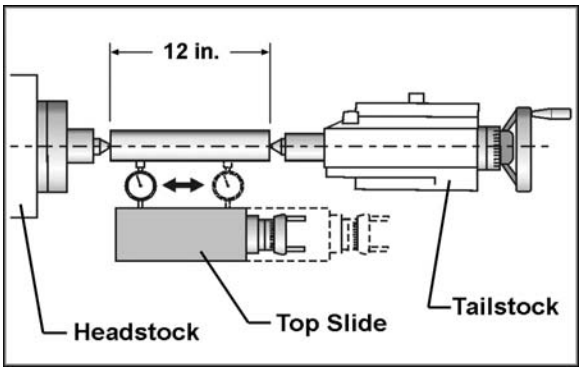


Figure 44 – Tailstock/Headstock alignment

13.9 **Spindle Bearings**

The spindle system is supported by three bearings, with the rear bearing serving as an auxiliary support.

Any play of the spindle bearings has been adjusted out by the manufacturer, so that radial and axial run-out of the spindle is within tolerances. If play develops in the future, adjust the bearings as follows (see Figure 45):

1. Loosen nut (1). Then loosen lock ring and loosen nut (2).
2. Adjust the play of front and middle bearings using nuts (3) and (4).
3. After adjustment, tighten the nuts one by one.
4. Run the machine without load for at least two hours, at highest speed. The temperature rise should not exceed 70 degrees Celsius (158°F). Otherwise, the machine must be adjusted again.

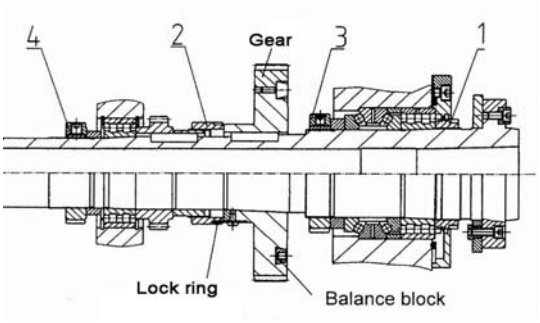


Figure 45 – Spindle bearing adjustment

13.10 **Speed Control**

If the chain on the speed control mechanism of the main drive becomes elongated and loose, the position of the speed control dial may become inaccurate.

Open the top cover of the headstock. Tighten the chain using the adjusting screw (Figure 46).

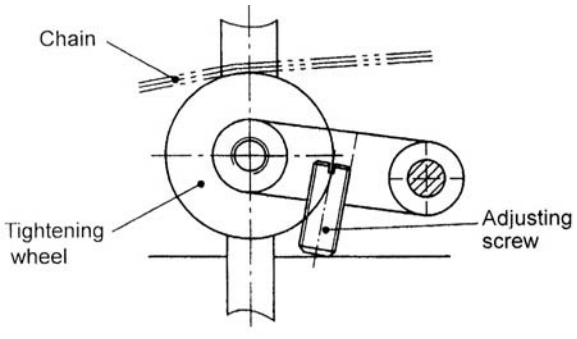


Figure 46 – Speed control chain adjustment

13.11 **Lead Screw**

To ensure the pitch accuracy in cutting threads, any axial run-out of the lead screw must be eliminated. See Figure 47. This is achieved by adjusting the thrust bearings (2 and 3) using the nut (1).

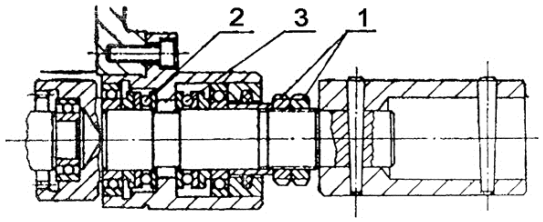


Figure 47 – Lead screw runout adjustment

13.12 **Apron Feed Clutch**

The feed transmission begins with the feed rod to the apron, through feed clutch to worm, through the gear drives, to longitudinal or cross movement.

The worm axle is equipped with an overstep clutch to provide rapid feed for the carriage. When the rapid feed motor drives the worm axle, it oversteps the feed rod in one direction.

The carriage (longitudinal feed) handwheel is automatically disengaged when the carriage is in rapid feed or longitudinal automatic feed. When the feed movements stop, the handwheel will reengage.

If the cutting force will not reach rated maximum value, remove the cap and adjust the clutch using the adjusting screw (see Figure 48).

⚠CAUTION Do not over tighten the feed clutch. Over tightening may nullify the protective feature and can damage the lathe.

To avoid feed rod and lead screw engaging at the same time, an interlocking mechanism is situated between longitudinal feed axle and half nut operation axle.

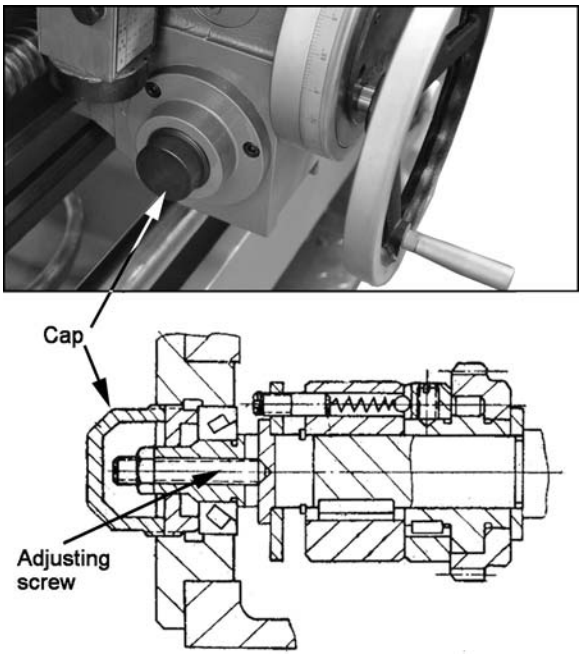


Figure 48 – Feed clutch adjustment

13.13 **Tool Post**

Tool holder (2) is positioned to the tool post body (1) through a dovetail groove and its center height can be adjusted by sliding the dovetail along the groove and turning screw (5).

The tool holder can be fixed by turning lever (7) and the middle bolt will drive the wedge block (4) downward for clamping the tool holder.

The whole tool post can be fixed by the top nut (6). Tool shank can be fixed to the tool holder by its screw (3) (see Figure 49).

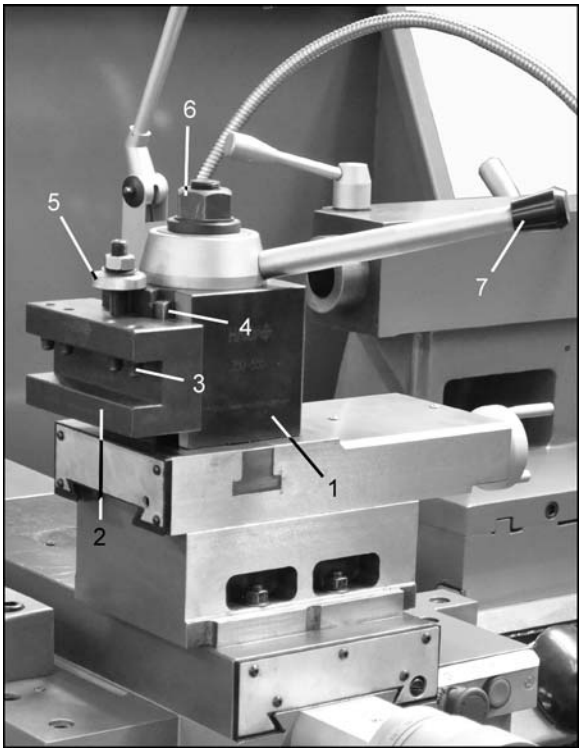
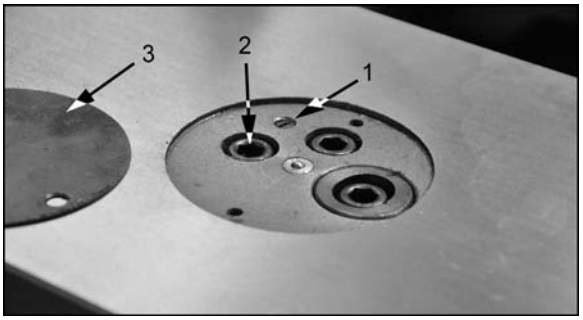


Figure 49 – Tool post adjustment

13.14 **Cross Slide Nut Adjustment**

The cross slide moves via a lead screw which drives a nut. The nut is a half-split nut, allowing slight adjustment if the cross slide becomes hard to move or develops backlash. Backlash is identified by turning the cross slide handwheel left and right – if there is a delay before any cross slide movement, the nut needs adjusting (Refer to Figure 50).

1. Remove dust cover (3).
2. Loosen set screw (1).
3. Tightensocket head screw (2) until the play is eliminated.*Do not overtighten, which may cause excessive wear to components.*
4. Retighten set screw (1).
5. Reinstall dust cover.



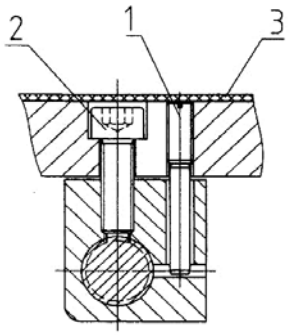


Figure 50 – Cross slide nut adjustment

13.15 **Shear Pin Replacement**

The lead screw and feed shaft are equipped with shear pins, which are designed to break in order to protect the drive system against overload. A broken shear pin must be replaced.

Knock out the broken pin; line up the holes and insert new pin.

13.16 **Steady Rest Adjustment**

Always grease the fingers before using the steady rest. The point at which the fingers contact the workpiece require continuous lubrication to prevent premature wear.

To set the steady rest (see Figure 51):

1. Loosen the hex nut (A) at the base of the steady rest, to slide the steady rest along the ways.
2. Loosen the knurled handle (B) at the side until it can be pivoted out of the slot.
3. Loosen the three lock knobs (C), and back off the fingers (D) using the knurled handles.
4. Pivot the collar on its hinge and position the steady rest around the workpiece.
5. Firmly tighten the hex nut at the base.
6. Set the fingers snugly to the work piece and secure by tightening the locking knobs. *Fingers should be snug but not overly tight.*

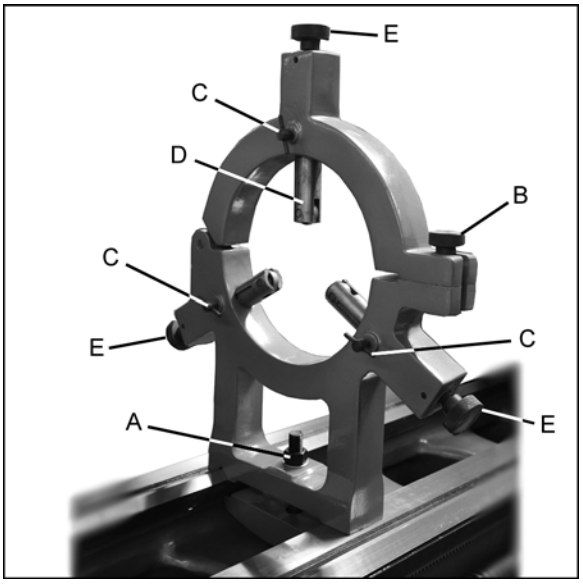


Figure 51 – Steady rest adjustment

13.17 **Follow Rest Adjustment**

The follow rest mounts to the saddle with two socket head cap bolts. The follow rest should be mounted so that the locking knobs point away from the chuck.

The sliding fingers are set similar to those on the steady rest – free of play, but not binding.

Always lubricate the fingers sufficiently with grease before operating.

14.0 **Troubleshooting the ZH Series Lathes**

Table 2

Trouble	Probable Cause	Remedy
Lathe will not start.	No electrical power, or wiring incorrect.	Verify incoming power, main leads, main switch is on.
	Emergency stop switch is pressed.	Rotate switch clockwise to release.
	End gear cover open, limit switch activated.	Close cover.
	Fuse blown in main electrical box.	Replace fuse.
	Fuse blown/circuit breaker tripped at power source.	Reset. Verify incoming power is proper for lathe.
	Defective on/off switch, motor or cable.	Have electrician test elements.
	Foot brake switch is faulty.	Check and replace as needed.
	Thermal relay tripped.	Reset. If it trips frequently, increase amp setting.
Spindle lacks turning power; or starts up slowly.	Friction clutch is slipping.	Adjust clutch.
	Belts are slipping.	Tighten belts.
Excessive machine vibration.	Workpiece unbalanced.	Reduce spindle speed.
	Workpiece deflecting.	Change chucking length or diameter. Use support on tailstock end.
	Tool deflecting.	Reduce tool length.
	Backlash on slide ways/gibs.	Adjust backlash.
	Slides running dry.	Properly lubricate slides/ways.
	Tool edge is dull.	Resharpen or replace tool.
	Chip load too high.	Reduce depth of cut or feed rate.
	Spindle bearings out of adjustment.	Adjust bearings.
	Belts misaligned.	Inspect belts and correct.
Lathe overheating.	Bogging down in cut; excessive feed rate or depth of cut.	Decrease feed rate or depth of cut.
Tool tip burns.	Cutting speed too high.	Reduce speed.
	Tool is dull.	Resharpen or replace.
Lathe turns a taper.	Tailstock not aligned with headstock.	Align tailstock.
	Lathe bed is twisted.	Correct by leveling lathe.
No automatic power feed.	Shear pin is broken.	Replace shear pin.
Carriage, cross slide or compound rest move with difficulty.	Carriage lock is tightened down.	Release carriage lock.
	Gibs are too tight.	Adjust using gib screws.
	Bed ways have shavings/debris on them; or are dry.	Clean ways and verify they are being lubricated properly.

15.0 **Lubrication Schedule and General Maintenance**

Regularly scheduled maintenance is crucial to ensure a long service life for your machine. The schedule below shows general cleaning, lubrication points and coolant replacement information for the ZH Series Lathes. **Push stop button and power off before lubricating.** Follow local regulations for disposal of used coolant/lubricants. Minimize direct skin contact with lubricants and coolants, and wear eye protection when pouring coolant in case of splash.

Mobile DTE® Oil Heavy Medium is recommended for the SAE-20W machine oil.

If the brand of oil is ever changed, it is recommended that you flush and clean the reservoir first to prevent any compatibility issues.

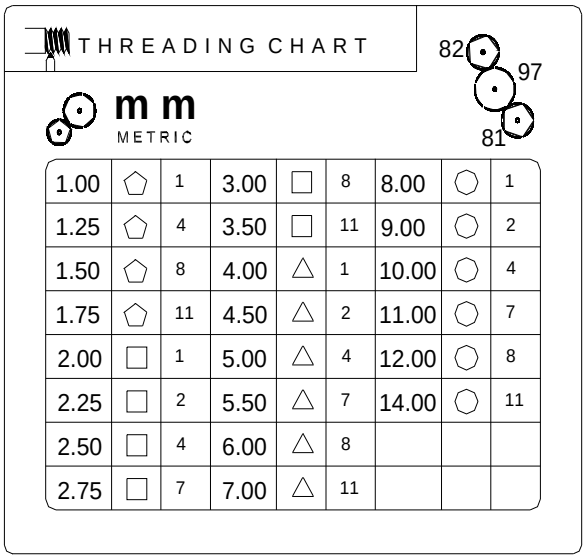
Table 3

Figure/Sect.	Element	Action	Lubricant	Frequency
sect 8.3	Chuck	Grease jaws and scroll	#2 lithium tube grease	periodically
sect 8.3	Spindle/cam locks/chuck body	light coat of oil	SAE-20W machine oil	periodically
sect 8.2	All exposed metal surfaces	light coat of oil	SAE-20W machine oil	frequently
Figure 9,10	Headstock	Drain and fill	SAE-20W machine oil	- after first 10 days, - after next 20 days, - every 2 to 3 months
Figure 11	Oil filter	Clean		monthly
Figure 9,10	Gearbox	Drain and fill	SAE-20W machine oil	- after first 3 months, - every 6 months
Figure 12	Apron and Saddle	Activate one shot lube handle		multiple times per shift, or as needed
Figure 12		Drain and fill	SAE-20W machine oil	- after first 3 months, - then annually
Figure 15	Leadscrew; Feed Rod; Spindle Direction Control Axle	Fill at oil port	SAE-20W machine oil	as needed
Figure 15	Travel Setting Rod	Fill at (2) ball oilers	SAE-20W machine oil	as needed
Figure 10	Change Gear Axle	grease	#2 lithium tube grease	once every shift
Figure 13	Cross slide	Fill at (2) ball oilers	SAE-20W machine oil	daily
Figure 13	Compound rest	Fill at (3) ball oilers	SAE-20W machine oil	daily
Figure 16	Tailstock	Fill at (2) ball oilers	SAE-20W machine oil	daily
Figure 14,16	Anti-dust felt on v-ways	Clean	kerosene	Inspect weekly
sect 9.1	Coolant reservoir *	(follow coolant manufacturer's directions)	Coolant of choice, approx. 4 gallons	(follow coolant manufacturer's directions)
sect 9.1	Chip trays	Clean; clear drain filters		periodically
Figure 52	Steady Rest	Lubricate finger shafts and contact points	Lead-based grease	before each use
sect 13.17	Follow Rest	Lubricate finger shafts and contact points	Lead-based grease	before each use
Figure 42	Belts	Inspect and tighten if needed		periodically

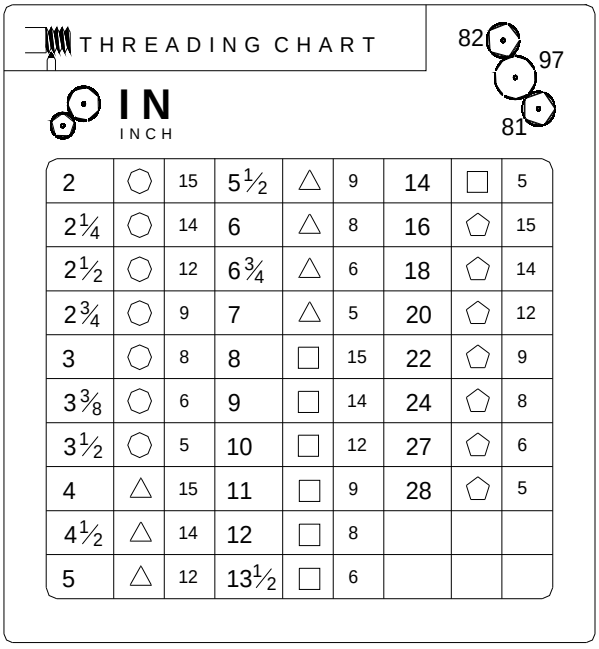
16.0 **Reference Tables**

16.1**Inch Lead And Feed**

Table 4

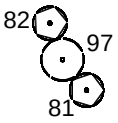


1.00	⬠	1	3.00	□	8	8.00	⬡	1
1.25	⬠	4	3.50	□	11	9.00	⬡	2
1.50	⬠	8	4.00	△	1	10.00	⬡	4
1.75	⬠	11	4.50	△	2	11.00	⬡	7
2.00	□	1	5.00	△	4	12.00	⬡	8
2.25	□	2	5.50	△	7	14.00	⬡	11
2.50	□	4	6.00	△	8			
2.75	□	7	7.00	△	11			



2	⬡	15	5 1/2	△	9	14	□	5
2 1/4	⬡	14	6	△	8	16	⬠	15
2 1/2	⬡	12	6 3/4	△	6	18	⬠	14
2 3/4	⬡	9	7	△	5	20	⬠	12
3	⬡	8	8	□	15	22	⬠	9
3 3/8	⬡	6	9	□	14	24	⬠	8
3 1/2	⬡	5	10	□	12	27	⬠	6
4	△	15	11	□	9	28	⬠	5
4 1/2	△	14	12	□	8			
5	△	12	13 1/2	□	6			

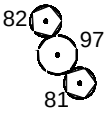
THREADING CHART



M P
MODULEPITCH

0.50	⬠	1	1.75	□	11	3.00	8	△	5.50	⬡	7
0.75	⬠	8	2.00	△	1	3.50	11	△	6.00	⬡	8
1.00	□	1	2.25	△	2	4.00	1	⬡	7.00	⬡	11
1.25	□	4	2.50	△	4	4.50	2	⬡			
1.50	□	8	2.75	△	7	5.00	4	⬡			

THREADING CHART



D P
DIAMETRAL PITCH

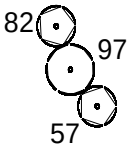
4	15	⬡	7	5	⬡	12	8	△	22	9	□	40	12	⬠
4½	14	⬡	8	15	△	14	5	△	24	8	□	44	9	⬠
5	12	⬡	9	14	△	16	15	□	28	5	□	48	8	⬠
5½	9	⬡	10	12	△	18	14	□	32	15	⬠	56	5	⬠
6	8	⬡	11	9	△	20	12	□	36	14	⬠			

16.2**Special Inch Lead And Feed**

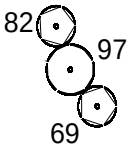
Table 5

THREADING CHART — ALTERNATIVE GEAR CHANGES

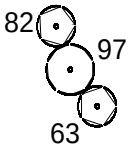
I N
INCH



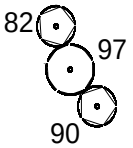
2⅜	⬡	6
4¾	△	6
9½	□	6
19	⬠	6



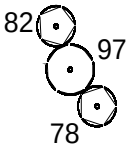
2⅞	⬡	6
5¾	△	6
11½	□	6
23	⬠	6



2⅝	⬡	6
5¼	△	6
10½	□	6
21	⬠	6



3¾	⬡	6
7½	△	6
15	□	6
30	⬠	6



3¼	⬡	6
6½	△	6
13	□	6
26	⬠	6

16.3 **Speed Selection Lever Positions**

Table 6

No.	Lever Position		Spindle Speeds (RPM)
	A	B	
1	black	black	36
2			50
3			70
4	light grey	light grey	100
5			140
6			200
7	red	red	280
8			400
9			560
10	grey	grey	800
11			1200
12			1600

17.0 **Electrical –** 230 volt to 460 volt Conversion

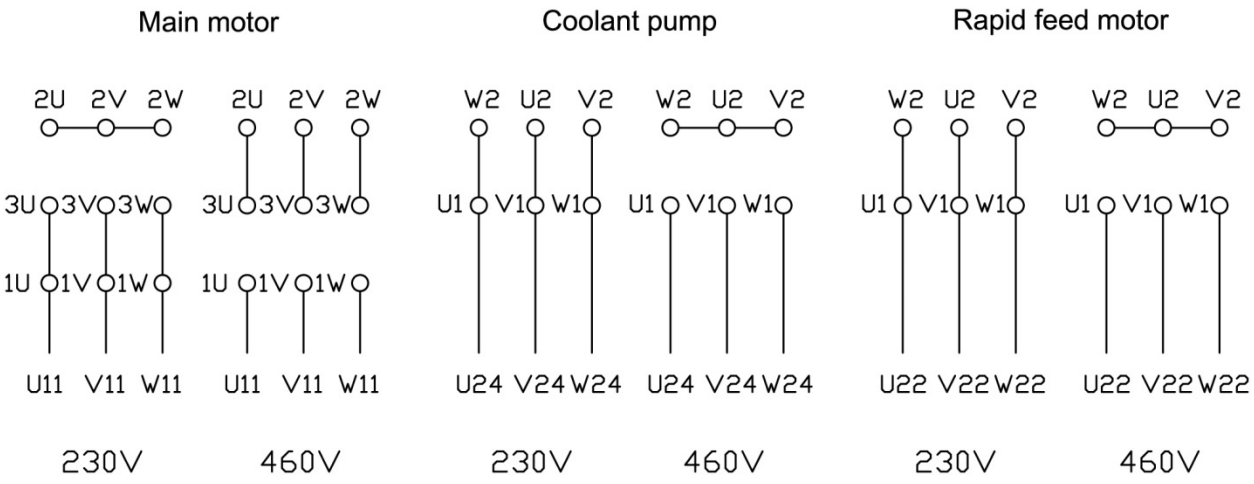


Figure 53

18.0 **Change Gear Diagram**

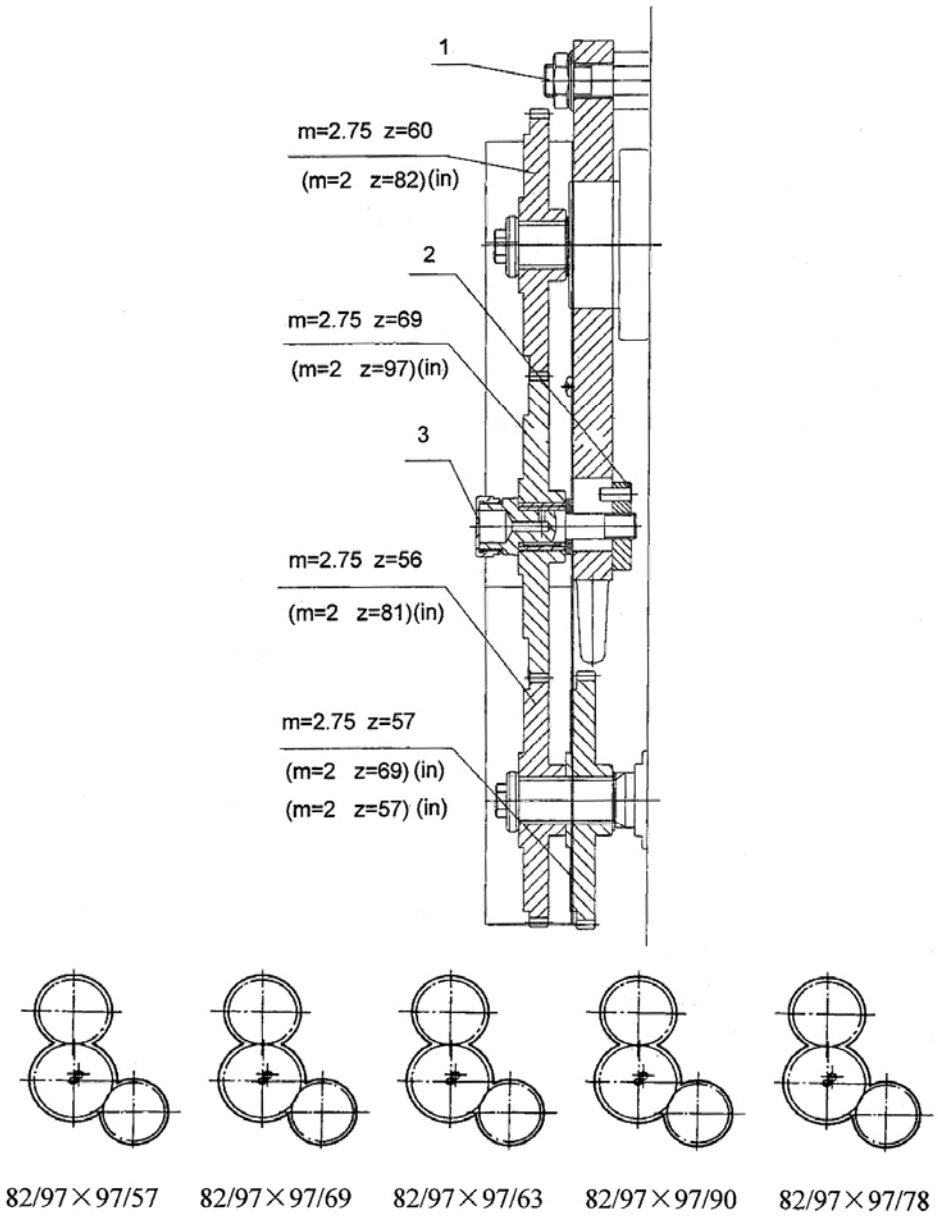
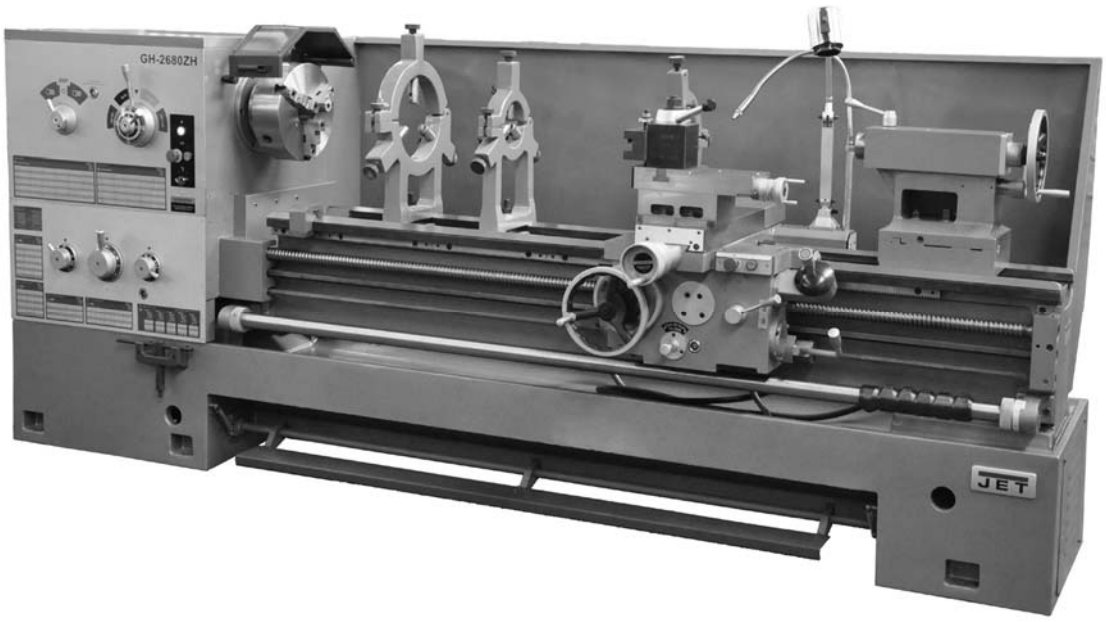


Figure 54

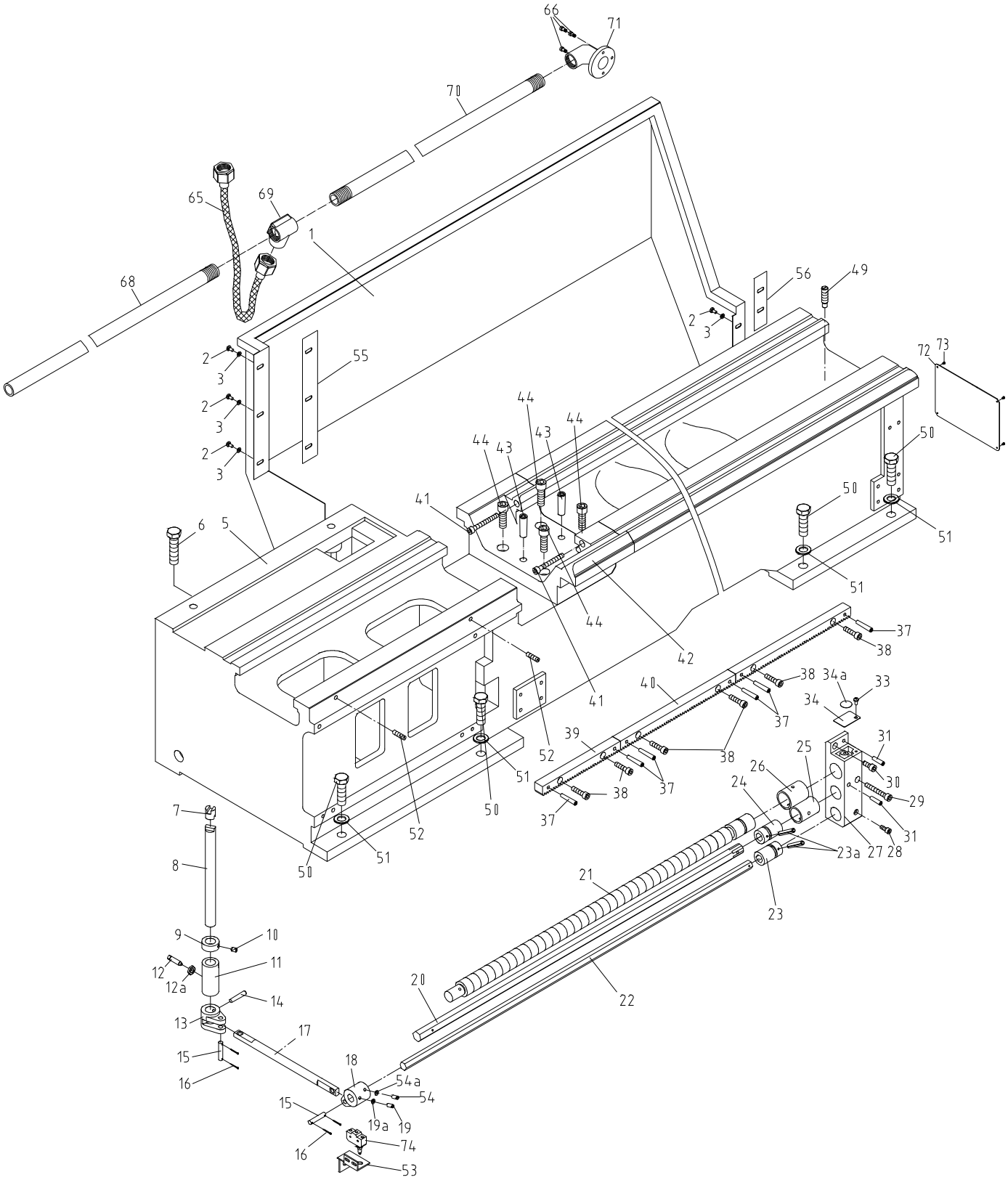
Parts List and Electrical Diagrams
ZH Series Lathes
Models GH-2680ZH; GH-26120ZH



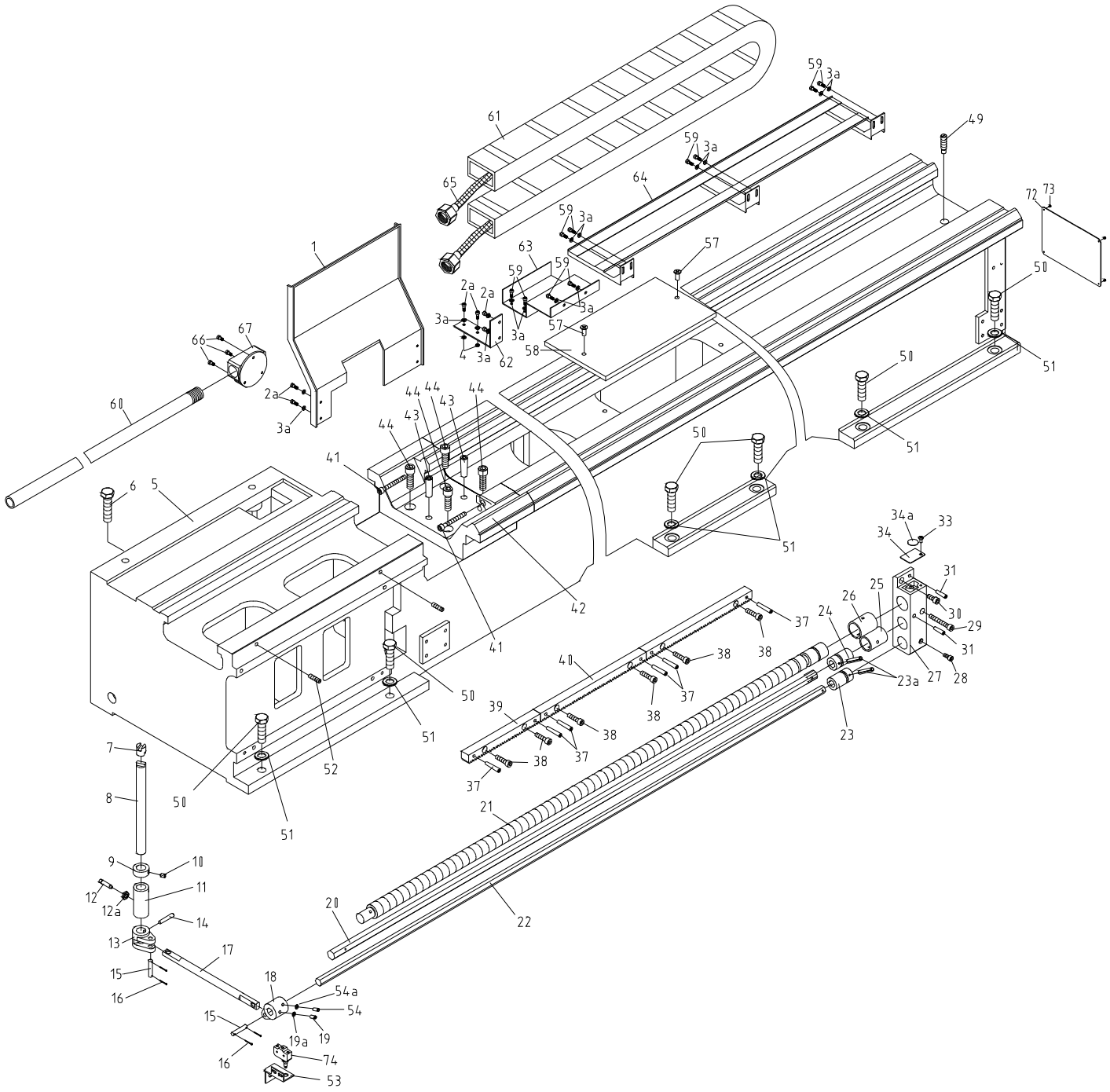
Model GH-2680ZH shown

For ZH-Series Lathes Operation and Maintenance Instructions, see document M-321860

1.1 **Bed Assembly I – Exploded View**



1.2 **Bed Assembly I (for 120” ZH only) – Exploded View**

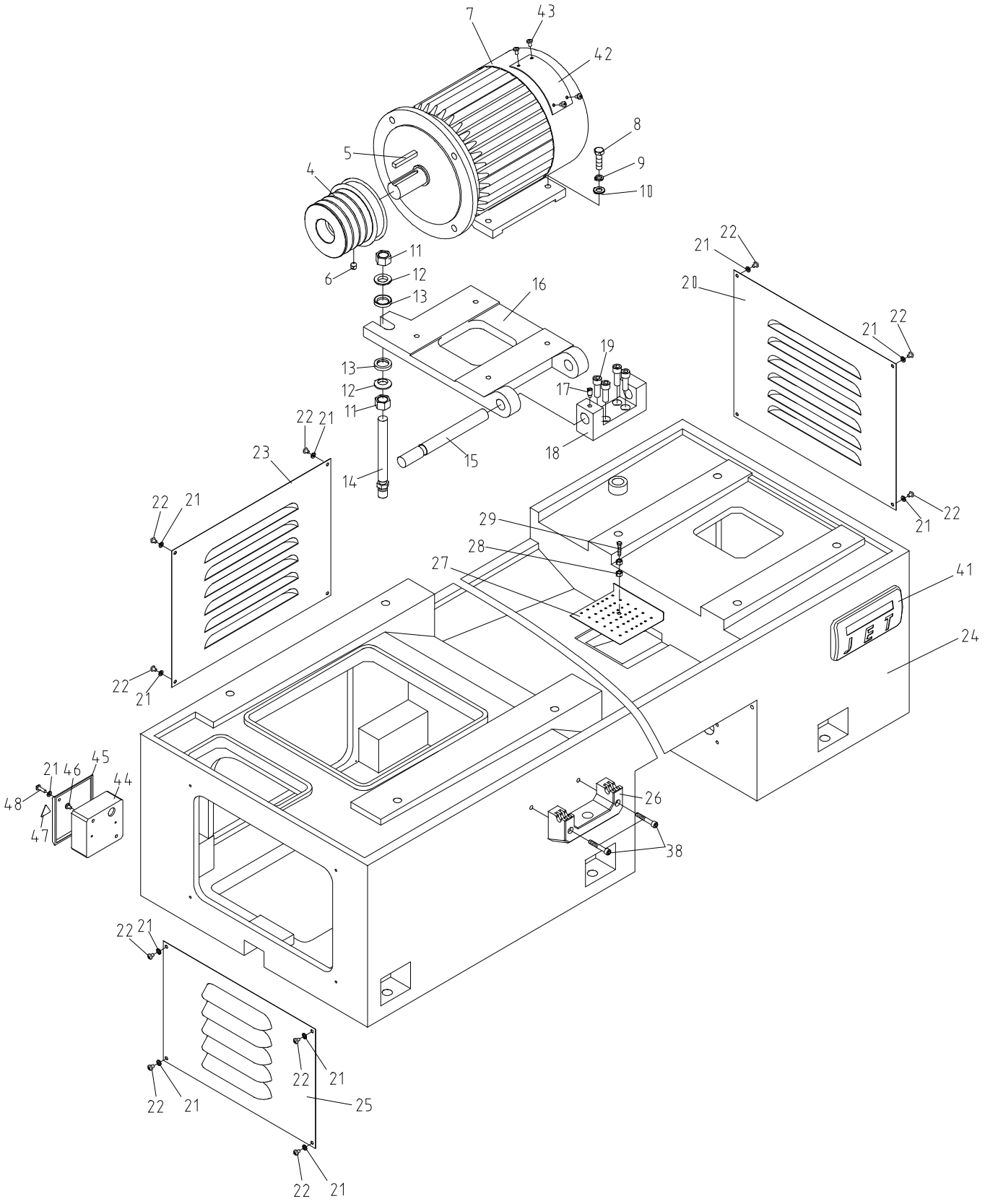


1.3 **Bed Assembly I – Parts List**

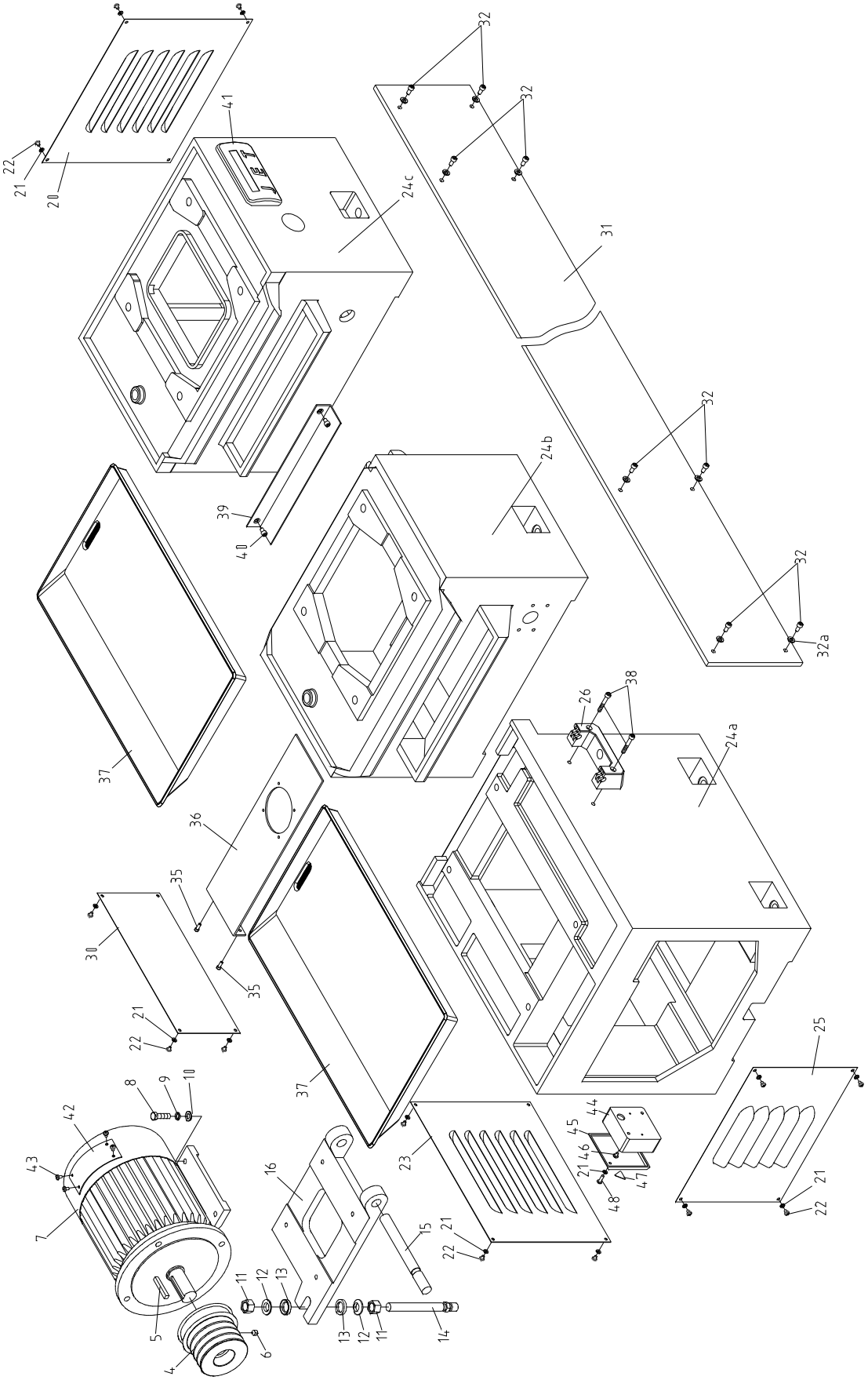
Index No.	Part No.	Description	Size	Qty
1	C6266C12701C-G	Splash Guard (for 80” ZH only)	80”	1
	C6266C12701D-G	Traveling Splash Guard (for 120” ZH only)	120”	1
	C6266C12701L-G	Splash Guard (for 120” ZH only) (serial #160415ZH0145 and higher)	120”	1
2	GB70- M8x10	Hex Socket Cap Screw	M8x10	5
2a	GB70- M6x14	Hex Socket Cap Screw (for 120” ZH only)	M6x14	6
3	GB97.2-8	Flat Washer	8 mm	5
3a	TS-1550041	Flat Washer (for 120” ZH only)	6 mm	16
4	GB6172-M6	Hexagon Thin nut (for 120” ZH only)	M6	2
5	C6266C01101C-G	Bed (for 80” ZH only)	80”	1
	C6266C01101D-G	Bed (for 120” ZH only)	120”	1
6	GB5782-M20x60	Hex Cap Bolt	M20x60	4
7	C6140W01705	Crossed Head		1
8	C6140W01706	Screw		1
9	C6140W01707	Collar		1
10	GB71-M10x12	Slotted Set Screw	M10x12	1
11	C6140W01709	Sleeve		1
12	GB85-M10x35	Square Set Screw	M10x35	1
12a	GB6172-M10	Hex Nut	M10	1
13	C6140W01104-G	Crank		1
14	GB118-8x50	Taper Pin	8x50 mm	1
15	C6140W01710	Shaft		2
16	GB91-2x20	Split Pin	2x20 mm	4
17	C6140W01711A	Pulling Rod		1
18	C6266C01106-G	Sleeve		1
19	GB71-M6x16	Slotted Set Screw	M6x16	1
19a	GB6172-M6	Nut	M6	1
20	C6266C01703C	Hex Feed Rod (for 80” ZH only)		1
	C6266C01703D	Hex Feed Rod (for 120” ZH only)		1
21	C6266C01702C (in)	Lead Screw (for 80” ZH only)		1
	C6266C01702D (in)	Lead Screw (for 120” ZH only)		1
22	C6266C01705C	Hex Control Rod (for 80” ZH only)		1
	C6266C01705D	Hex Control Rod (for 120” ZH only)		1
23	C6140W01724	Sleeve		1
23a	GB879-5x30	Spring Pin	5x30 mm	2
24	C6140W01725	Sleeve		1
25	C6140W01302	Bronze Bushing		1
26	C6140W01301	Bronze Bushing		1
27	C6140W01109-G	Bracket		1
28	TS-1505041	Hex Socket Cap Screw	M8x20	1
29	TS-1505111	Hex Socket Cap Screw	M10x70	1
30	TS-1505031	Hex Socket Cap Screw	M10x25	1
31	GB118-8x35	Taper Pin	8x35 mm	2
33	TS-1503011	Hex Socket Cap Screw	M6x8	1
34	C6140W01726	Cover (serial #160315ZH0144 and lower)		1
	20151027	Cover (serial #160415ZH0145 and higher)		1
34a	C6266C04A311	Label (serial #160315ZH0144 and lower)		1
	C6266C04A311-1	Label (serial #160415ZH0145 and higher)		1
37	B118-8x45	Taper Pin (for 80” ZH only)	8x45 mm	12
	B118-8x45	Taper Pin (for 120” ZH only)	8x45 mm	18
38	S-1505051	Hex Socket Cap Screw (for 80” ZH only)	M10x35	12
	S-1505051	Hex Socket Cap Screw (for 120” ZH only)	M10x35	18
39	C6266C01704	Rack (both models)		1
40	C6140W01719A	Rack (for 80” ZH only)		5
	C6140W01719A	Rack (for 120” ZH only)		8

Index No.	Part No.	Description	Size	Qty
41	GB70-M10x85	Hex Socket Cap Screw	M10x85	2
42	C6266C01103	Gap		1
43	GB118-16x60	Taper Pin	16x60 mm	2
44	GB70-M16x50	Hex Socket Cap Screw	M16x50	4
49	C6140W01733	Pin		1
50	GB5782-M20x80	Hex Bolt (for 80” ZH only)	M20x80	8
	GB5782-M20x80	Hex Bolt (for 120” ZH only)	M20x80	12
51	GB97.2-20	Flat Washer (for 80” ZH only)	20 mm	8
	GB97.2-20	Flat Washer (for 120” ZH only)	20 mm	12
52	GB85-M12x75	Set Screw	M12x75	2
53	C6266C18716-G	Bracket		1
54	GB5781-M8X25	Hex Bolt	M8X25	1
54a	GB6172-M8	Nut	M8	1
55	C6266CLRG80	Rubber Gasket		1
56	C6266CRRG	Rubber Gasket		1
57	GB819- M5×12	Cross Recessed Countersunk Head Screw (for 120” ZH only)	M5×12	2
58	C6140W-01721-G	Cover (for 120” ZH only)		1
59	GB70- M6x10	Hex Socket Cap Screw (for 120” ZH only)	M6x10	10
60	C6266C18702/1650-G	Line Pipe (for 120” ZH only)		1
61	C6266C18709	Articulating Sleeve (for 120” ZH only)	50x82xR100x1000	2
62	C6266C18711-G	Drag Chain Support (for 120” ZH only)		1
63	C6266C18710-G	Drag Chain Support (for 120” ZH only)		1
64	C6266C18712	Drag Chain Carriage (for 120” ZH only, serial #160315ZH0144 and lower)		1
	C6266C18712A	Drag Chain Carriage (for 120” ZH only, serial #160415ZH0145 and higher)		1
65	P3	Flexible Stainless Wire Woven Tube (for 120” ZH only)	M33x2M30x2-2.6m	1
	P3	Flexible Stainless Wire Woven Tube (for 80” ZH only)	M33x2M30x2-1.65m	1
66	GB70- M6x12	Hex Socket Cap Screw	M6x12	6
67	D93-2-G	Tee Pipe Coupling (for 120” ZH only)	M33X2	1
68	C6266C18702/1200-G	Line Pipe (for 80” ZH only)		1
69	D93-1-G	Tee Pipe Coupling (for 80” ZH only)	M33X2	1
70	C6266C18703/1250-G	Line Pipe (for 80” ZH only)		1
71	D91-4-G	Right Angle Flange Pipe Joint (for 80” ZH only)	M33X2	1
72	C0632-01305	Label (serial #160315ZH0144 and lower)		1
	14~18R01305-5	Label (serial #160415ZH0145 and higher)		1
73	GB827-2x3	Rivet	2x3 mm	4
74	ZH-SQ4	Micro Switch	LXW5-11Q1	1

2.1 **Bed Assembly II – Exploded View**



2.2 **Bed Assembly II (for 120” ZH only) – Exploded View**

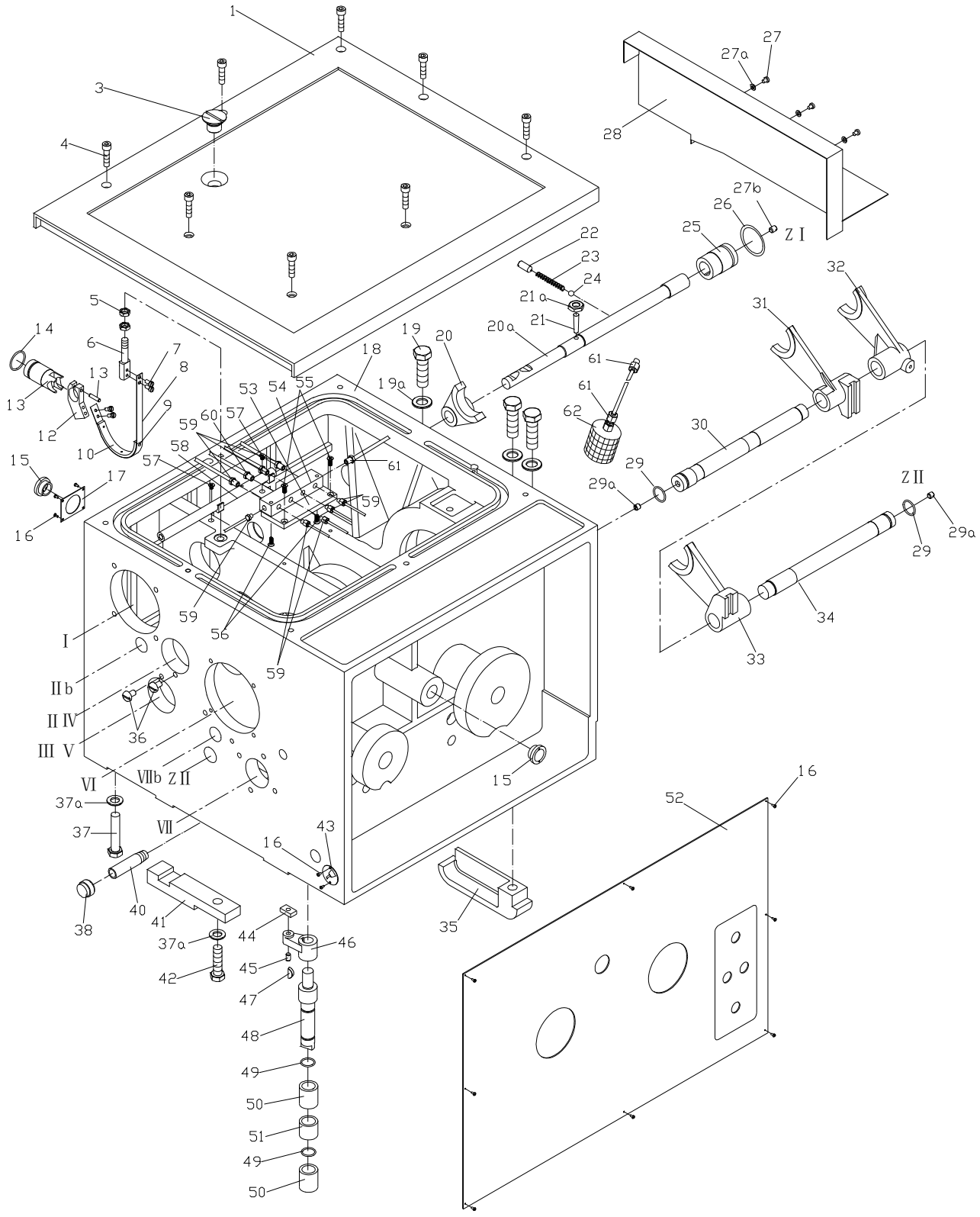


2.3 **Bed Assembly II – Parts List**

Index No.	Part No.	Description	Size	Qty
4	C6266C01105A	Pulley		1
5	GB1096-10x50	Flat Key	10x50 mm	1
6	GB71-M12x16	Slotted Set Screw	M12x16	1
7	Y132M-4TH/B3	Motor	10HP, 3PH, 230/460V	1
8	GB5782-M10x40	Hex Bolt	M10x40	4
9	GB93-10	Spring Washer	10 mm	4
10	GB97.2-10	Flat Washer	10 mm	4
11	GB6170-M20	Hex Nut	M20	2
12	GB849-20	Spheric Washer	20 mm	2
13	C6140W01735	Taper Washer		2
14	C6140W01714	Double Bolt		1
15	C6266C01711	Shaft		1
16	C6266C01104	Motor Mounting Plate		1
17	GB75-M10x14	Slotted Set Screws (for 80” ZH only)	M10x14	1
18	C6266C01107	Support (for 80” ZH only)		1
19	TS-1506041	Hex Socket Cap Screw (for 80” ZH only)	M12x35	4
20	C6266C01701-G	Cover		1
21	TS-1550041	Flat Washer (for 80” ZH only)	6 mm	14
	TS-1550041	Flat Washer (for 120” ZH only)	6 mm	18
22	GB818-M6x8	Cross Head Screw (for 80” ZH only) (serial #160315ZH0144 and lower)	M6x8	12
	GB2672-M6x8	Screw (for 80” ZH only) (serial #160415ZH0145 and higher)		12
	GB818-M6x8	Cross Head Screw (for 120” ZH only) (serial #160315ZH0144 and lower)	M6x8	16
	GB2672-M6x8	Screw (for 120” ZH only) (serial #160415ZH0145 and higher)	M6x8	16
23	C6266C01710-G	Cover		1
24	C6266C01102C-G	Bed Stand (for 80” ZH only)		1
24a	C6266C01108-G	Front Bed Stand (for 120” ZH only)		1
24b	C6266C01109-G	Middle Bed Stand (for 120” ZH only)		1
24c	C6266C01110-G	Rear Bed Stand (for 120” ZH only)		1
25	C6266C01707-G	Cover		1
26	1440R09302B	Chuck Key Holder (serial #160415ZH0145 and higher)		1
	ZX-S96	Proximity Switch for Chuck Key Holder (not shown)		1
27	1440R01705	Drain Plate (for 80” ZH only)		1
28	TS-1540041	Hex Nut (for 80” ZH only)	M6	2
29	TS-1482041	Hex Cap Screw (for 80” ZH only)	M6x20	1
30	C6140W01723-G	Cover (for 120” ZH only)		1
31	C6266C01715-G	Front Splash Guard (for 120” ZH only)		1
32	GB70-M8X16	Hex Socket Cap Screw (for 120” ZH only)	M8X16	12
32a	GB97-8	Washer (for 120” ZH only)	8 mm	12
35	GB70-M6x16	Hex Socket Cap Screw (for 120” ZH only)	M6x16	2
36	C6266C01713-G	Coolant Tank Bracket (for 120” ZH only)		1
37	C6266C01712-G	Lacquer Tray (for 120” ZH only)		2
38	GB70- M8x50	Hex Socket Cap Screw (serial #160415ZH0145 and higher)	M8x50	2
39	C61321723A-G	Bracket		1
40	GB70- M8x12	Hex Socket Cap Screw	M8x12	2
41	JET-165	JET LOGO (serial #160415ZH0145 and higher)		1
42	C6266C18305-1	Motor Label (serial #160315ZH0144 and lower)		1
	C6266C18305-2	Motor Label (serial #160415ZH0145 and higher)		1
43	GB818-M3x6	Cross Head Screw (serial #160315ZH0144 and lower)	M3x6	4
	GB2672-M3x6	Screw (serial #160415ZH0145 and higher)	M3x6	4
44	GH-1440A18303-G	Wiring Box		1

Index No.	Part No.	Description	Size	Qty
45	GH-1440A18304-G	Wiring Box Cover		1
46	GB818-M6x8	Cross Head Screw	M6x8	2
47	C613618302	Warning Label		1
48	GB2672-M6x20	Screw	M6x20	2

3.1 **Headstock Assembly I – Exploded View**

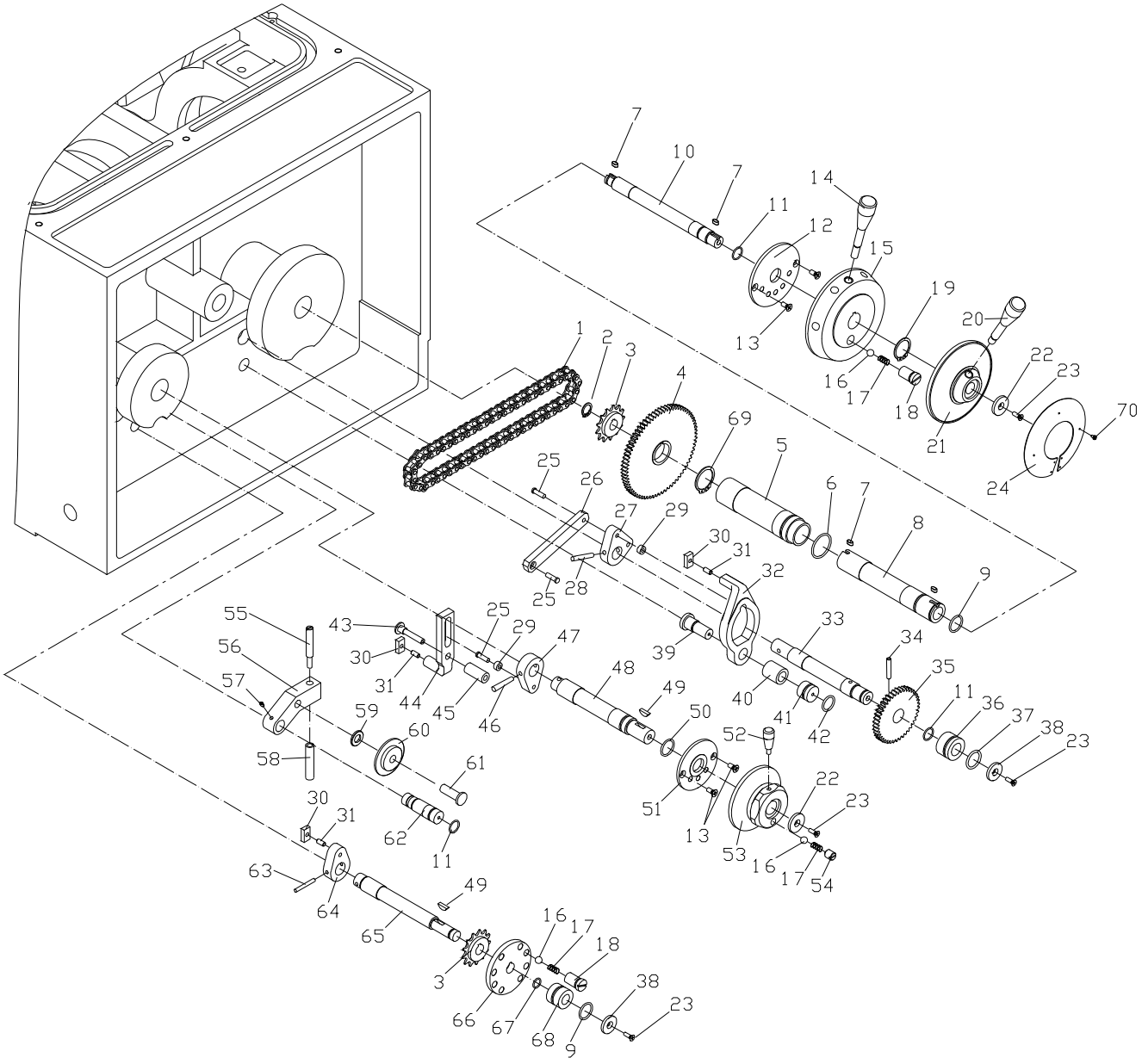


3.2 **Headstock Assembly I – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C02502-G	Headstock Cover		1
3	C6140W02835	Flat Head Countersunk Screw		1
4	TS-1505051	Hex Socket Cap Screw	M10x35	8
5	GB6172-M12	Hex Nut	M12	2
6	C6266C02768	Braking Belt Support		1
7	GB65-M6x10	Slotted Socket Cap Screw	M6x10	4
8	C6266C02767	Braking Belt		1
9	GB867-3x10	Cup Head Rivet	3x10 mm	3
10	C6266C02503	Braking Friction Disc		1
11	GB119-6n6x14	Pin	6n6x14 mm	1
12	C6266C02770	Braking Belt Support		1
13	C6266C02769	Shaft		1
14	GB3452.1-30x2.65	O-Ring	30x2.65 mm	1
15	R51-2-M27x1.5	Oil Glass	M27x1.5	2
16	GB818-M3x4	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M3x4	14
	GB2672-M3x6	Screw (serial #160415ZH0145 and higher)	M3x6	14
17	C6266C02306	Sign Label– Oil Level (serial #160315ZH0144 and lower)		1
	C6266C02306-1	Sign Label– Oil Level (serial #160415ZH0145 and higher)		1
18	C6266C02101-G	Headstock		1
19	GB5782-M20x75	Hexagon Head Bolt	M20x75	3
19a	GB97.2-20	Washer	20 mm	3
20	C6266C02125	Fork		1
20a	C6266C02721A	Control Shaft		1
21	GB881-8x40	Pin	8x40 mm	1
21a	GB6172-M8	Hex Nut	M8	1
22	GB71-M12x30	Slotted Set Screw	M12x30	1
23	Q81-1-1.6x8x70	Spring	1.6x8x70	1
24	SB-10MM	Steel Ball	10 mm	1
25	C6266C02130	Bushing		1
26	GB3452.1-38.7x3.55	O-Ring	38.7x3.55 mm	1
27	GB818-M6x16	Cross Head Screw	M6x16	3
27a	GB97.2-6	Washer	6 mm	3
27b	GB73-M8x10	Slotted Set Screw	M8x10	1
28	C6266C02757-G	Cover		1
29	GB3452.1-26.5x2.65	O-Ring	26.5x2.65 mm	1
29a	GB73-M10x10	Slotted Set Screw	M10x10	2
30	C6266C02761	Control Shaft		1
31	C6266C02128	Fork		1
32	C6266C02124	Fork		1
33	C6266C02120	Fork		1
34	C6266C02762	Control Shaft		1
35	C6140W02141-G	Front Cover		1
36	C6140W02711	Screw		3
37	GB5782-M16x80	Hexagon Head Bolt	M16x80	2
37a	GB97.2-16	Washer	16 mm	3
38	C6140W02831	Nut		1
40	C6140W02832	Drain Pipe		1
41	C6140W02833	Clamping Plate		1
42	TS-1494052	Hex Cap Screw	M16x60	1
43	C6266C02303	Sign Label (serial #160315ZH0144 and lower)		1
	C6266C02303-1	Sign Label (serial #160415ZH0145 and higher)		1
44	C6140W02143	Sliding Block		1
45	GB119-N6x20	Pin	n6x20 mm	1
46	C6140W02129	Rocker		1

Index No.	Part No.	Description	Size	Qty
47	GB1099-6x22	Woodruff Key	6x22 mm	1
48	C6266C02763	Shaft		1
49	G51-2A-25x2.4	O-Ring	25x2.4 mm	2
50	C6140W02127	Collar		2
51	C6266C02119	Collar		1
52	C6266C02305-23	Headstock Label Panel (for 80” ZH only) (serial #160315ZH0144 and lower)		1
	GH26120ZH-52	Headstock Label Panel (for 120” ZH only) (serial #160315ZH0144 and lower)		1
	C6266C02305-168	Headstock Label Panel (serial #160415ZH0145 and higher)		1
53	C6140W02837	Board		1
54	C6140W02836	Oil Distributor		1
55	GB819-M5x10	Cross Recessed Head Countersunk Screw	M5x10	2
56	GB819-M6x14	Cross Recessed Head Countersunk Screw	M6x14	2
57	GB818-M6x8	Cross Recessed Pan Head Screw	M6x8	2
58	C6266C02781	Oil Sprayer Assembly		1
59	G92-1A-4	Fitting	4 mm	group of 8
60	G92-1A-8	Fitting	8 mm	1
61	G92-1A-10	Fitting	10 mm	group of 4
62	SFW-02A	Oil Filter		1

4.1 **Headstock Assembly II – Exploded View**

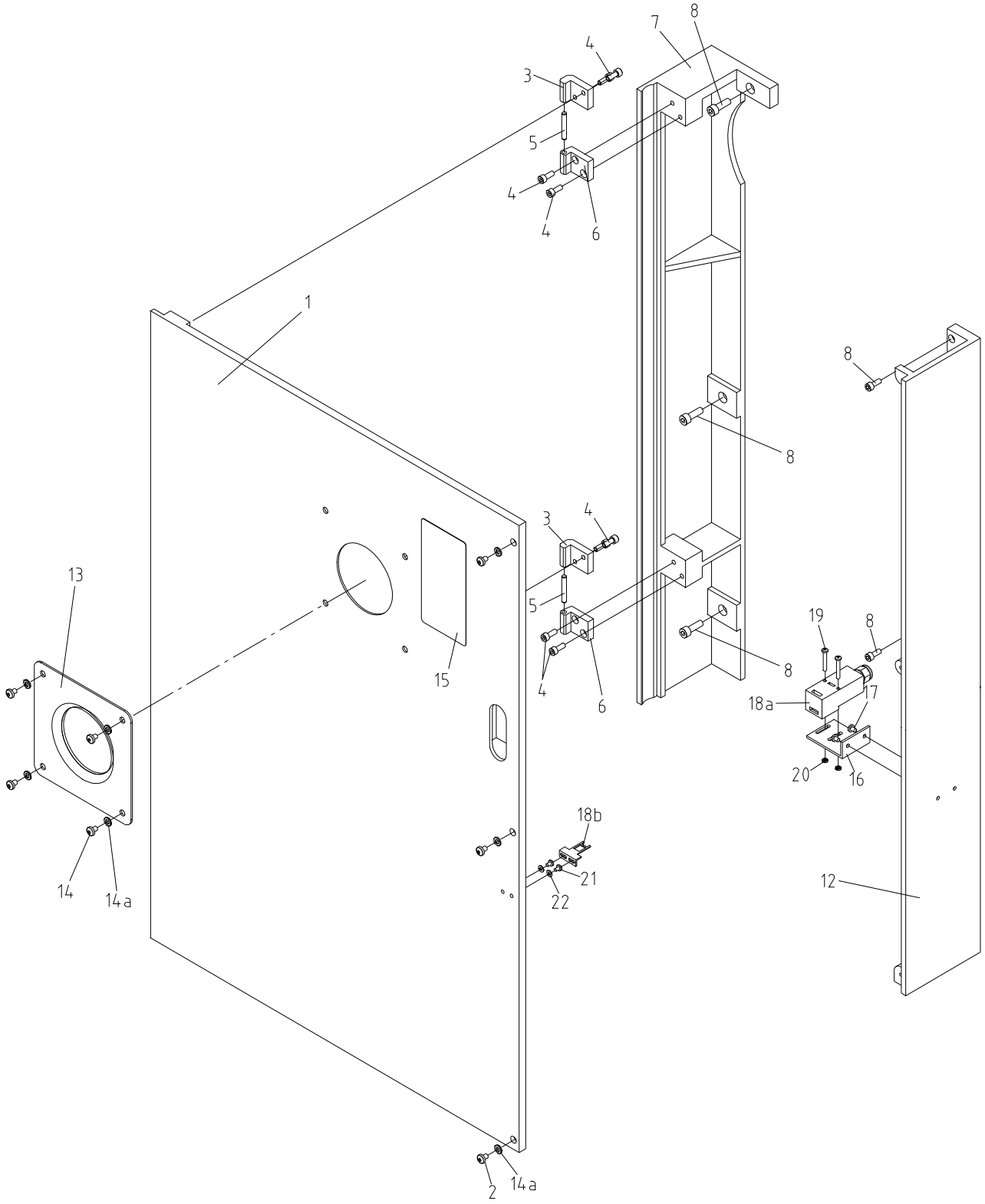


4.2 **Headstock Assembly II – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266CHA01	Chain	12.7 x 58 mm	1
2	GB894.1-16	C-Clip for Shaft	16 mm	1
3	C6140W02808	Chain Wheel		2
4	C6266C02751	Gear		1
5	C6266C02780	Sleeve		1
6	GB3452.1-34.5x2.65	O-Ring	34.5x2.65 mm	1
7	GB1096-5x10	Flat Key	5x10 mm	4
8	C6266C02753	Collar		1
9	GB3452.1-25x2.65	O-Ring	25x2.65 mm	2
10	C6266C02752	Shaft		1
11	GB3452.1-17x1.8	O-Ring	17x1.8 mm	3
12	C6266C02756	Positioning Disc		1
13	GB819-M6x14	Cross Recessed Head Countersunk Screw	M6x14	4
14	C6140W02799-G	Lever		1
15	C6266C02114-G	Lever Support		1
16	SB-10MM	Steel Ball	10 mm	3
17	Q81-1-1.6x8x18	Spring	1.6x8x18	3
18	C6266C02754	Positioning Screw		2
19	GB894.1-30	C-Clip for Shaft	30 mm	1
20	C6140W02801-G	Lever		1
21	C6140W02123-G	Lever Support		1
22	C6140W02821-G	Washer		2
23	GB819-M5x16	Cross Recessed Head Countersunk Screw	M5x16	6
24	C6266C02304	Speed Sign (serial #160315ZH0144 and lower)		1
	C6266C02304A	Speed Sign (serial #160415ZH0145 and higher)		1
25	C6140W02813	Pin		3
26	C6266C02775	Connector		1
27	C6266C02121	Rocker		1
28	GB117-6x45	Taper Pin (serial #120720ZH0041 and lower)	6x45 mm	1
	GB877-6x50	Taper Pin (serial #130102ZH0042 and higher)	6x50 mm	1
29	C6140W02812	Roller		2
30	C6140W02119	Sliding Block		3
31	GB119-6n6x14	Pin	6n6x14 mm	3
32	C6266C02122	Fork		1
33	C6266C02765	Axis		1
34	GB117-6x35	Taper Pin (serial #120720ZH0041 and lower)	6x35 mm	1
	GB877-6x40	Taper Pin (serial #130102ZH0042 and higher)	6x40 mm	1
35	C6266C02749	Gear		1
36	C6266C02112	Collar		1
37	GB3452.1-30x2.65	O-Ring	30x2.65 mm	1
38	C6266C02750	Washer		2
39	C6266C02764	Pin		1
40	C6266C02123	Collar		1
41	C6266C02111	Plug		1
42	GB3452.1-20x2.65	O-Ring	20x2.65 mm	1
43	C6266C02760	Shaft		1
44	C6266C02118	Fork		1
45	C6266C02116	Collar		1
46	GB117-6x40	Taper Pin (serial #120720ZH0041 and lower)	6x40	1
	GB877-6x45	Taper Pin (serial #130102ZH0042 and higher)	6x45	1
47	C6266C02117	Rocker		1
48	C6266C02759	Shaft		1
49	GB1099-5x19	Woodruff Key	5x19 mm	2
50	GB3452.1-21.2x2.65	O-Ring	21.2x2.65 mm	1
51	C6266C02758	Positioning Disc		1

Index No.	Part No.	Description	Size	Qty
52	C6140W02822-G	Lever		1
53	C6266C02115-G	Lever Support		1
54	GB73-M12x14	Set Screws	M12x14	1
55	C6266C02774	Bolt		1
56	C6266C02129	Rocker		1
57	TS-1522021	Socket Set Screw	M5x8	1
58	C6266C02773	Screw		1
59	TS-2360121	Flat Washer	12 mm	1
60	C6140W02826	Tightening Wheel		1
61	C6140W02825	Pin		1
62	C6266C02771	Shaft		1
63	GB117-5x40	Taper Pin (serial #120720ZH0041 and lower)	5x40 mm	1
	GB877-5x45	Taper Pin (serial #130102ZH0042 and higher)	5x45 mm	1
64	C6266C02127	Rocker		1
65	C6266C02766	Shaft		1
66	C6266C02772	Positioning Disc		1
67	GB3452.1-12.5x1.8	O-Ring	12.5x1.8 mm	1
68	C6266C02126	Collar		1
69	GB894.1-35	C-Clip for Shaft	35 mm	1
70	GB818-M3x6	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M3x6	7
	GB2672-M3x6	Screw (serial #160415ZH0145 and higher)	M3x6	7

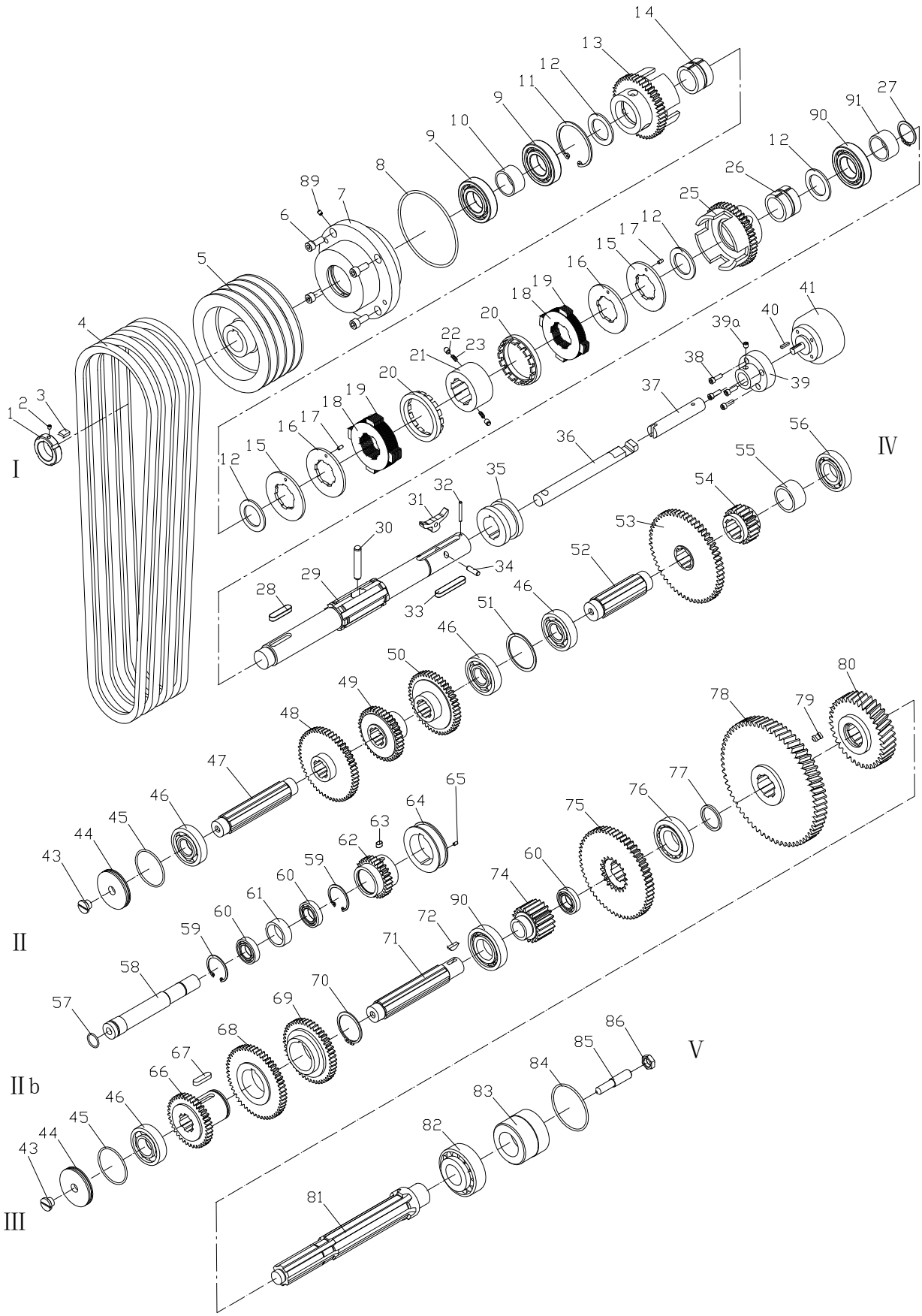
5.1 **Headstock Assembly III – Exploded View**



5.2 **Headstock Assembly III – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C08501-G	Back Cover		1
2	GB2672-M6x25	Screw	M6x25	3
3	C6266C08706	Upper Hinge		2
4	GB70-M6x12	Hex Socket Cap Screw	M6x12	8
5	GB119-6h8x40	Pin	6h8x40	2
6	C6266C08707	Lower Hinge		2
7	C6266C08504-G	Rear Side Plate		1
8	TS-1503031	Hex Socket Cap Screw	M6x14	5
12	C6266C08711A-G	Lower Front Side Plate		1
13	C6266C08714-G	Cover		1
14	GB818-M6x8	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M6x8	4
	GB2672-M6x8	Screw (serial #160415ZH0145 and higher)	M6x8	4
14a	GB97.2- 6	Washer	6	7
15	GH-2680ZH-11304-4	Warning Label (80” ZH only, serial #160415ZH0145 and higher)		1
	GH-26120ZH-11304-5	Warning Label (120” ZH only, serial #160415ZH0145 and higher)		1
16	C6266C18718	Bracket		1
17	GB818-M5x6	Cross Recessed Pan Head Screw	M5x6	2
18	ZH-SQ1	Door Switch Assembly	QKS8	1
18a		Door Switch	QKS8-1	1
18b		Door Switch	QKS8-2	1
19	GB818-M4x30	Cross Recessed Pan Head Screw	M4x30	2
20	GB6172-M4	Hex Nut	M4	2
21	GB818-M4x6	Cross Recessed Pan Head Screw	M4x6	2
22	GB97-4	Washer	4	2

6.1 **Headstock Assembly IV – Exploded View**

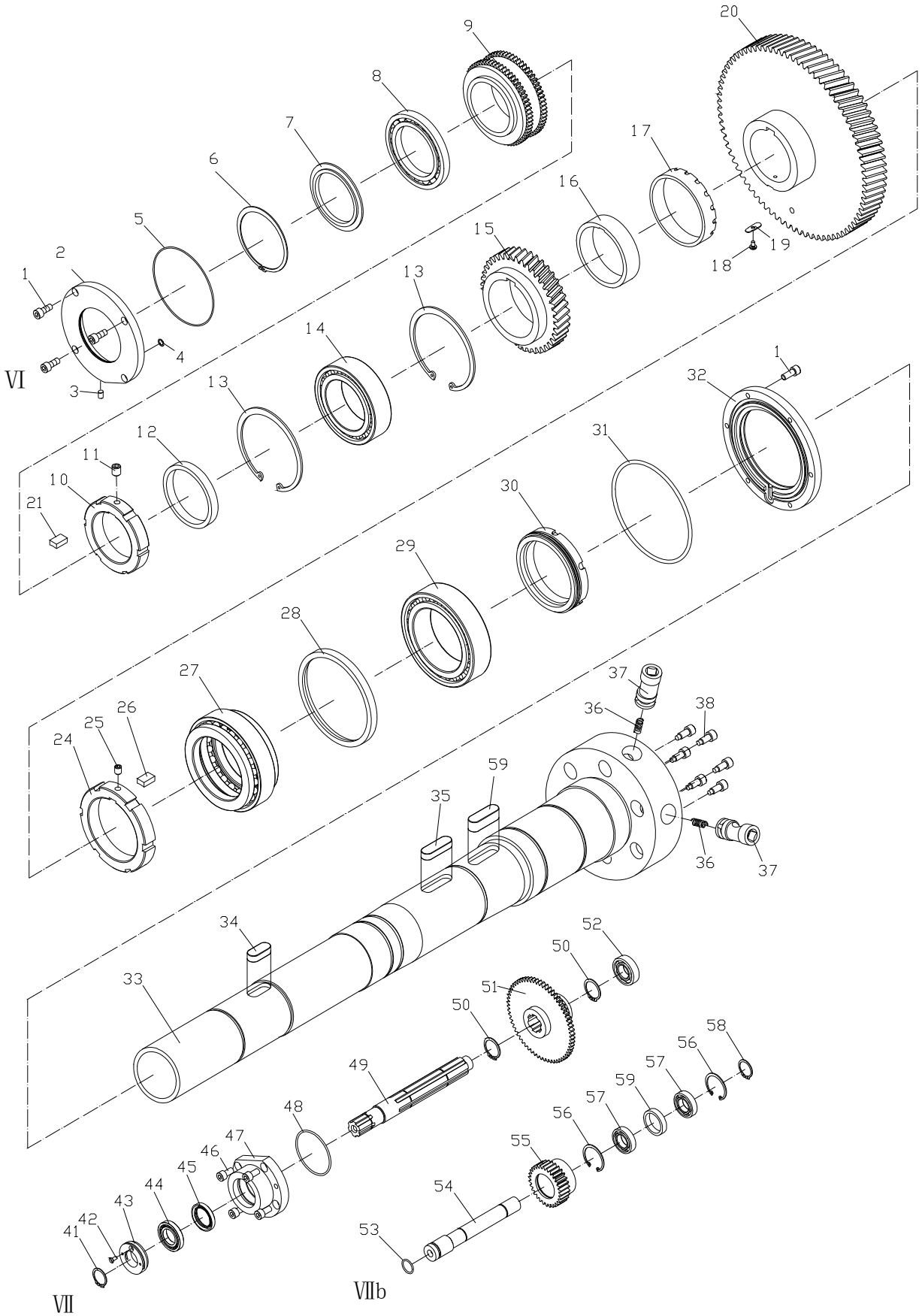


6.2 **Headstock Assembly IV – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6140W02752-1/2	Round Nut		1
2	TS-1523011	Hex Socket Set Screw	M6x6	1
3	C6140W02752-2/2	Clamping Piece		1
4	B2464	Belt		4
5	C6266C02107	Pulley		1
6	TS-1505031	Hex Socket Cap Screw	M10x25	4
7	C6266C02105	Bearing Cover		1
8	GB3452.1-122x3.55	O-Ring	122x3.55 mm	1
9	BB-6208ZZ	Bearing	6208ZZ	2
10	C6266C02106	Spacer		1
11	GB894.1-40	C-Clip for Shaft	40 mm	1
12	C6266C02723	Spacer		4
13	C6266C02730	Forward Clutch Housing		1
14	C6266C02302	Collar		1
15	C6140W02748	Pressure Plate		2
16	C6140W02747	Pressure Plate		2
17	GB119-5x10	Pin	5x10 mm	2
18	C6140W02746	Inner Friction Disc (forward 8 pcs and reverse 5 pcs)		13
19	C6140W02745	Outer Friction Disc (forward 7 pcs and reverse 4 pcs)		11
20	C6140W02741	Adjusting Nut		2
21	C6266C02727	Spline Sleeve		1
22	C6140W02744	Stop Pin		2
23	Q81-1-0.8x5x16	Spring	0.8x5x16 mm	2
25	C6266C02724	Reverse Clutch Housing		1
26	C6266C02301	Collar		1
27	GB894.1-40	Circlip for Shaft	40 mm	1
28	GB1096-12x50	Flat Key	12x50 mm	1
29	C6266C02731A	Shaft (I)		1
30	GB119-12x70	Pin	12x70 mm	1
31	C6240W02732	Pressure Piece		1
32	GB119-5x40	Pin	5x40 mm	1
33	GB1096-12x70	Flat Key	12x70 mm	1
34	GB119-8x25	Pin	8x25 mm	1
35	C6140W02733	Sliding Ring		1
36	C6266C02728	Shaft		1
37	C6266C02722	Shaft		1
38	TS-1503051	Hex Socket Cap Screw	M6x20	3
39	C6140W02106	Pump Support		1
39a	GB78-M8x10	Hex Socket Set Screw With Cone Point	M8x10	1
40	GB1096-4x16	Flat Key	4x16 mm	1
41	DB-B4	Bracket		1
43	C6266C02740	Bolt		2
44	C6266C02736	Cover		2
45	GB3452.1-65x3.55	O-Ring	65x3.55 mm	2
46	BB-6306	Ball Bearing	6306	3
47	C6266C02735	Shaft (II)		1
48	C6266C02734	Gear		1
49	C6266C02733	Gear		1
50	C6266C02732	Gear		1
51	C6266C02737	Circlip		1
52	C6266C02718	Shaft (IV)		1
53	C6266C02720	Gear		1
54	C6266C02719A	Gear		1
55	C6266C02103	Sleeve		1
56	BB-6207	Ball Bearing	6207	2

Index No.	Part No.	Description	Size	Qty
57	GB3452.1-25x2.65	O-Ring	25x2.65 mm	1
58	C6266C02729	Shaft (IIb)		1
59	GB893.1-47	C-Clip	47 mm	2
60	BB-6005	Ball Bearing	6005	2
61	C6266C02104	Sleeve		1
62	C6266C02726	Gear		1
63	GB1096-8x12	Flat Key	8x12 mm	1
64	C6266C02725	Brake Wheel		1
65	GB73-M5x8	Slotted Set Screw	M5x8	1
66	C6266C02741	Gear		1
67	GB1096-10x40	Flat Key	10x40 mm	1
68	C6266C02738	Gear		1
69	C6266C02742	Gear		1
70	GB894.1-55	Circlip for Shaft	55 mm	1
71	C6266C02739	Shaft (III)		1
72	GB1099-6x22	Woodruff Key	6x22 mm	1
74	C6266C02717	Gear		1
75	C6266C02716A	Gear		1
76	BB-32208	Bearing	32208	1
77	C6266C02779	C-Clip for Shaft		1
78	C6266C02715	Gear		1
79	C6140W02733	Clamping Sleeve		3
80	C6266C02714	Gear		1
81	C6266C02713	Shaft (V)		1
82	32308	Tapered Roller Bearing	32308	1
83	C6140W02103	Shaft Plug (VI)		1
84	GB3452.1-82.5x3.55	O-Ring	82.5x3.55 mm	1
85	C6140W02717	Hex Socket Cap Screw		1
86	GB6173-M16x1.5	Nut	M16x1.5	1
89	GB119- 6x8	Pin	6x8 mm	1
90	BB-6208	Bearing	6208	2
91	C6266C02131	Sleeve (serial #120720ZH0038 and higher)		1

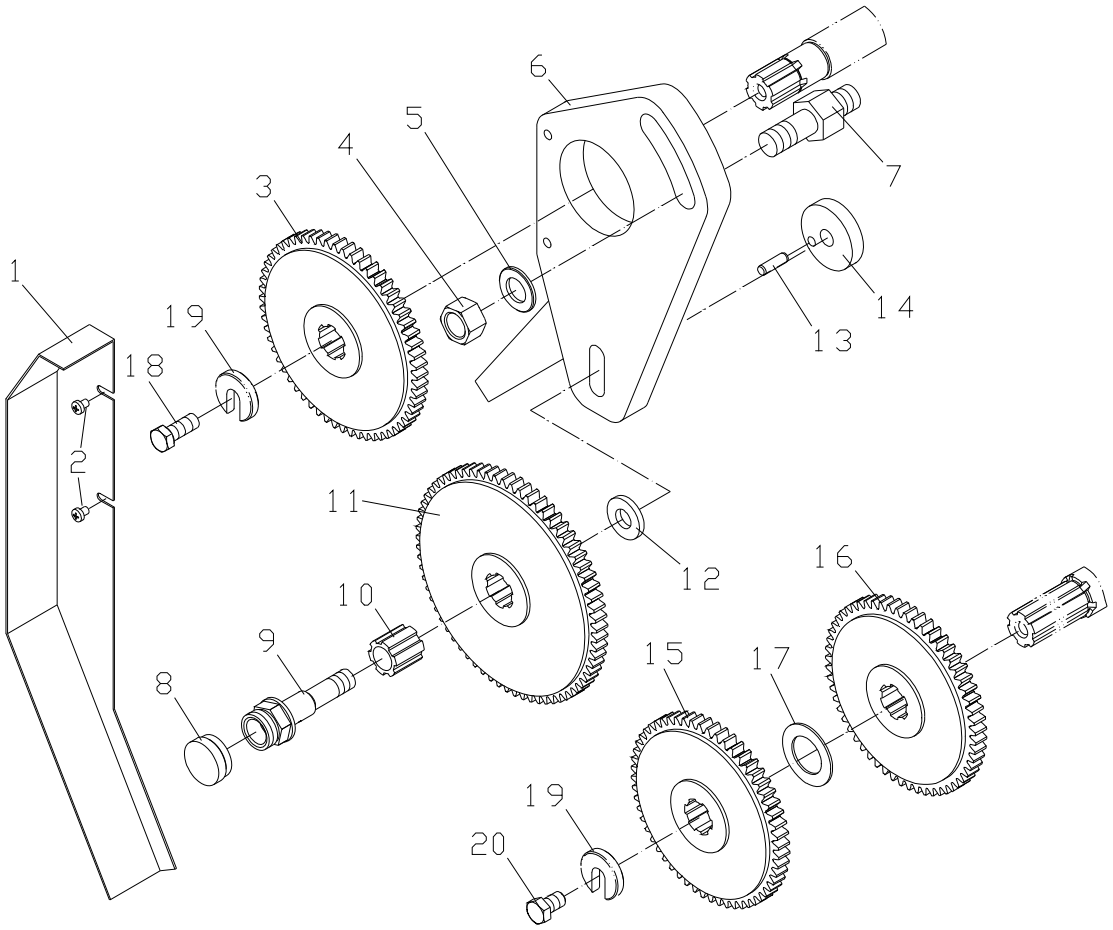
7.1 **Headstock Assembly V – Exploded View**



7.2 **Headstock Assembly V – Parts List**

Index No.	Part No.	Description	Size	Qty
1	TS-1505031	Hex Socket Cap Screw	M10x25	1
2	C6266C02108	Back Flange Cover		1
3	GB119-6x8	Pin	6x8	1
4	G51-2A-12x1.9	O-Ring	12x1.9	4
5	GB3452.1-180x2.65	O-Ring	180x2.65	1
6	GB894.1-120	C-Clip for Shaft	120	1
7	C6266C02744	Bearing Back C-Clip		1
8	16024	Ball Bearing	16024	1
9	C6266C02743	Double Gear		1
10	C6266C02702-1	Round Nut		1
11	TS-1526011	Hex Socket Cap Screw	M12x12	3
12	C6266C02703	C-Clip		1
13	GB893.1-200	C-Clip for Bore	200	2
14	NN3026K/P5	Cylindrical Roller Bearing		1
15	C6266C02704	Gear		1
16	C6266C02705	Thread Sleeve		1
17	C6266C02706	Nut		1
18	GB67-M6x10	Screw	M6x10	1
19	C6140W02715	Fixing Plate		2
20	C6266C02707	Gear		1
21	C6266C02702-2	Clamping Plate		1
24	C6266C02708-1	Round Nut		1
25	TS-1526021	Hex Socket Cap Screw	M12x16	3
26	C6266C02708-2	Pin		3
27	2268930	Bearing		1
28	C6266C02709	Bearing C-Clip		1
29	NN3030K/W33/P5	Bearing		1
30	C6266C02710	Round Nut		1
31	GB3452.1-250x5.3	O-Ring	250x5.3	1
32	C6266C02102-G	Front Flange Cover		1
33	C6266C02701	Spindle		1
34	GB1096-10x40	Flat Key	10x40	1
35	GB1096-16x50	Flat Key	16x50	2
36	Q81-1-1x8x16	Spring	1x8x16	6
37	C6266C02711	Cam		6
38	C6266C02712	Positioning Screw		6
41	GB894.1-30	C-Clip for Shaft	30	1
42	GB68-M5x12	Slotted Head Screw	M5x12	1
43	C6140W02776	Adjusting Screw		1
44	6006-2RS	Ball Bearing	6006	1
45	GB13871-B-35x51x8	Oil Seal	B-35x51x8	1
46	TS-1505021	Hex Cap Screw	M10x20	4
47	C6266C02110	Bearing Cover		1
48	G51-2A-80x3.1	Oil Seal	80x3.1	1
49	C6266C02747	Shaft (VII)		1
50	GB894.1-35	C-Clip	35	2
51	C6266C02746	Gear		1
52	6205	Ball Bearing	6205	1
53	GB3452.1-25x2.65	O-Ring	25x2.65	1
54	C6266C02748	Shaft (VIIb)		1
55	C6266C02745	Gear		1
56	GB893.1-47	C-Clip for Bore	47	2
57	6005	Ball Bearing	6005	2
58	GB894.1-25	C-Clip for Shaft	25	1
59	C6266C02109	Sleeve		1

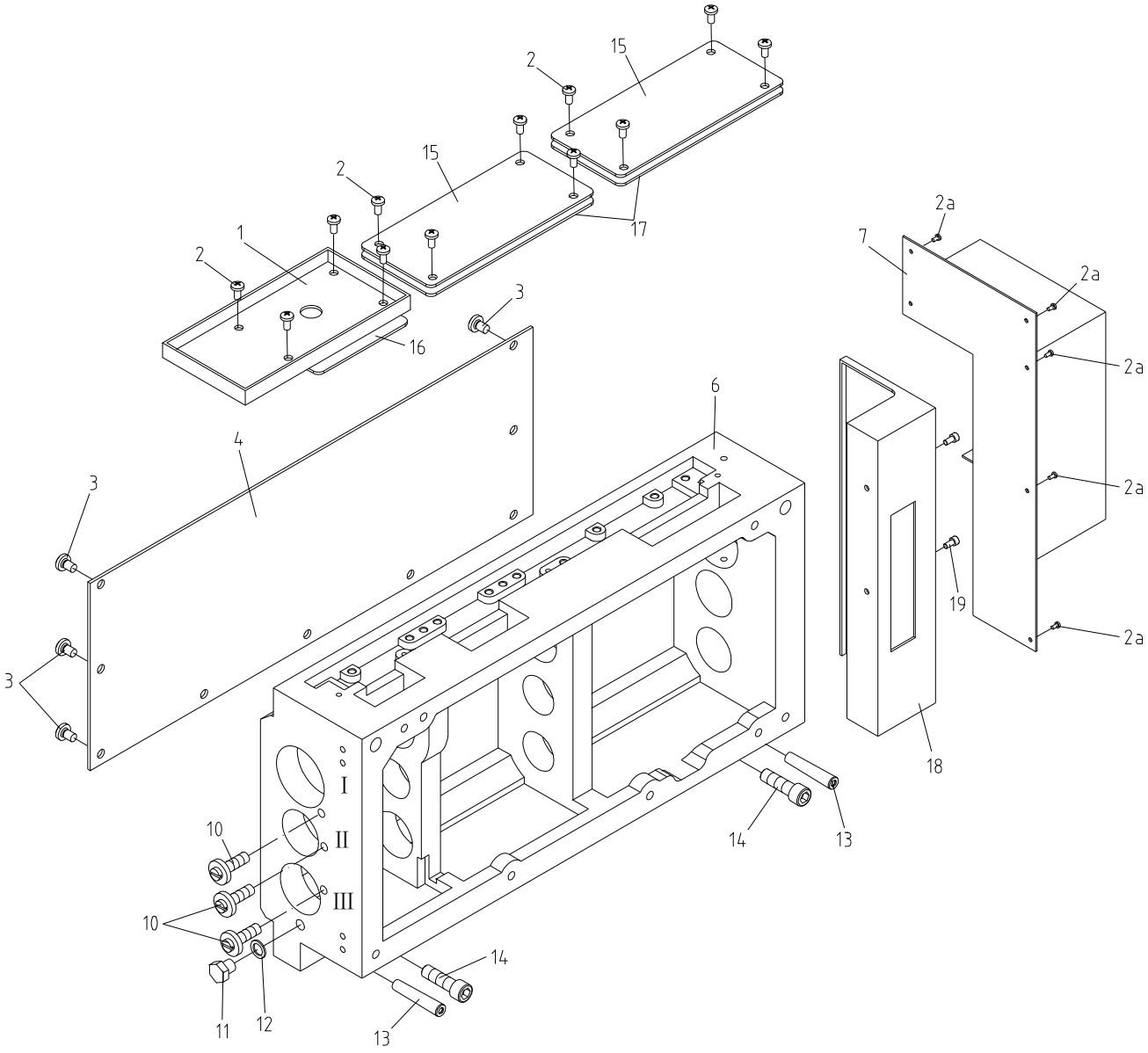
8.1 **Gear Assembly – Exploded View**



8.2 **Gear Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C08708-G	Splash Guard		1
2	GB818-M6x8	Screw (serial #160315ZH0144 and lower)	M6x8	2
	GB2672-M6x8	Screw (serial #160415ZH0145 and higher)	M6x8	2
3	C6266C08702	Gear (in.)	2m82T	1
4	GB6172-M20	Hex Nut	M20	1
5	GB97.2-20	Washer	20	1
6	C6266C08101	Quadrant		1
7	C6266C02776	Bolt		1
8	C6140W08703	Nut Cover		1
9	C6140W08702	Gear Shaft		1
10	C6140W08301	Spline Sleeve		1
11	C6266C08102	Gear (in.)	2m97T	1
12	C6266C08701	Washer		1
13	GB119-8n6x20	Pin	8n6x20	1
14	C6140W08704	Position Nut		1
15	C6266C08703	Gear (in.)	2m81T	1
16	C6266C08705	Gear (in.)	2m57T	1
17	1440R06001C-2	Collar		may vary
18	TS-1492021	Hex Cap Screw	M12x30	1
19	GB851-A12x40	Split Washer	A12x40	2
20	GB5783-M12x20	Hexagon Head Bolt	M12x20	1

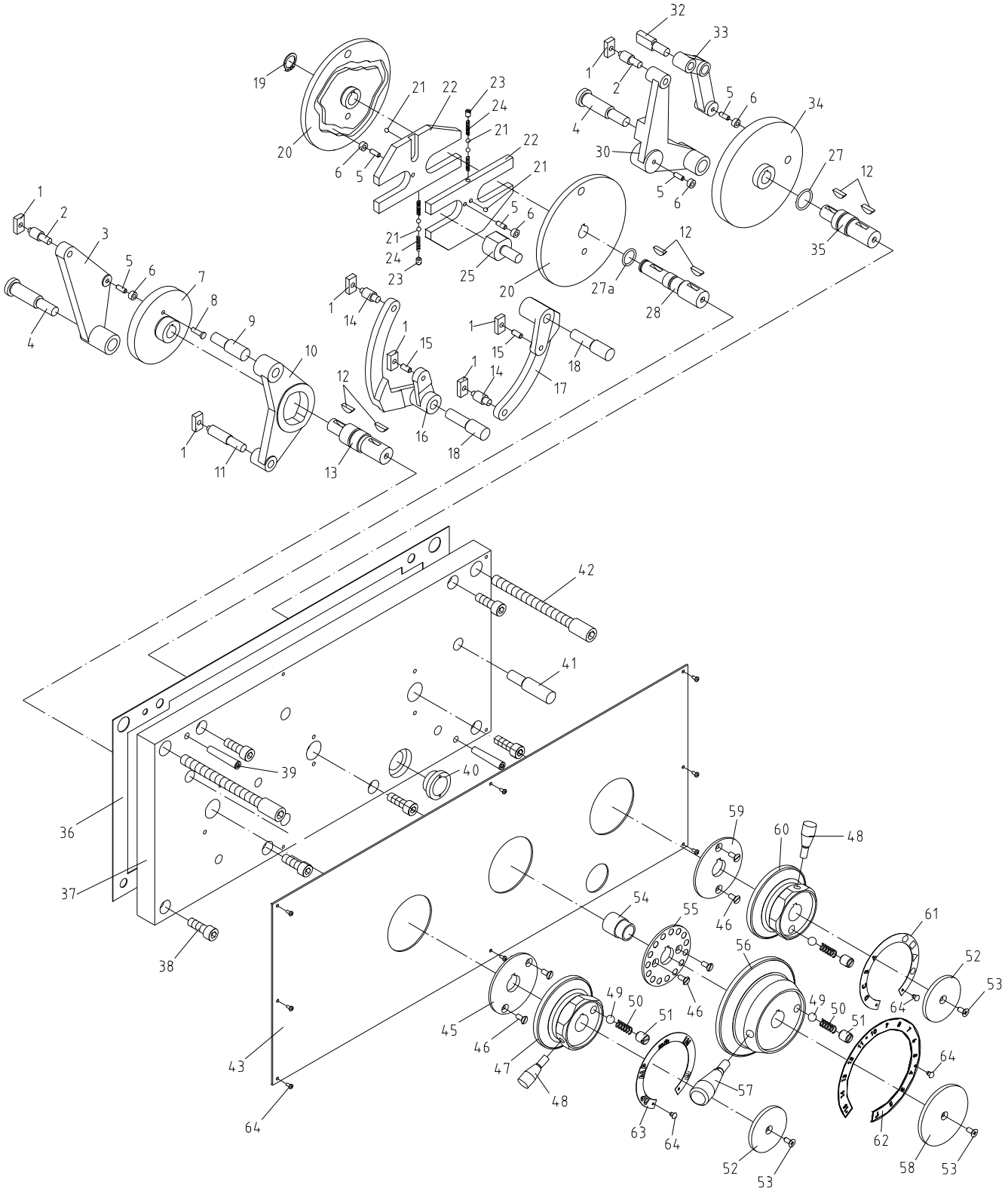
9.1 **Gear Box Assembly I – Exploded View**



9.2 **Gear Box Assembly I – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C05767-G	Oil Plate		1
2	TS-1534032	Cross Recessed Pan Head Screw	M6x10	12
2a	GB70-M3x10	Hex Socket Cap Screw	M3x10	6
3	TS-1490011	Hex Cap Screw	M8x12	9
4	C6140W05A729-G	Back Cover		1
6	C6140W05A101-G	Feed Box Casting		1
7	C6266C05765J-G	Side Splash Guard		1
10	C6140W05A728	Shoulder Screw		3
11	G38-2A-M12x1.25	Hex Cap Screw	M12x1.25	1
12	TS-2360121	Copper Gasket	12 mm	1
13	GB118-10x50	Taper Pin	10x50 mm	2
14	TS-1506051	Hex Socket Cap Screw	M12x40	2
15	C6266C05768	Panel		2
16	C6266C-05501	Gasket		1
17	C6266C-05502	Gasket		2
18	C6266C-05766	Bracket		1
19	GB70-M6x12	Gasket	M6x12	2

10.1 **Gear Box Assembly II – Exploded View**

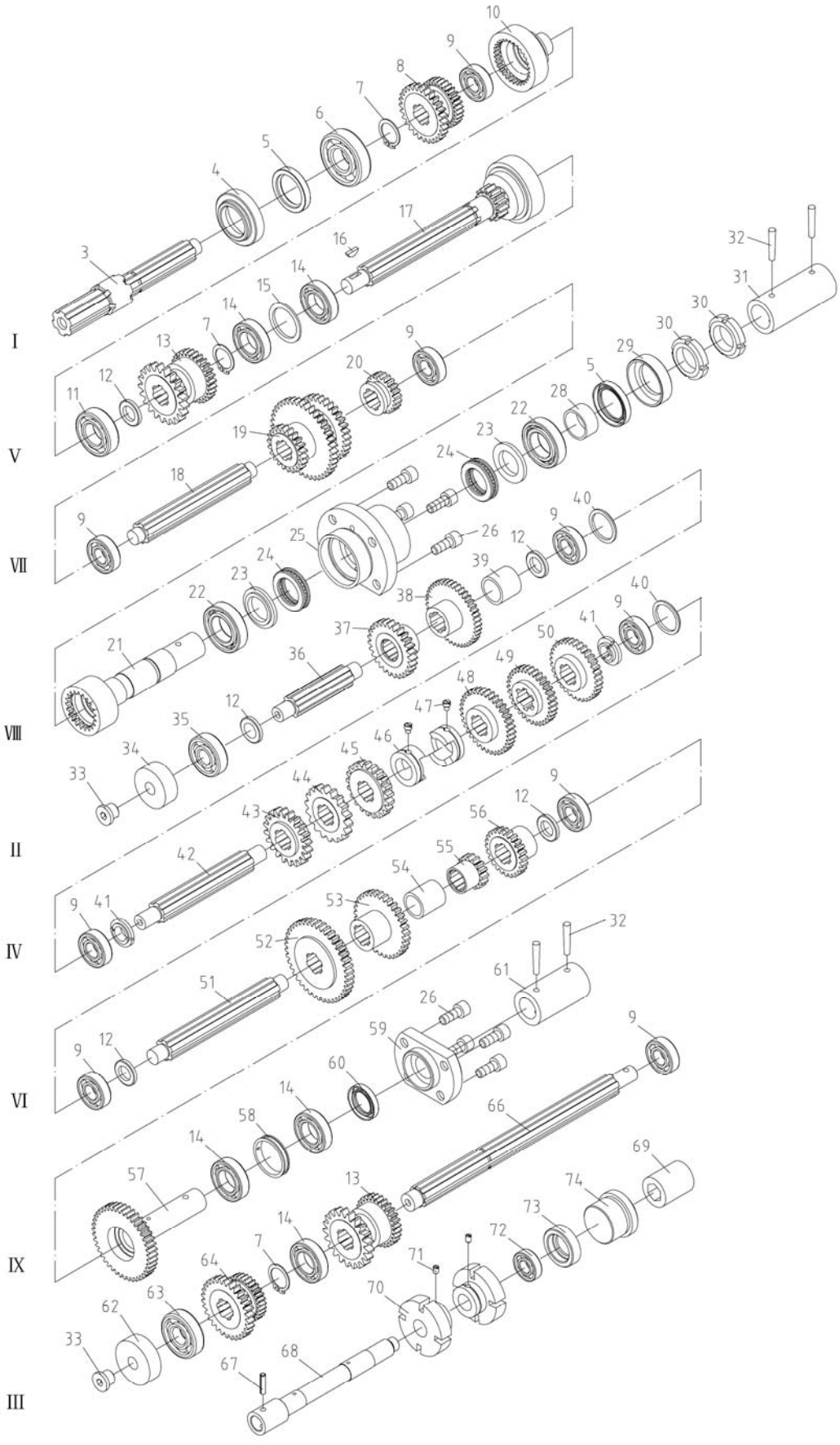


10.2 **Gear Box Assembly II – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6140W05109	Sliding Block		7
2	C6140W05A701	Shaft		2
3	C6140W05A105	Ratio Change Rocker		1
4	C6140W05709	Rocker Shaft		2
5	GB119-5x14	Pin	5x14 mm	5
6	C6140W05720	Roller		6
7	C6140W05708	Cam		1
8	C6140W05A703	Roller Shaft		1
9	C6140W05702	Shaft		1
10	C6140W05A103	Rocker		1
11	C6140W05A710	Shaft		1
12	GB1099-5x19	Woodruff Key	5x19 mm	6
13	C6140W05707	Shaft		1
14	C6140W05A711	Shaft		2
15	GB119-6x14	Pin	6x14 mm	2
16	C6140W05A110	Shaft		1
17	C6140W05A106	Upper Rocker		1
18	C6140W05712	Shaft		2
19	GB894.1-16	C-clip for Shaft	16 mm	1
20	C6140W05A717	Cam		2
21	SB-5MM	Steel Ball	5 mm	6
22	C6140W05A719	Pulley		2
23	TS-1523021	Set Screw	M6x8	2
24	Q81-1-0.6x4x20	Spring	0.6x4x20 mm	4
25	C6140W05A718	Positioning Column		1
27	G51-2A-25x2.4	O-Ring	25x2.4 mm	2
27a	G51-2A-16 x2.4	Ring Seal	16x2.4 mm	1
28	C6140W05A716	Handle Axle		1
30	C6140W05A112	Rocker		1
32	C6140W05A722	Shaft		1
33	C6140W05A111	Rocker		1
34	C6140W05A725	Cam		1
35	C6140W05A723	Shaft		1
36	C6140W05A501	Gasket		1
37	C6140W05A115-G	Front Cover		1
38	TS-1505041	Hex Socket Cap Screw	M10x30	6
39	GB118-8x50	Pin	8x50 mm	2
40	C6266CGBA40	Oil Sight Glass	M27x1.5	1
41	C6140W05721	Shaft		1
42	C6140W05A727	Hex Socket Cap Screw		1
43	C6266C05301A-7	Gearbox Label Panel (serial #160315ZH0144 and lower)		1
	C6266C05301A-22	Gearbox Label Panel (serial #160415ZH0145 and higher)		1
45	C6140W05A704	Positioning Disc		1
46	GB68-M5x12	Slotted Head Screw	M5x12	6
47	C6140W05A104-G	Lever Support		1
48	C6140W05705-G	Lever		2
49	SB-10MM	Steel Ball	10 mm	3
50	Q81-1-1x8x25	Spring	1x8x25 mm	3
51	GB73-M12x14	Slotted Set Screw	M12x14	3
52	C6140W05706-G	Disc		2
53	GB819-M5x12	Cross Recessed Head Screw	M5x12	3
54	C6140W05A108	Collar		1
55	C6140W05A713	Positioning Disc		1
56	C6140W05A107-G	Lever Support		1
57	C6266C05714-G	Lever		1

Index No.	Part No.	Description	Size	Qty
58	C6140W05715-G	Cover		1
59	C6140W05A724	Positioning Disc		1
60	C6140W05A104-G	Lever Support		1
61	C6140W05308	Handle Panel (serial #160315ZH0144 and lower)		1
	C6140W05308-2	Handle Panel (serial #160415ZH0145 and higher)		1
62	C6140W05A307	Handle Panel (serial #160315ZH0144 and lower)		1
	C6140W05A307-2	Handle Panel (serial #160415ZH0145 and higher)		1
63	C6140W05306	Handle Panel (serial #160315ZH0144 and lower)		1
	C6140W05306-2	Handle Panel (serial #160415ZH0145 and higher)		1
64	TS-1531012	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M3x6	17
	GB2672- M3x6	Screw (serial #160415ZH0145 and higher)	M3x6	17

11.1 **Gear Box Assembly III – Exploded View**

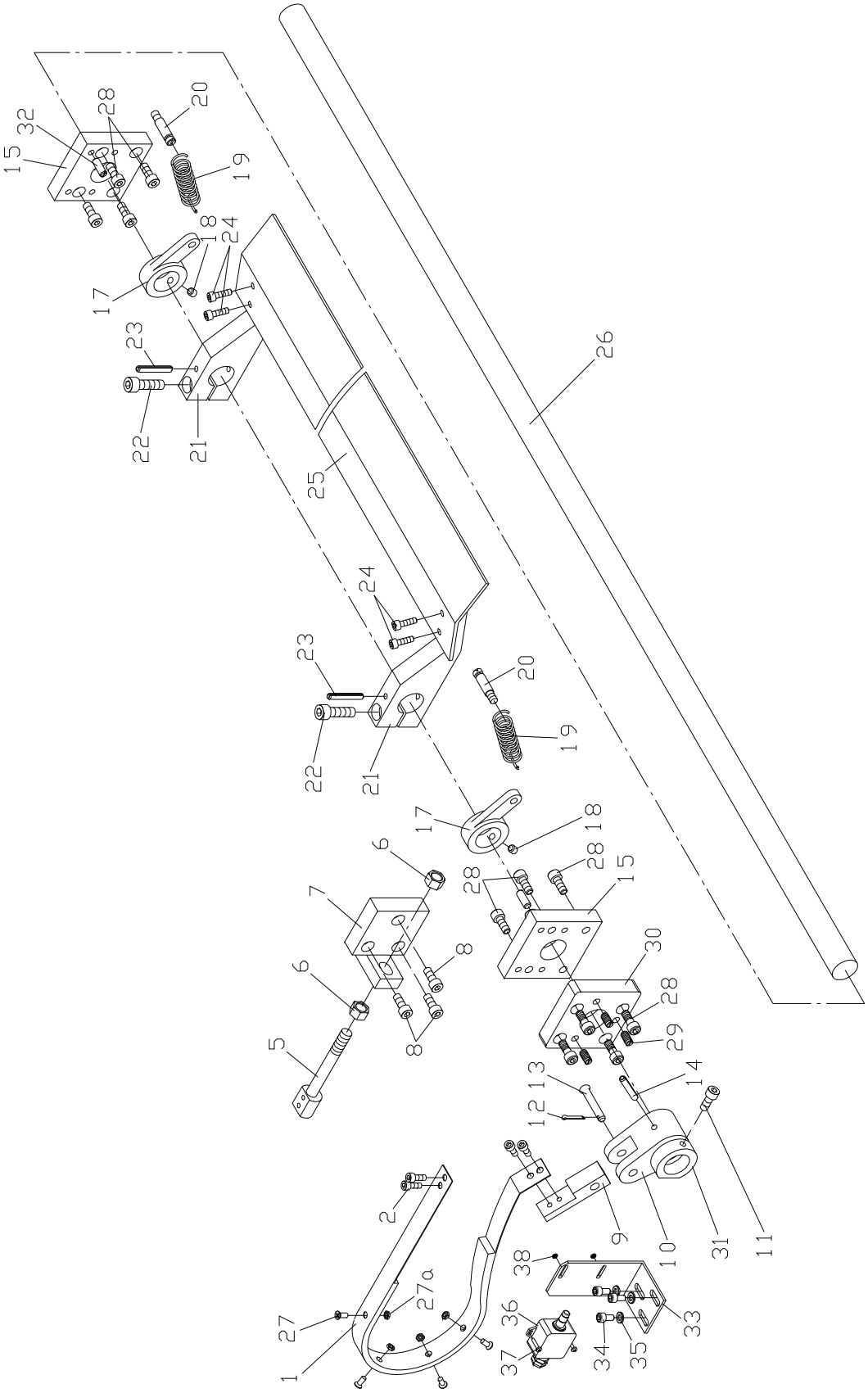


11.2 **Gear Box Assembly III – Parts List**

Index No.	Part No.	Description	Size	Qty
3	C6140W05A730	Shaft (I)		1
4	C6266C05772J	Bearing Cover		1
5	G51-1-.B-35x50x8	Oil Seal	B-35x50x8	2
6	BB-6305	Ball Bearing	25x62x17 mm	1
7	GB894.1-25	C-Clip for Shaft	25 mm	3
8	C6140W05731	Double Gear		1
9	BB-6203	Ball Bearing	17x40x12 mm	9
10	C6140W05732	Gear		1
11	BB-6205	Ball Bearing	25x52x15 mm	1
12	C6140W05A769	Spacer		5
13	C6140W05733	Double Gear		2
14	BB-6005	Ball Bearing	25x47x12 mm	5
15	C6140W05736	Spacer		1
16	GB1099-4x19	Woodruff Key	4x19 mm	1
17	C6140W05A735	Shaft (V)		1
18	C6140W05A738	Shaft (VII)		1
19	C6140W05737	Triple Gear		1
20	C6140W05739	Gear		1
21	C6140W05743	Shaft (VIII)		1
22	16006	Bearing	30x55x9 mm	2
23	C6140W05740	Spacer		2
24	BB-51106	Thrust Bearing	30x47x11 mm	2
25	C6140W05117-G	Flange Sleeve		1
26	GB70- M10x25	Hex Socket Cap Screw	M10x25	8
28	C6266C05773J	Sleeve		1
29	C6266C05741J	Bearing Cover		1
30	C6140W05742	Round Nut		2
31	C6140W05767	Shaft		1
32	GB117-6x40	Taper Pin	6x40 mm	4
33	G38-4A-M16x1.5	Plug	M16x1.5	2
34	C6140W05A771	Bearing Cover		1
35	BB-6303	Ball Bearing	17x47x14 mm	1
36	C6140W05A762	Shaft (II)		1
37	C6140W05763	Gear		1
38	C6140W05764	Gear		1
39	C6140W05125	Sleeve		1
40	C6140W05751	Sleeve		2
41	C6140W05A752	Adjust Washer		2
42	C6140W05A754	Shaft (IV)		1
43	C6140W05A759	Gear		1
44	C6140W05758	Gear		1
45	C6140W05757	Gear		1
46	C6140W05A734	Positioning Sleeve		2
47	GB75-M8x10	Slotted Set Screw	M8x10	2
48	C6140W05756	Gear		1
49	C6140W05755	Gear		1
50	C6140W05753	Gear		1
51	C6140W05A749	Shaft (VI)		1
52	C6140W05750	Gear		1
53	C6140W05A748	Gear		1
54	C6140W05A124	Sleeve		1
55	C6140W05747	Gear		1
56	C6140W05746	Gear		1
57	C6140W05745	Shaft (IX)		1

Index No.	Part No.	Description	Size	Qty
58	C6140W05A744	Sleeve		1
59	C6140W05A121-G	Flange Sleeve		1
60	G51-1-B-25x40x7	Oil Seal	B-25x40x7	1
61	C6140W05768	Shaft Connector		1
62	C6140W05A770	Bearing Cover		1
63	BB-6304	Ball Bearing	20x52x15 mm	1
64	C6140W05761	Double Gear		1
66	C6140W05A760	Shaft (III)	mm	1
67	GB879-6x25	Straight Pin	6x25	1
68	C6140W05A772	Shaft		1
69	C6140W05122	Sleeve		1
70	C6266C05130J	Oil Splash Ring		2
71	GB78-M6x12	Slotted Set Screw	M6x12	2
72	BB-6002	Ball Bearing	15x32x9 mm	1
73	C6266C05774J	Sleeve		1
74	C6266C05123J	Sleeve		1
75	GB77-M6x12	Slotted Set Screw	M6x12	2

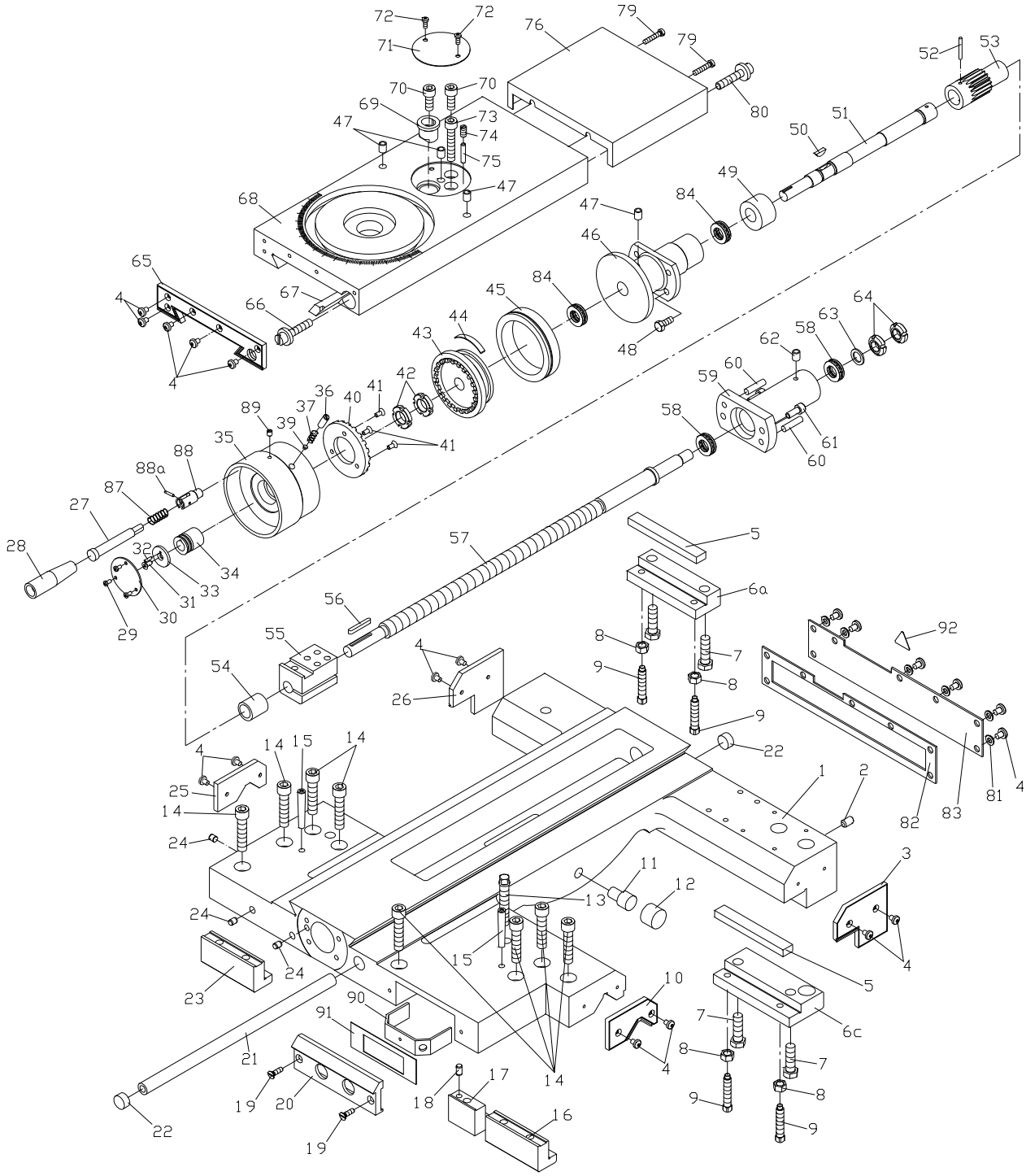
12.1 **Brake Assembly – Exploded View**



12.2 **Brake Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C22705	Brake Belt		1
2	GB70-M6x8	Hex Socket Cap Screw	M6x8	4
5	C6266C22704	Bolt		1
6	TS-2311121	Hex Nut	M12	2
7	C6266C22103-G	Braking Belt Support		1
8	TS-1504041	Hex Socket Cap Screw	M8x20	3
9	C6266C22706	Brake Block		1
10	C6266C22104-G	Fork		1
11	TS-1504041	Hex Socket Cap Screw	M8x20	1
12	GB91-3x20	Cotter Pin	3x20 mm	1
13	C6266C22707	Pin Shaft		1
14	GB879-5x35	Spring Pin	5x35 mm	1
15	C6266C22101-G	Support (for 80” Lathe only)		2
	C6266C22101-G	Support (for 120” Lathe only)		4
17	C6266C22102-G	Brake Support (for 80” Lathe only)		2
	C6266C22102-G	Brake Support (for 120” Lathe only)		4
18	TS-1524041	Hex Socket Set Screw (for 80” Lathe only)	M8x8	2
	TS-1524041	Hex Socket Set Screw (for 120” Lathe only)	M8x8	4
19	Q81-1-2.5X18X80	Spring (for 80” Lathe only)	2.5x18x80 mm	2
	Q81-1-2.5X18X80	Spring (for 120” Lathe only)	2.5x18x80 mm	4
20	C6266C22702	Screw (for 80” Lathe only)		2
	C6266C22702	Screw (for 120” Lathe only)		4
21	C6266C22105-G	Brake Support (for 80” Lathe only)		3
	C6266C22105-G	Brake Support (for 120” Lathe only)		6
22	TS-1505051	Hex Socket Head Cap Screw (for 80” Lathe only)…	M10x35	3
	TS-1505051	Hex Socket Head Cap Screw (for 120” Lathe only)..	M10x35	6
23	GB879-6x45	Spring Pin (for 80” Lathe only)	6x45 mm	3
	GB879-6x45	Spring Pin (for 120” Lathe only)	6x45 mm	6
24	TS-1503051	Hex Socket Cap Screw (for 80” Lathe only)	M6x20	6
	TS-1503051	Hex Socket Cap Screw (for 120” Lathe only)	M6x20	12
25	C6266C22708C	Pedal (for 80” Lathe only)		1
	C6266C22708D	Pedal (for 120” Lathe only)		2
26	C6266C22703C-G	Shaft (for 80” Lathe only)		1
	C6266C22703D-G	Shaft (for 120” Lathe only)		1
27	GB819-M5x12	Cross Recessed Countersunk Head Screw	M5x12	4
27a	GB6172-M5	Hex Nut	M5	4
28	TS-1504041	Hex Socket Cap Screw (for 80” Lathe only)	M8x20	12
	TS-1504041	Hex Socket Cap Screw (for 120” Lathe only)	M8x20	20
29	GB78-M8x16	Hex Socket Cap Screw	M8x16	3
30	C6266C22106-G	Support		1
31	C6266C22107-G	Sleeve		1
32	C6266C22701	Screw (for 80” ZH only)		2
	C6266C22701	Screw (for 120” ZH only)		4
33	C6266C18705-G	Bracket		1
34	GB70-M6x12	Hex Socket Cap Screw	M6x12	3
35	GB97-6	Washer	6 mm	3
36	ZH-SQ2	Limit Switch	JW2-11H/W1	1
37	GB818-M4x20	Cross Recessed Pan Head Screw	M4x20	2
38	GB6172-M6	Hex Nut	M6	2

13.1 **Saddle and Cross Slide Assembly – Exploded View**

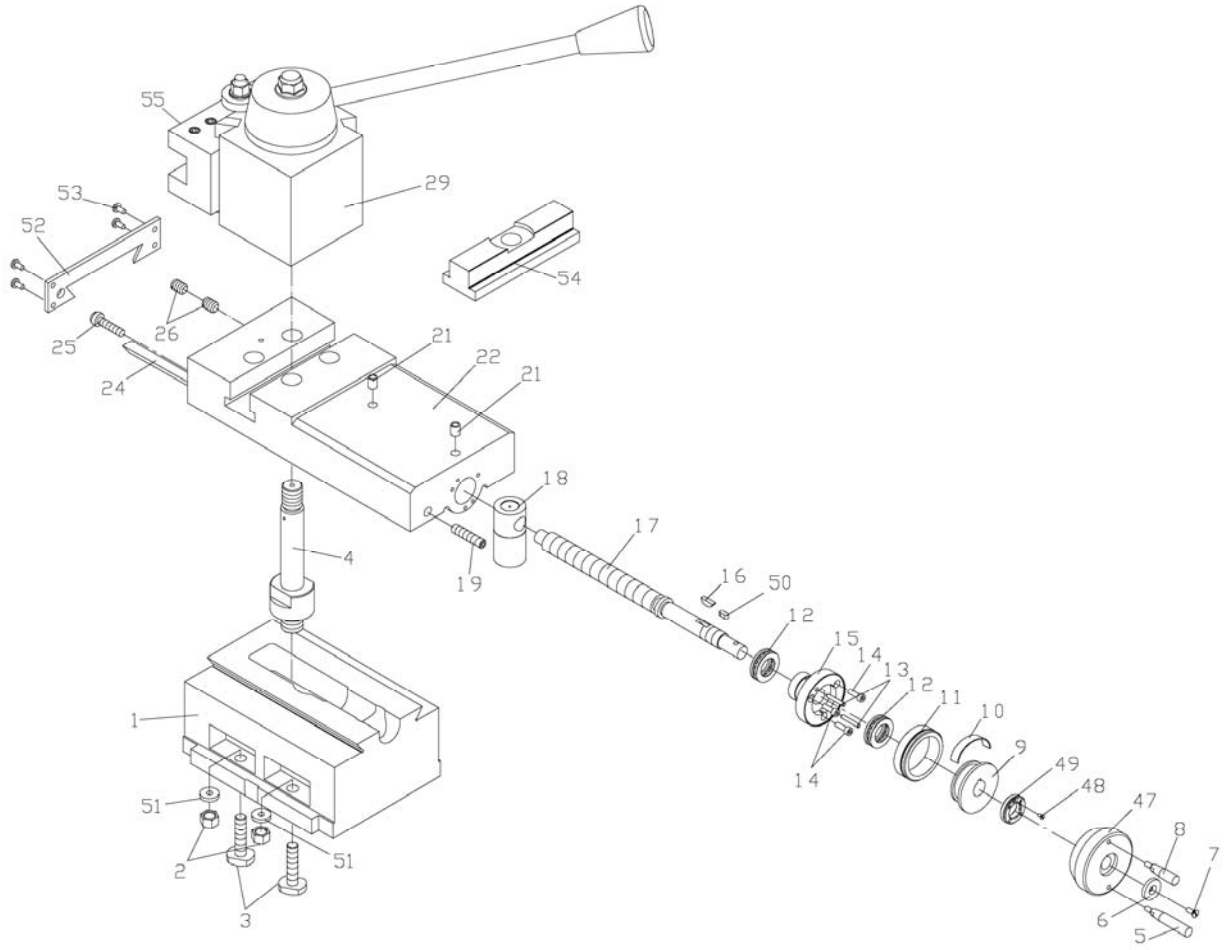


13.2 **Saddle and Cross Slide Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C04101A-G	Slide		1
2	GB73-M10x16	Slotted Set Screw	M10x16	1
3	C614W04503	Wipe Plate		1
4	GB819-M5x16	Cross Recessed Flat Head Screw (serial #160315ZH0144 and lower)	M5x16	20
	GB2672-M5x16	Screw (serial #160415ZH0145 and higher)	M5x16	20
5	C6140W04107	Lining Plate		1
6a	C6140W04718	Clamping Plate		1
6c	C6140W04720	Clamping Plate		1
7	TS-1506061	Hex Socket Cap Screw	M12x45	4
8	TS-2311121	Hex Nut	M12	4
9	GB85-M10x35	Square Set Screw	M10x35	4
10	C6266C04503	Wipe Plate		1
11	1440R04788	Stop Pin		1
12	1440R04507	Stop Pin Cap		1
13	GB83-M12x70	Square Cap Bolt	M12x70	1
14	GB70-M12x55	Hex Socket Cap Screw	M12x55	8
15	GB119-8x70	Pin	8x70 mm	2
16	C6140W04713	Front Clamping Plate		2
17	C6140W04712	Locking Plate		1
18	GB119-8n6x20	Pin	8n6x20	1
19	GB68-M6x22	Recessed Countersunk Head Screw	M6x22	2
20	C6140W04715	Switch Seat		1
21	C6140W04711	Line Pipe		1
22	C6140W04106	Plug		2
23	C6140W04720	Back Clamping Block		1
24	GB119-8n6x10	Pin (serial #160315ZH0144 and lower)	8n6x10	3
	G38-3A-Z1/8”	Oil Plug Screw (serial #160415ZH0145 and higher)	Z1/8”	3
25	C6266C04503	Wipe Plate		1
26	C6140W04504	Wipe Plate		1
27	C6266C04756T-G	Lever Shaft		1
28	C6266C04757T-G	Lever Sleeve		1
29	GB818-M4x8	Cross Recessed Flat Head Screw	M4x8	3
30	C6266C04306	Panel (serial #160315ZH0144 and lower)		1
	C6266C04306-6	Panel (serial #160415ZH0145 and higher)		1
31	GB819-M5x12	Cross Recessed Flat Head Screw	M5x12	1
32	GB119-3n6x12	Pin	3n6x12	1
33	C6266C04725	Cover		1
34	C6266C04724J	Sleeve		1
35	C6266C04754J-G	Handle		1
36	GB73-M8x10	Slotted Set Screw	M8x10	1
37	Q81-1-0.8x6x25	Spring	0.8x6x25 mm	1
39	C6266C04733	Positioning Pin		1
40	C6266C04720	Connector		1
41	GB819-M5x14	Cross Recessed Flat Head Screw	M5x14	3
42	GB812-M18x1.5	Round Nut	M18x1.5	2
43	C6266C04719-G	Connector		1
44	C6266C04718	Leaf Spring		1
45	C6266C04735D	Dial (inches)		1
46	C6140W04107	Screw Support (serial #101129ZH0005 and lower)		1
	C6266C04107JA	Screw Support (serial #111105ZH0006 and higher)		1
47	GB1155-10	Oil Cup	10 mm	3
48	GB70-M8x45	Hex Socket Cap Screw	M8x45	4
49	C6266C04109J	Sleeve (serial #101129ZH0005 and lower)		1

Index No.	Part No.	Description	Size	Qty
	C6266C04109	Sleeve (serial #111105ZH0006 and higher)		1
50	GB1099-5x7.5x19	Woodruff Key	5x7.5x19 mm	1
51	C6266C04726J	Shaft		1
52	GB117-4x35	Taper Pin	4x35 mm	1
53	C6266C04705	Shaft		8
54	C6266C04103	Sleeve		1
55	C6266C04304YA	Nut (inch threads)		1
56	GB1096-5x40	Flat Key	5x40 mm	1
57	C6266C04701A	Lead Screw (inch threads)		1
58	51103	Thrust Bearing	17x30x9 mm	2
59	C6266C04110-G	Bracket		1
60	GB117-8x30	Taper Pin	8x30 mm	2
61	TS-1504041	Hex Socket Cap Screw	M8x20	2
62	GB1155-6	Oil Cup	6 mm	1
63	C6266C04702	Washer		1
64	GB812-M14x1.5	Round Nut	M14x1.5	2
65	C6266C04501	Wipe Plate		1
66	C6266C04727	Gib Setting Screw		1
67	C6266C04728	Cross Slide Gib		1
68	C6266C04102A	Cross Slide		1
69	C6266C04704	Sleeve		1
70	TS-1505071	Hex Socket Head Cap Screw	M10x45	2
71	C6140W04714	Cover		1
72	GB818-M5x8	Cross Recessed Pan Head Screw	M5x8	2
73	GB70-M10x75	Hex Socket Cap Screw	M10x75	1
74	GB73-M8x40	Slotted Set Screw	M8x40	1
75	GB119-6x35	Pin	6x35 mm	1
76	C6266C04703-G	Splash Guard		1
79	GB65-M6x12	Slotted Socket Cap Screw	M6x12	2
80	C6266C04727	Gib Adjusting Screw		1
81	GB97.2-5	Washer	5 mm	7
82	C6266C04502A	Gasket		1
83	C6266C04729A-G	Cover		1
84	51104	Bearing (serial #111105ZH0006 and higher)		2
85	C6266CCA84	Turcite-B (not shown)	620x50x0.8 mm	1
86	C6266CCA85	Turcite-B (not shown)	620x30x0.8 mm	2
87	Q81-1-1.4x13x48	Spring	1.4x13x48 mm	1
88	C6266C04755T-G	Sleeve		1
88a	GB119-3x16	Pin	3x16 mm	1
89	GB71-M5x8	Hexagon Socket Set Screws With Flat Point	M5x8	1
90	C6266C18501	Bracket		1
91	C6266C18502	Gasket		1
92	C613618302	Electrical Warning Label		1

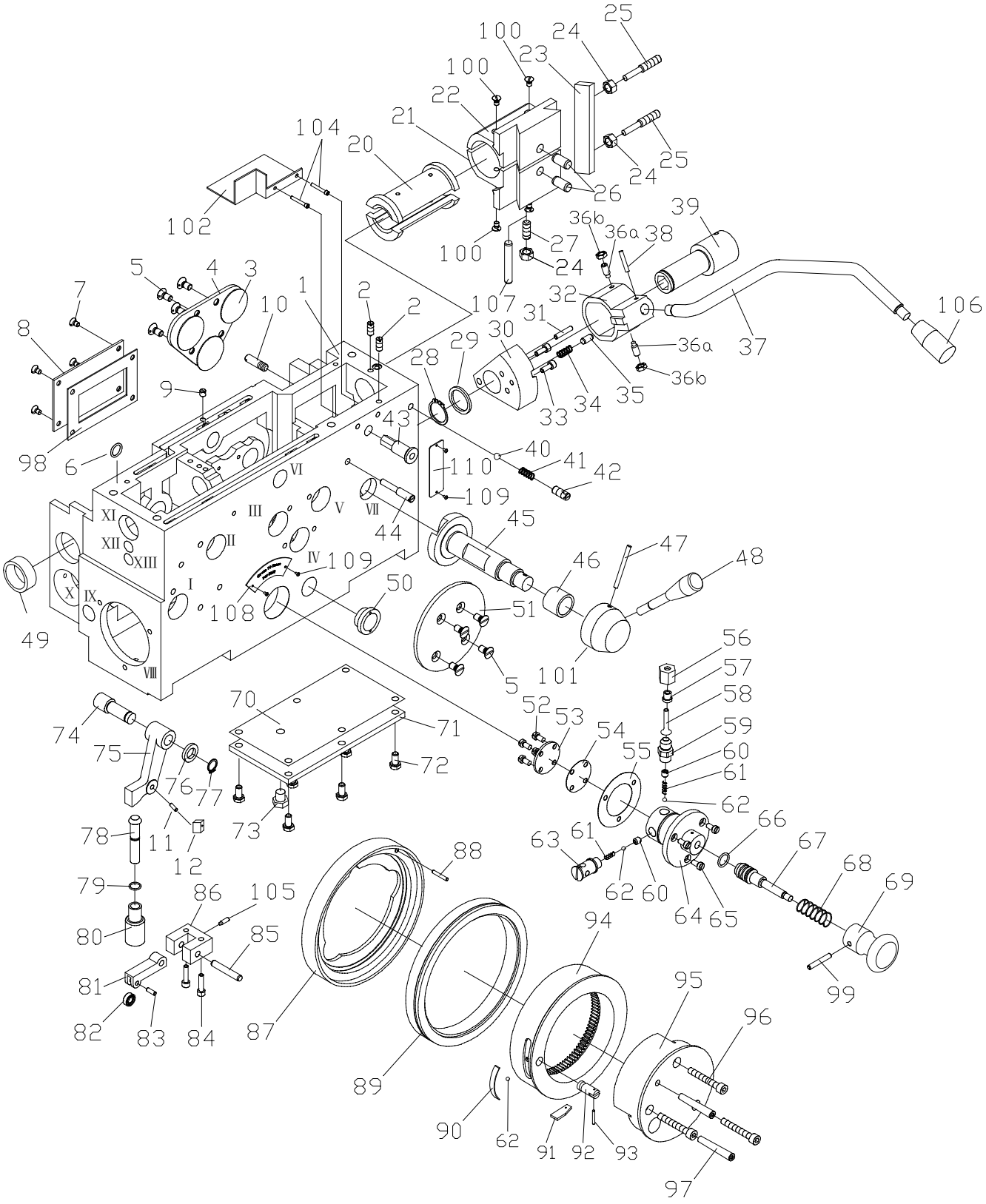
14.1 **Tool Post and Compound Rest Assembly – Exploded View**



14.2 **Tool Post and Compound Rest Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C04104	Revolving Plate		1
2	TS-1540081	Hex Nut	M12	4
3	C6266C04706	Compound Screw		4
4	C6266C04707	Shaft (serial #100710ZH0002 and lower)		1
	C6266C04707K-1	Shaft (serial #160315ZH0144 and lower)		1
	C6266CK4801KH	Shaft (serial #160415ZH0145 and higher)		1
5	C6266C04758J-G	Handle		1
6	GB891-B25	Circlip	B25	1
7	GB819-M5x12	Cross Recessed Flat Head Screw	M5x12	1
8	C6266C04757J-G	Handle		1
9	C6140W04110-G	Dial		1
10	C6140W04739	Leaf Spring		1
11	C6266C04736A	Dial (inches)		1
12	BB-51104	Thrust Bearing	20x35x10	2
13	GB117-4x25	Taper Pin	4x25 mm	2
14	GB70-M5x14	Hex Socket Cap Screw	M5x14	3
15	C6140W04111A	Bearing		1
16	GB1099-5x7.5x19	Woodruff Key	5x7.5x19	1
17	C6266C04734JA	Lead Screw (inch)		1
18	C6266C04301A	Nut (inch)		1
19	GB77-M12x70	Hex Socket Set Screw	M12x70	1
21	GB1155-10	Oil Cup	10 mm	2
22	C6266C04105	Longitudinal Slide (serial #100710ZH0002 and lower)		1
	C6266C04105K	Longitudinal Slide (serial #160315ZH0144 and lower)		1
	C6266C04105KH	Longitudinal Slide (serial #160415ZH0145 and higher)		1
24	C6266C04717	Slide Gib		1
25	C6266C04716	Adjusting Screw		1
26	GB73-M10x20	Slotted Set Screw	M10x20	2
29	C6266C04708J	Tool Post (serial #160315ZH0144 and lower)		1
	251-555	Quick Change Tool Post (serial #160415ZH0145 and higher)		1
47	C6266C04752JA-G	Handle Seat		1
48	GB68-M3x6	Slotted Head Screw	M3x6	1
49	C6266C04758T	Locking Nut		1
50	GB1096-5x12	Flat Key	5x12	1
51	TS-2360121	Flat Washer	12 mm	4
52	C6266C04506	Wipe Plate		1
53	TS-1533052	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M5x16	4
	GB2672-M5x16	Screw (serial #160415ZH0145 and higher)	M5x16	4
54	C6266C04707K-2	T-Groove Block		1
55	ZX-250-501	Tool Holder		1

15.1 **Apron Assembly I – Exploded View**

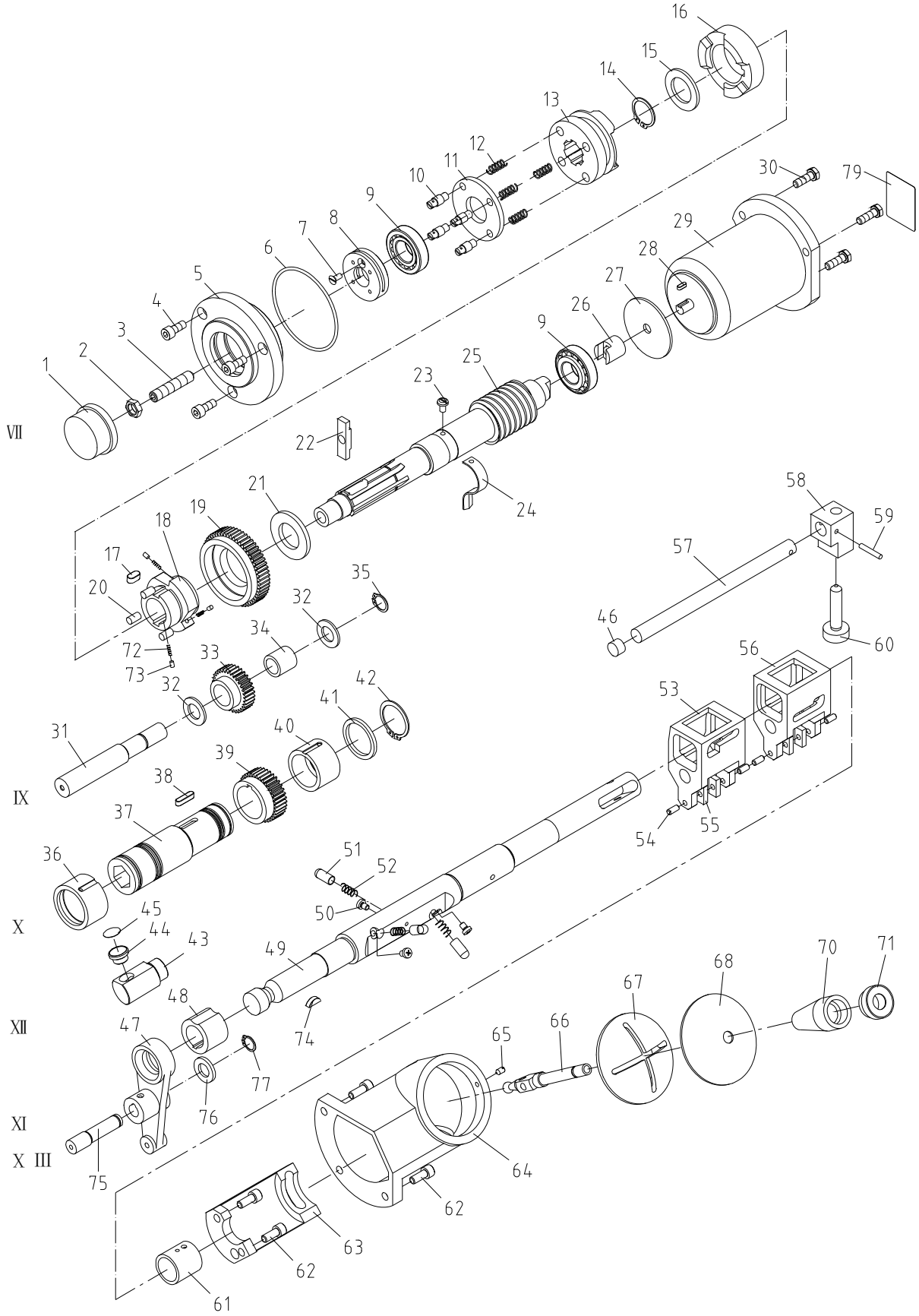


15.2 **Apron Assembly I – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C06101-G	Apron Casting		1
2	TS-1524021	Socket Set Screw	M8x10	2
3	C6266C06506	Gasket		1
4	C6140W06750	Back Cover		1
5	GB819-M8x16	Cross Recessed Countersunk Head Screw	M8x16	8
6	GB3452.1-8.75x1.8G	O-Ring	8.75x1.8G	1
7	GB68-M6x10	Recessed Countersunk Head Screw	M6x10	4
8	C6140W06731	Cover		1
9	GB71-M6x10	Slotted Set Screw	M6x10	1
10	GB878-10x35	Parallel Pins With External Thread	10x35	1
11	GB1096-6x14	Pin	6x14 mm	1
12	C6140W06715	Block		1
20	C6140W06302	Half Nut		1
21	C6140W06107	Lower Nut		1
22	C6140W06108	Upper Nut		1
23	C6140W06759	Gib		1
24	TS-1540071	Hex Nut	M10	2
25	C6140W06758	Cylindrical End Set Screw		2
26	GB119-12x25	Pin	12x25 mm	2
27	GB73-M10x25	Slotted Set Screw	M10x25	1
28	GB894.1-30	C-Clip for Shaft	30 mm	1
29	C6140W06755	Collar		1
30	C6266C06105-G	Positioning Block		1
31	GB117-6x35	Taper Pin	6x35 mm	1
32	C6266C06106-G	Lever Support		1
33	TS-1503041	Hex Socket Cap Screw	M6x16	2
34	Q81-1-1.6x8x22	Spring	1.6x8x22	1
35	GB119-8x15	Pin	8x15 mm	1
36a	GB79-M8x20	Hex Socket Set Screw	M8x20	2
36b	GB6172-M8	Hex Nut	M8	2
37	C6266C06711J-G	Control Handle		1
38	GB117-5x30	Taper Pin	5x30 mm	1
39	C6266C06710	Positioning Sleeve		1
40	SB-10MM	Steel Ball	10 mm	1
41	Q81-1-1.5x8x35	Spring	1.5x8x35	1
42	GB73-M12x14	Slotted Set Screw	M12x14	1
43	C6266C06A780	Positioning Sleeve		1
44	C6140W06716	Bolt		1
45	C6140W06725	Shaft (VII)		1
46	C6140W06303Y	Sleeve		1
47	GB117-5x60	Pin	5x60 mm	1
48	C6140W02801-G	Handle		1
49	C6266C06104	Sleeve		1
50	R51-2-M27x1.5	Oil Sight Glass	M27x1.5	1
51	C6140W06760-G	Front Cover		1
52	GB65-M6x10	Slotted Socket Cap Screw	M6x10	4
53	C6266C06713	Pump Cover		1
54	C6266C06505	Gasket		1
55	C6266C06504	Gasket		1
56	Y91-1A-8	Nut	M8	1
57	C6266C06727	Sleeve		1
58	T3-M	Copper Pipe	Ø6x0.75x450 mm	1
59	C6266C06726	Valve		1
60	C6266C06714	Adjusting Bolt		2
61	Q81-1-0.3x3x12	Spring	0.3x3x12 mm	2

Index No.	Part No.	Description	Size	Qty
62	SB-5MM	Steel Ball	5 mm	4
63	C6266C06715	Oil Purifier		1
64	C6266C06107-G	Pump		1
65	GB65-M6x12	Slotted Socket Cap Screw	M6x12	3
66	G51-2A-20x2.4	O-Ring	20x2.4 mm	1
67	C6266C06712J	Piston Rod		1
68	Q81-1-1.2x19x70	Spring	1.2x19x70 mm	1
69	1440R04783-G	Knob		1
70	C6266C06502	Gasket		1
71	C6266C06103-G	Bottom Cover		1
72	TS-1504021	Hex Socket Cap Screw	M8x12	6
73	GB38-2-M12x1.5	Drain Plug	M12x1.5	1
74	C6266C06725	Shaft		1
75	C6266C06109	Rocker		1
76	C6266C06724	Collar		1
77	GB894.1-15	C-Clip for Shaft	15 mm	1
78	C6266C06721	Rod		1
79	G51-2A-12x1.9	O-Ring	12x1.9 mm	1
80	C6266C06723	Sleeve		1
81	C6266C06722	Block		1
82	606	Bearing	6x17x6 mm	1
83	GB119-6x14	Pin	6x14 mm	1
84	GB70-M6x25	Hex Socket Cap Screw	M6x25	2
85	GB119-8n6x45	Pin	8n6x45	1
86	C6266C06110	Positioning Block		1
87	C6140W06116-G	Bracket Disc		1
88	GB119-6x25	Pin	6x25 mm	1
89	C6140W06761	Dial		1
90	C6140W06769	Leaf Spring		1
91	C6140W06767	Locked Knob		1
92	C628006730-G	Adjusting Screw		1
93	Q81-1-0.4x3x10	Spring	0.4x3x10 mm	1
94	C6266C06762	Gear (inch)		1
95	C6266C06117	Bracket (inch)		1
96	TS-1504111	Hex Socket Cap Screw	M8x55	3
97	GB119-12n6x40	Pin	12n6x40	2
98	C6266C06501	Gasket		1
99	GB117-4x18	Taper Pin	4x18 mm	1
100	GB68-M6x12	Recessed Countersunk Head Screw	M6x12	4
101	C6140W06109-G	Handle Seat		1
102	C6266C06740J	Wire Baffle (serial #130102ZH0042 and higher)		1
104	GB70-5x25	Hex Socket Cap Screw (serial #130102ZH0042 and higher)	5x25	2
105	GB75-5x16	Slotted Cylindrical End Set Screw	5x16 mm	1
106	C6266C06702-G	Level Sleeve		1
107	GB119-8h8x50	Pin	8h8x50	1
108	C6266C06303	Label (serial #160315ZH0144 and lower)		1
	C6266C06303-9	Label (serial #160415ZH0145 and higher)		1
109	GB818-M3x6	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M3x6	4
	GB2672-M3x6	Screw (serial #160415ZH0145 and higher)	M3x6	4
110	C6266C06305	Label (serial #160315ZH0144 and lower)		1
	C6266C06305-1	Label (serial #160415ZH0145 and higher)		1

16.1 **Apron Assembly II – Exploded View**

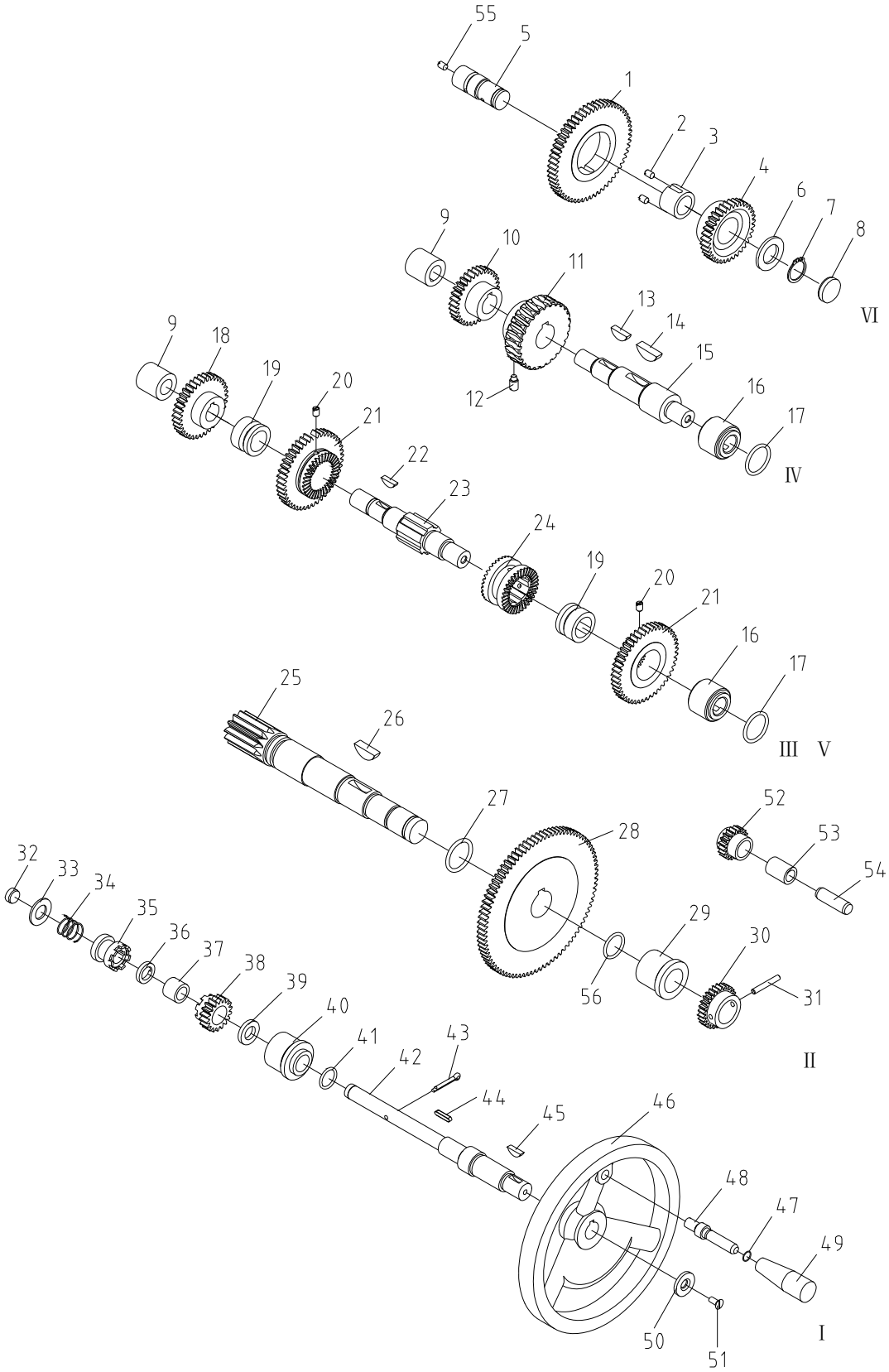


16.2 **Apron Assembly II – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6140W06738	Cap		1
2	GB6172-M12	Hex Flat Nut	M12	1
3	GB78-M12x60	Hex Set Screw (serial #130531ZH0069 and lower)		
			M12x60	1
	C6266C06779	Screw (serial #130531ZH0070and higher)		1
4	TS-1504041	Hex Socket Cap Screw	M8x20	3
5	C6140W06111	Flange (serial #130531ZH0069 and lower)		1
	C6266C06111A	Flange (serial #130531ZH0070 and lower)		1
	C6266C06111A-G	Flange		1
6	G51-2A-90x3.1	O-Ring	90x3.1	1
7	GB68-M5x12	Recessed Countersunk Head Screw	M5x12	1
8	C6140W06739	Adjusting Circlip		1
9	30502/P6-25x52x15	Bearing	25x52x15	2
10	C6266C06734	Bolt		4
11	C6140W06740	Washer		1
12	Q81-1-1x10x35	Spring (serial #130531ZH0069 and lower)	1x10x35	4
	Q81-1-1.2x10x35	Spring (serial #130531ZH0070 and higher)	1.2x10x35	4
13	C6266C06707	Clutch		1
14	GB894.1-30	Circlip for Shaft	30	1
15	C6266C06708	Washer		1
16	C6266C06706	Clutch		1
17	GB1096-8x16	Flat Key	8x16	1
18	C6140W06708	Star Gear		1
19	C6140W06709	Gear		1
20	C6140W06726	Pin		3
21	C6140W06710	Washer		1
22	C6140W06737	Block		1
23	GB67-M6x10	Slotted Pan Head Screw	M6x10	1
24	C6140W06729	Splash Leaf		1
25	C6266C06709	Worm (serial #130531ZH0069 and lower)		1
	C6266C06709A	Worm (serial #130531ZH0070 and higher)		1
26	C6140W06728	Motor Connector		1
27	C6266C06503	Washer		1
28	GB1096-4x14	Flat Key	4x14	1
29	YSS56BJ-G	Rapid Feed Motor……1/2HP, 3PH, 230V/460V		1
30	GB70-M8x30	Hex Socket Cap Screw	M8x30	3
31	C6140W06736	Shaft (IX)		1
32	C6140W06735	Washer		2
33	C6140W06734	Gear		1
34	C6140W06306	Sleeve		1
35	GB894.1-16	Circlip for Shaft	16	1
36	C6140W06305	Sleeve		1
37	C6140W06733	Shaft (X)		1
38	GB1096-6x25	Flat Key	6x25	1
39	C6140W06732	Gear		1
40	C6140W06304	Sleeve		1
41	C6140W06730	Washer		1
42	GB894.1-38	Circlip for Shaft	38	1
43	C6266C6704A	Oil Tap Cover		1
44	C6266C06705A	Oil Tap		1
45	C6266C04A311	Label (serial #160315ZH0144 and lower)		1
	C6266C04A311-1	Label (serial #160415ZH0145 and higher)		1
46	C6266C06102	Plug		1
47	C6140W06103	Fork		1
49	C6140W06712	Control Shaft		1

Index No.	Part No.	Description	Size	Qty
50	GB67-M6x8	Slotted Pan Head Screw	M6x8	3
51	C6140W06701	Pin		3
52	Q81-1-1.6x8x22	Spring	1.6x8x22	3
53	C6140W06713	Fork		1
54	GB119-6n6x14	Pin	6n6x14	6
55	C6140W06715	Sliding Block		6
56	C6140W06714	Right Fork		1
57	C6140W06717	Shaft		1
58	C6140W06104	Interlocking Block		1
59	GB117-5x30	Taper Pin	5x30	1
60	C6140W06718	Shaft		1
61	C626C06304	Sleeve		1
62	TS-1504041	Hex Socket Cap Screw	M8x20	5
63	C6140W06719	Bracket		1
64	C6140W06105-G	Bracket		1
65	GB71-M6x10	Slotted Set Screw	M6x10	1
66.	C6140W06722A-G	Handle		1
67	C6140W06106-G	Cross Cover		1
68	C6140W06501	Washer		1
69	GB119-8x25	Pin	8x25	1
70	C6140W06721A-G	Handle		1
71	C6140W06720A-G	Seat		1
72	Q81-1-0.3x3x12	Spring	0.3x3x12	3
73	C6140W06727	Pin		3
75	C6140W06704	Shaft (XIII)		1
76	C6140W06705	Collar		1
77	GB894.1-14	C-clip For Shaft	14	1
78	GB71-M5x6	Slotted Set Screw	M5x6	1
79	C6266C18518-17	Motor Label (serial #160415ZH0145 and higher)	1	

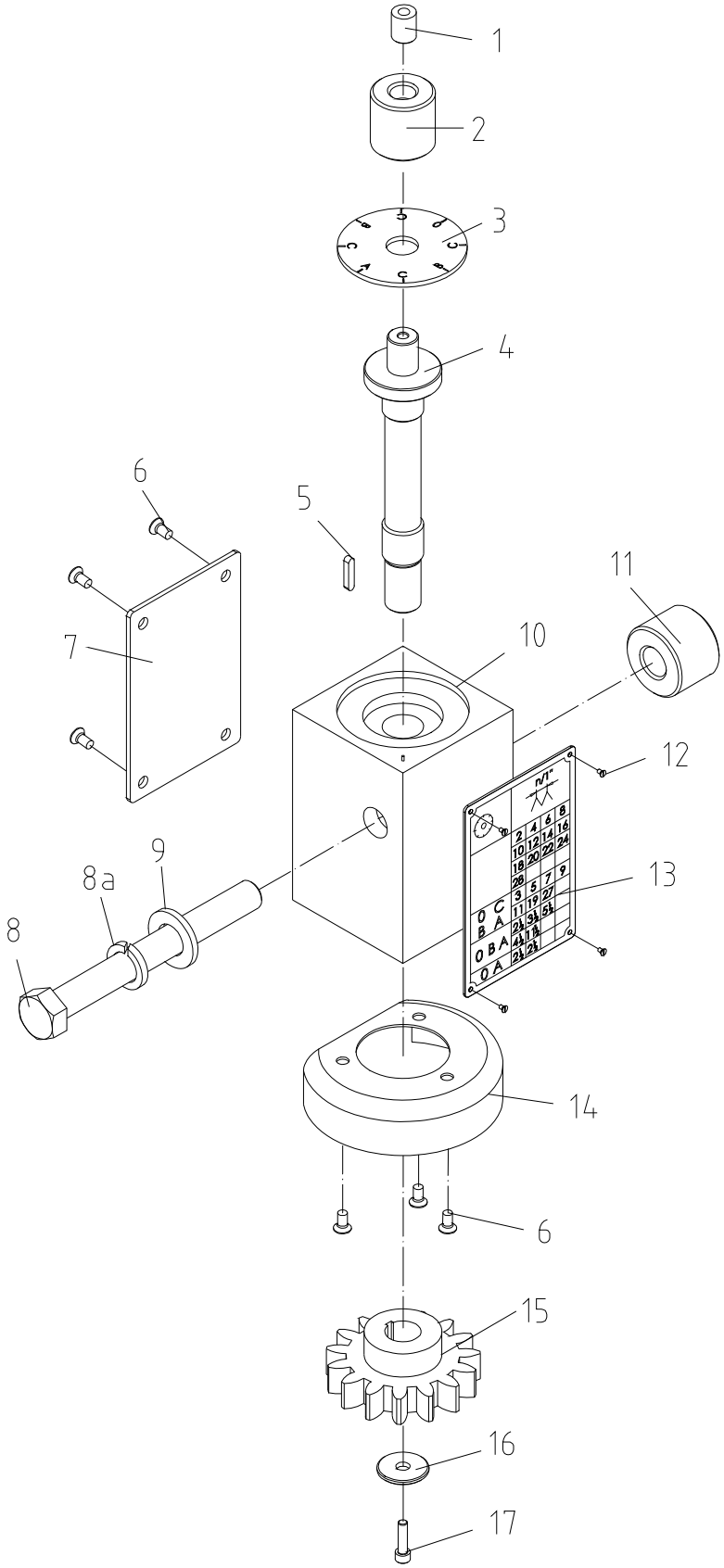
17.1 **Apron Assembly III – Exploded View**



17.2 **Apron Assembly III – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6140W06751	Gear		1
2	GB71-M6x8	Slotted Set Screw	M6x8	2
3	C6140W06309	Sleeve		1
4	C6140W06752	Gear		1
5	C6266C06728	Shaft (VI)		1
6	C6140W06754	Washer		1
7	GB894.1-20	Circlip for Shaft	20	1
8	C6140W06114	Plug		1
9	C6140W06113	Sleeve		3
10	C6140W06749	Gear		1
11	C6140W06308	Worm Wheel		1
12	GB72-M8x16	Slotted Set Screw	M8x16	1
13	GB1099-6x22	Woodruff Key	6x22	1
14	GB1099-8x28	Woodruff Key	8x28	1
15	C6140W06748	Shaft (IV)		1
16	C6140W06115	Sleeve		3
17	G51-2A-35x3.1	O-Ring	35x3.1	3
18	C6140W06746	Gear		2
19	C6140W06307	Sleeve		4
20	GB71-M6x10	Slotted Set Screw	M6x10	4
21	C6140W06744	Gear		4
22	GB1099-5x16	Woodruff Key	5x16	2
23	C6140W06747	Shaft (III)		2
24	C6140W06745	Connector		2
25	C6140W06743	Shaft (II)		1
26	GB1099-8x28	Woodruff Key	8x28	1
27	G51-2A-32x3.5	O-Ring	32x3.5	1
28	C6140W06742	Gear		1
29	C6140W06118	Sleeve		1
30	C6266C06764	Gear (in.)		1
31	GB117-5x35	Taper Pin (serial #120720ZH0041 and lower)	5x35	1
	GB877-5x40	Taper Pin (serial #130102ZH0042 and higher)	5x40	1
32	C6140W06112	Plug		1
33	C6140W06774	Washer		1
34	Q81-1-1.6x18x25	Spring	1.6x18x25	1
35	C6140W06773	Connector		1
36	C6140W06772	Washer		1
37	C6140W06311	Sleeve		1
38	C6140W06771	Gear		1
39	C6140W06770	Washer		1
40	C6140W06120	Sleeve		1
41	G51-2A-18x2.4	O-Ring I	18x2.4	1
42	C6140W06775	Shaft (I)		1
43	GB91-4x25	Pin	4x25	1
44	GB1096-4x20	Flat Key	4x20	1
45	GB1099-5x16	Woodruff Key	5x16	1
46	C6266C06111-G	Hand Wheel		1
47	GB895-10	Steel C-clip	10	1
48	C6140W06766-G	Shaft		1
49	C6140W06765-G	Lever Sleeve		1
50	GB891-B25	Circlip	B25	1
51	GB68-M5x12	Recessed Countersunk Head Screw	M5x12	1
52	C6266C06763	Gear (in.)		1
53	C6140W06310Y	Sleeve		1
54	GB119-12n6x40	Pin	12n6x40	1
56	G51-2A-25x2.4	O Ring Seal	25x2.4	1

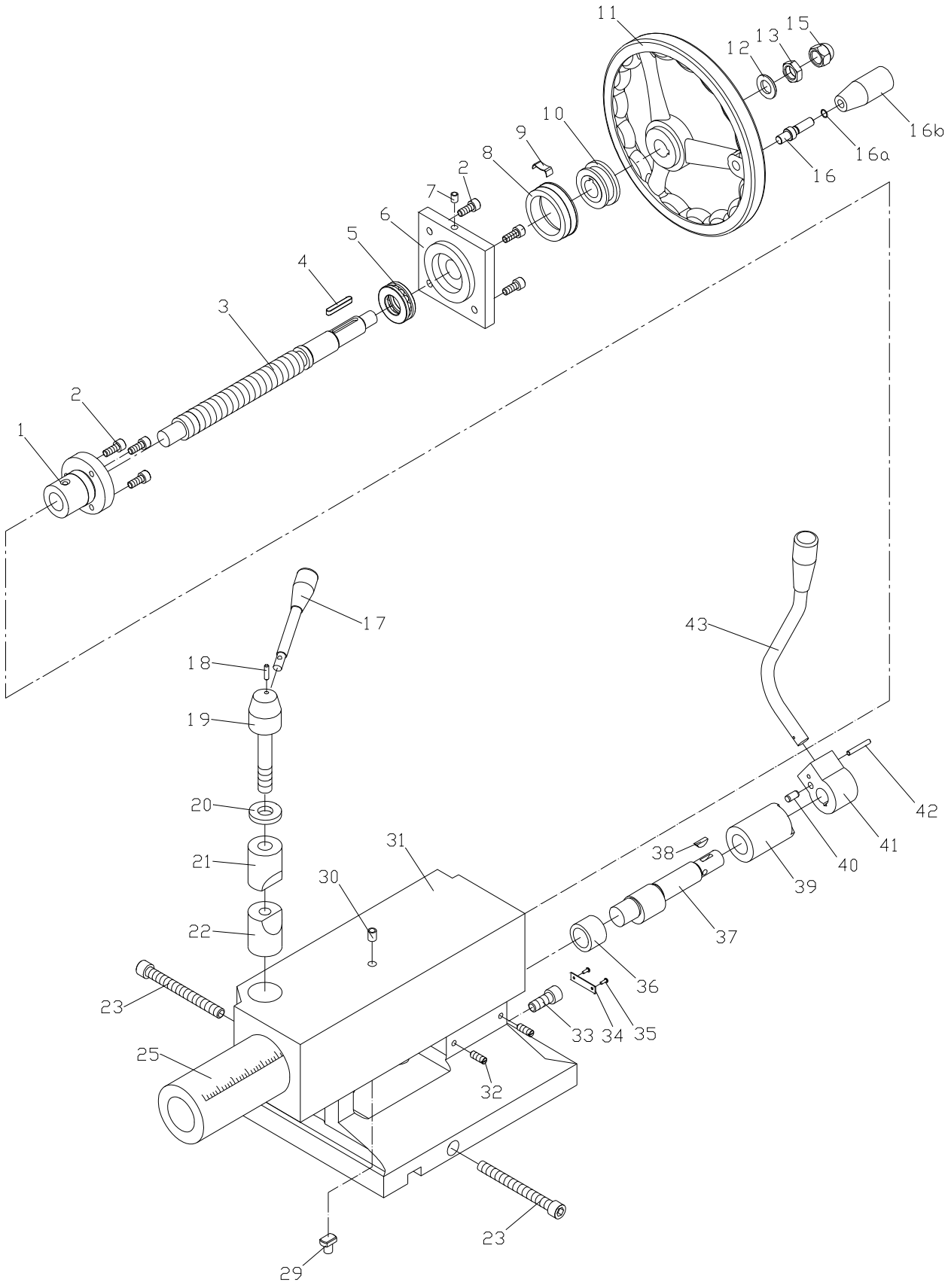
18.1 **Apron Assembly IV – Exploded View**



18.2 **Apron Assembly IV – Parts List**

Index No.	Part No.	Description	Size	Qty
1	GB1155-10	Oil Cup	10 mm	1
2	C6266C11703	Handle		1
3	C6266C11305 (in)	Label (serial #160315ZH0144 and lower)		1
	C6266C11305-1(in)	Label (serial #160415ZH0145 and higher)		1
4	C6266C11702	Shaft		1
5	GB1096-4×15	Key	4x15 mm	1
6	GB818- M4×8	Cross Recessed Pan Head Screw	M4x8	7
7	C6266C11701	Cover		1
8	GB5782- M12×110	Hex Cap Bolt	M12x110	1
8a	GB93-12	Spring Washer	12 mm	1
9	GB97.2-12	Flat Washer	12 mm	1
10	C6266C11101-G	Casting		1
11	C6266C11705	Sleeve		1
12	GB827-2×5	Aluminium Rivet	2x5 mm	4
13	C6266C11306 (in)	Label (serial #160315ZH0144 and lower)		1
	C6266C11306-1(in)	Label (serial #160415ZH0145 and higher)		1
14	C6266C11704	Cover Casting		1
15	C6266C11104	Helical Gear		1
16	C6266C11706	Washer		1
17	GB70- M5×10	Hex Socket Cap Screw	M5x10	1

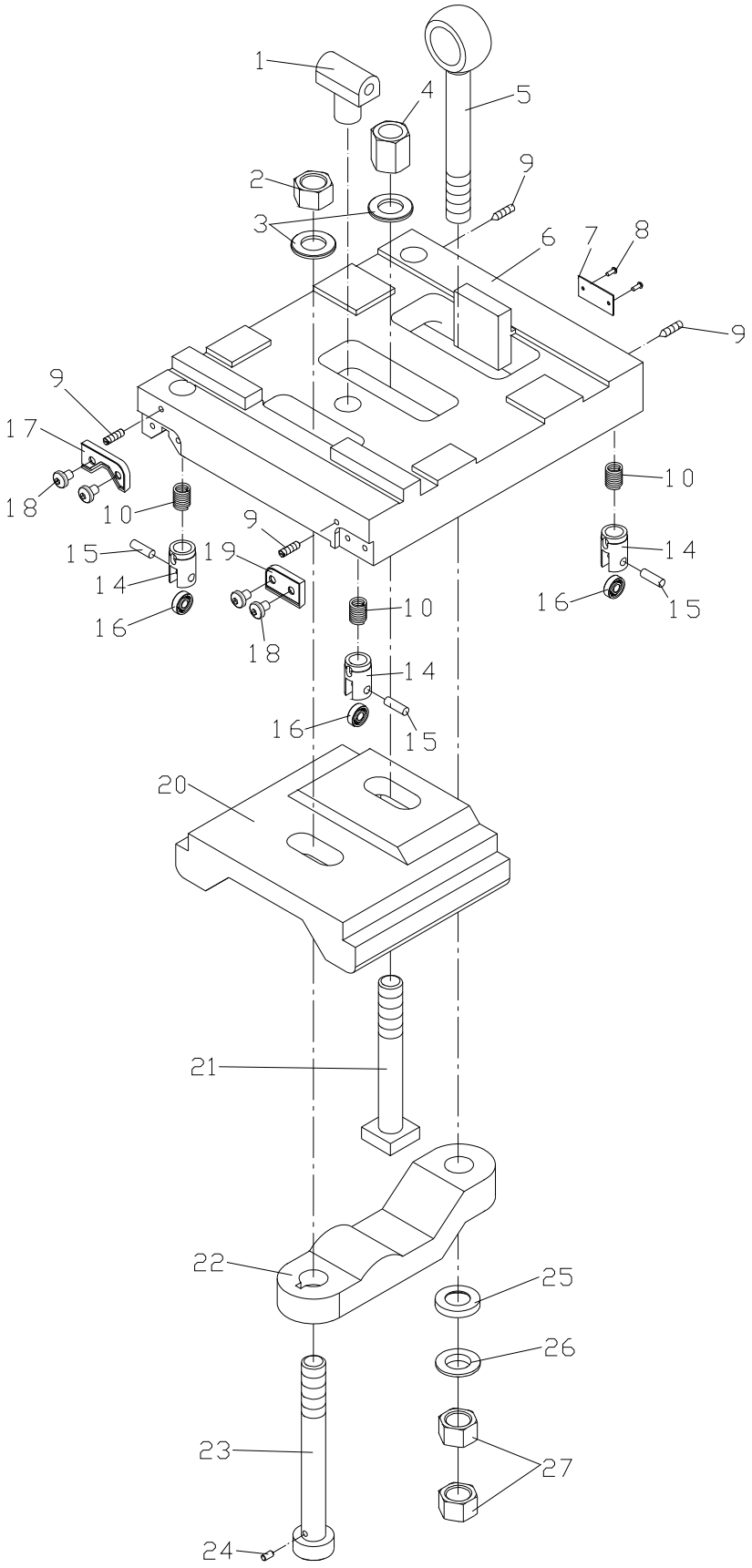
19.1 **Tailstock Assembly I – Exploded View**



19.2 **Tailstock Assembly I – Parts List**

Index No.	Part No.	Description	Size	Qty
1	1440R03105	Nut		1
2	TS-1504041	Hex Socket Cap Screw	M8x20	7
3	1860R03710A	Lead Screw		1
4	GB1096-6x40	Flat Key	6x40 mm	1
5	BB-51205	Thrust Bearing	25x47x15 mm	1
6	C6266C03105	Back Cover		1
7	GB1155-8	Oil Cup	8 mm	2
8	1440R03708	Dial		1
9	C613203711	Leaf Spring		1
10	1440R03706	Sleeve		1
11	C6140W03107A-G	Handwheel		1
12	TS-155010	Flat Washer	16 mm	1
13	GB6172-M16	Hex Flat Nut	M16	1
15	GB923-M16	Acorn Nut	M16	1
16	C6140W06766-G	Shaft		1
16a	GB895-10	Steel C-clip	10 mm	1
16b	C6140W06765-G	Lever Sleeve		1
17	C6140W03710-G	Lever		1
18	GB117-5x20	Straight Pin	5x20 mm	1
19	C6140W03715-G	Lever Support		1
20	C6140W03716	Washer		1
21	C6140W03717	Clamping Block		1
22	C6140W03718	Clamping Block		1
23	GB70-M12x120	Hex Socket Cap Screw	M12x120	2
25	1860R03701A	Center Sleeve		1
28	TS-1505011	Hex Socket Cap Screw	M10x16	1
29	1440R03702	Positioning Block		1
30	GB1155-10	Oil Cup	10 mm	1
31	C6266C03101-G	Tailstock Casting		1
32	GB75-M8x25	Slotted Cylindrical End Set Screw	M8x25	2
33	TS-1506021	Hex Socket Cap Screw	M12x25	1
34	C063203303	Scale		1
35	GB867-3x8	Cup Head Rivet	3x8 mm	4
36	C6140W03103	Sleeve		1
37	C6250B03704	Eccentric Shaft		1
38	GB117-6x45	Taper Pin	6x45 mm	1
39	C6250B03103	Sleeve		1
40	GB119-8x15	Pin	8x15 mm	1
41	C6250B03104-G	Lever Sleeve		1
42	GB117-5x40	Taper Pin	5x40 mm	1
43	C6250B03705-G	Lock Handle		1

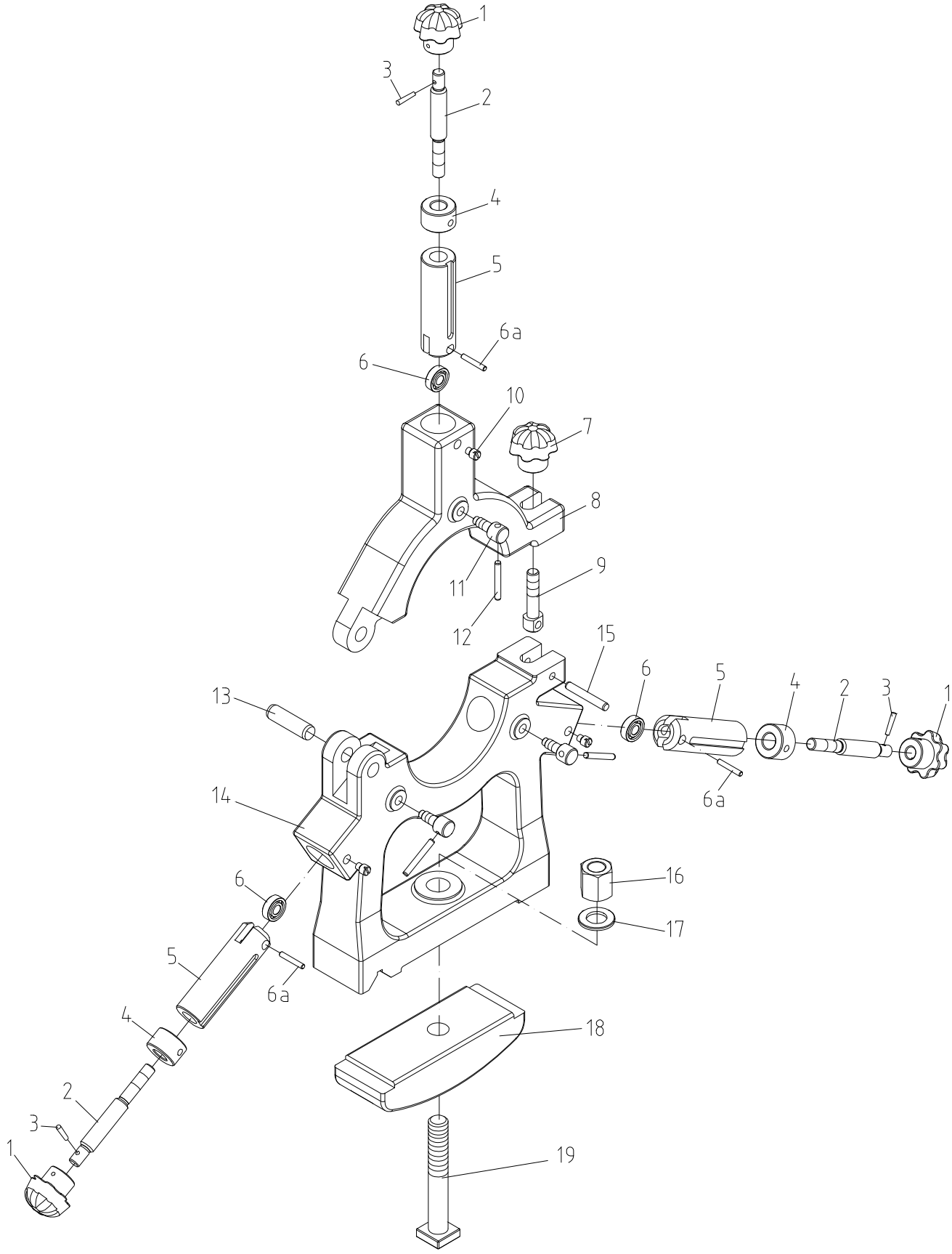
20.1 **Tailstock Assembly II – Exploded View**



20.2 **Tailstock Assembly II – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6140W03110	Nut		1
2	GB6171-M20x1.5	Hex Nut	M20x1.5	1
3	TS-1550111	Flat Washer	20 mm	1
4	GB56-M20	Hex Thick Nut	M20	1
5	C6266C03703	Pulling Rod		1
6	C6266C03102-G	Sliding Base		1
7	C063203304	Sign Plate		1
8	GB867-3x8	Half Circle Rivet	3x8 mm	4
9	GB75-M6x16	Slotted Cylindrical End Set Screw	M6x16	4
10	GB2089-1.8x14x18	Spring		4
14	C6140W03713	Bearing Support		4
15	C6140W03714	Small Axle		4
16	BB-607ZZ	Ball Bearing	7x19x6 mm	4
17	C6140W03502	Wipe Plate		1
18	TS-1534032	Phillips Pan Head Machine Screw (serial #160315ZH0144 and lower)	M6x10	4
	GB2672-M6x10	Screw (serial #160415ZH0145 and higher)	M6x10	4
19	C6140W03503	Wipe Plate		1
20	C6140W03104-G	Clamping Block		1
21	C6266C03702	Screw		1
22	C6140W03111-G	Clamping Block		1
23	C6266C03701	Screw		1
24	GB119-5x10	Straight Pin	5x10 mm	1
25	GB850-20	Taper Washer	20 mm	1
26	GB849-20	Ball Washer	20 mm	1
27	GB6173-M20x1.5	Hex Nut	M20x1.5	2

21.1 **Steady Rest Assembly (Small and Large) – Exploded View**



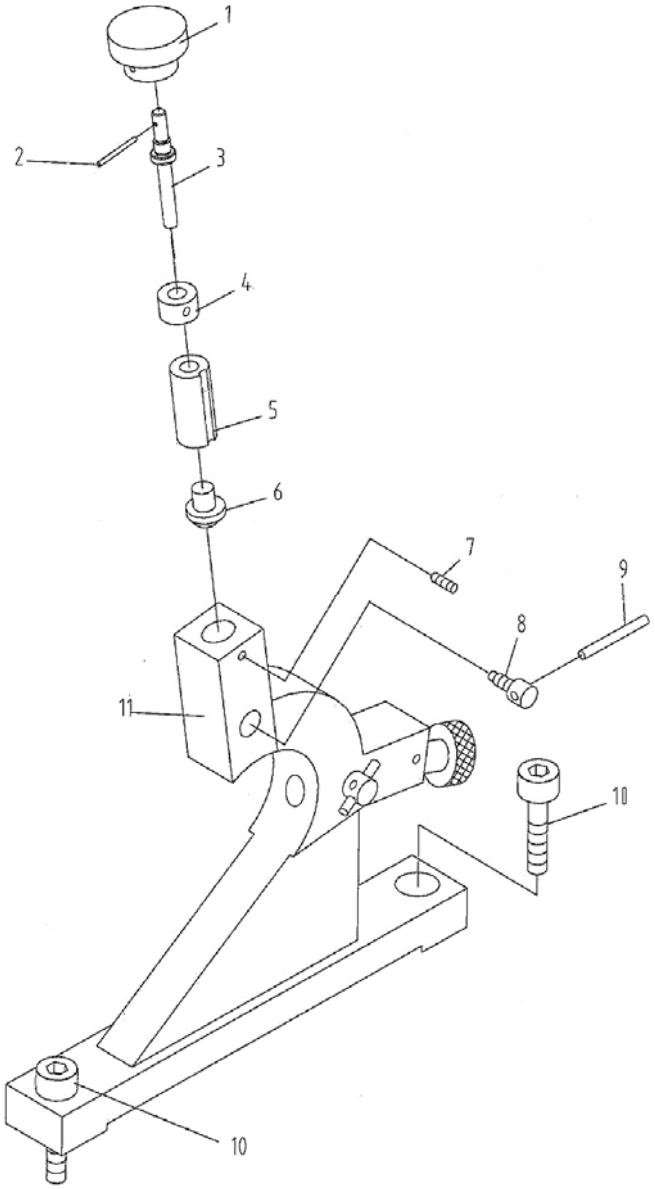
21.2 **Steady Rest Assembly (Small) – Parts List**

Index No.	Part No.	Description	Size	Qty
	GH-26XX-SRA	Steady Rest Assembly–Small (includes #1-19)		
1	GB4141.29-X12	A Type Asterisk Handle	Ø12 mm	3
2	C6140W10702	Sliding Sleeve		3
3	GB117-4x25	Pin	4x25 mm	3
4	C6140W10703	Slotted Set Screw		3
5	C6266C10C701	Lever (serial #160415ZH0145 and higher)		3
6	6000-2RS	Bearing (serial #160415ZH0145 and higher)	10x26x8 mm	3
6a	C6140ZK10B702	Shaft (serial #160415ZH0145 and higher)		3
7	GB4141.29-M12	B Type Asterisk Handle	M12	1
8	C6140W10102-G	Steady Rest Upper Body		1
9	C6140W10701	Screw		1
10	GB75-M10x16	Slotted Set Screw	M10x16	3
11	C6140W10704	Set Screw		3
12	GB119-6x45	Pin	6x45 mm	3
13	GB119-16x55	Pin	16x55 mm	1
14	C6266C10A101-G	Steady Rest Lower Body		1
15	GB119-8x55	Pin	8x55 mm	1
16	GB56-M20	Hex Extra Thick Nut	M20	1
17	GB97.2-20	Washer	20 mm	1
18	C6140W10104-G	Clamping Plate		1
19	C6140W10706	Square Head Bolt		1

21.3 **Steady Rest Assembly (Large) – Parts List**

Index No.	Part No.	Description	Size	Qty
	GH-26XXZH-SRAL	Steady Rest Assembly–Large (includes #1-19)		
1	GB4141.29-X12	A Type Asterisk Handle	Ø12 mm	3
2	C6266C10702	Sliding Sleeve		3
3	GB117-4x25	Pin	4x25 mm	3
4	C6266C10701	Slotted Set Screw		3
5	C6140ZK10B701	Lever (serial #160415ZH0145 and higher)		3
6	6000-2RS	Bearing (serial #160415ZH0145 and higher)	10x26x8 mm	3
6a	C6140ZK10B702	Shaft (serial #160415ZH0145 and higher)		3
7	GB4141.29-M12	B Type Asterisk Handle	M12	1
8	C6266C10102-G	Steady Rest Upper Body		1
9	C6140W10701	Screw		1
10	GB75-M10x14	Slotted Set Screw	M10x14	3
11	C6140W10704	Set Screw		3
12	GB119-6x45	Pin	6x45 mm	3
13	GB119-16x55	Pin	16x55 mm	1
14	C6266C10101-G	Steady Rest Lower Body		1
15	GB119-8x55	Pin	8x55 mm	1
16	GB56-M20	Hex Extra Thick Nut	M20	1
17	GB97.2-20	Washer	20 mm	1
18	C6140W10104-G	Clamping Plate		1
19	C6140W10706	Square Head Bolt		1

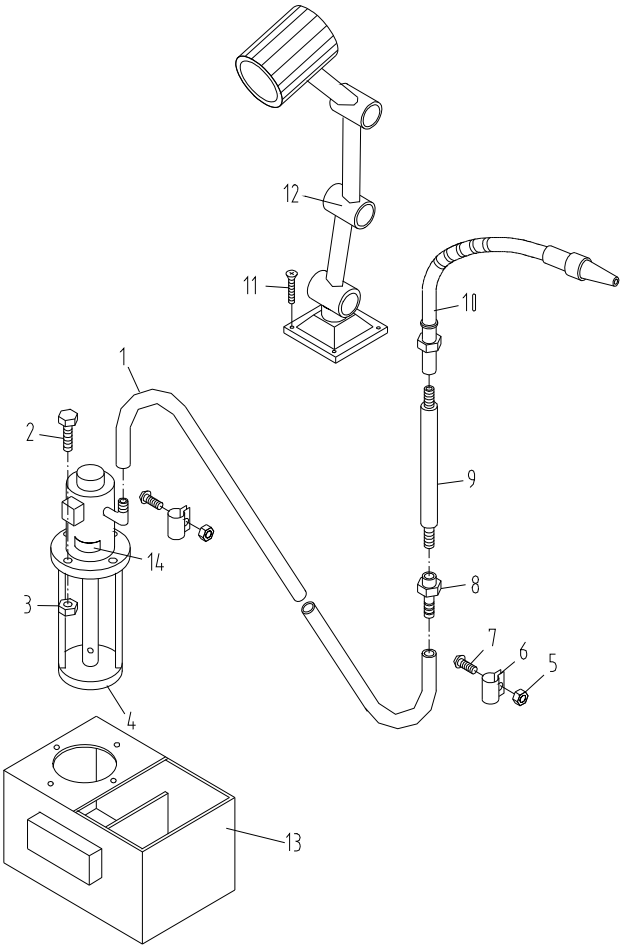
22.1 **Follow Rest Assembly – Exploded View**



22.2 **Follow Rest Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	GB4141.29-12	A-Type Knurled Handle	12 mm	1
2	GB117-4x25	Pin	4x25 mm	1
3	C626610705	Screw		1
4	C6266C10704	Nut		1
5	C6266C10706	Sliding Sleeve		1
6	C6266C10302	Block		1
7	GB75-M10x16	Slotted Set Screw	M10x16	2
8	C6140W10704	Set Screw		2
9	GB119-A6x45	Pin	A6x45 mm	2
10	GB70-M16x55	Hex Socket Cap Screw	M16x55	2
11	C6266C10103-G	Follow Rest Casting		1

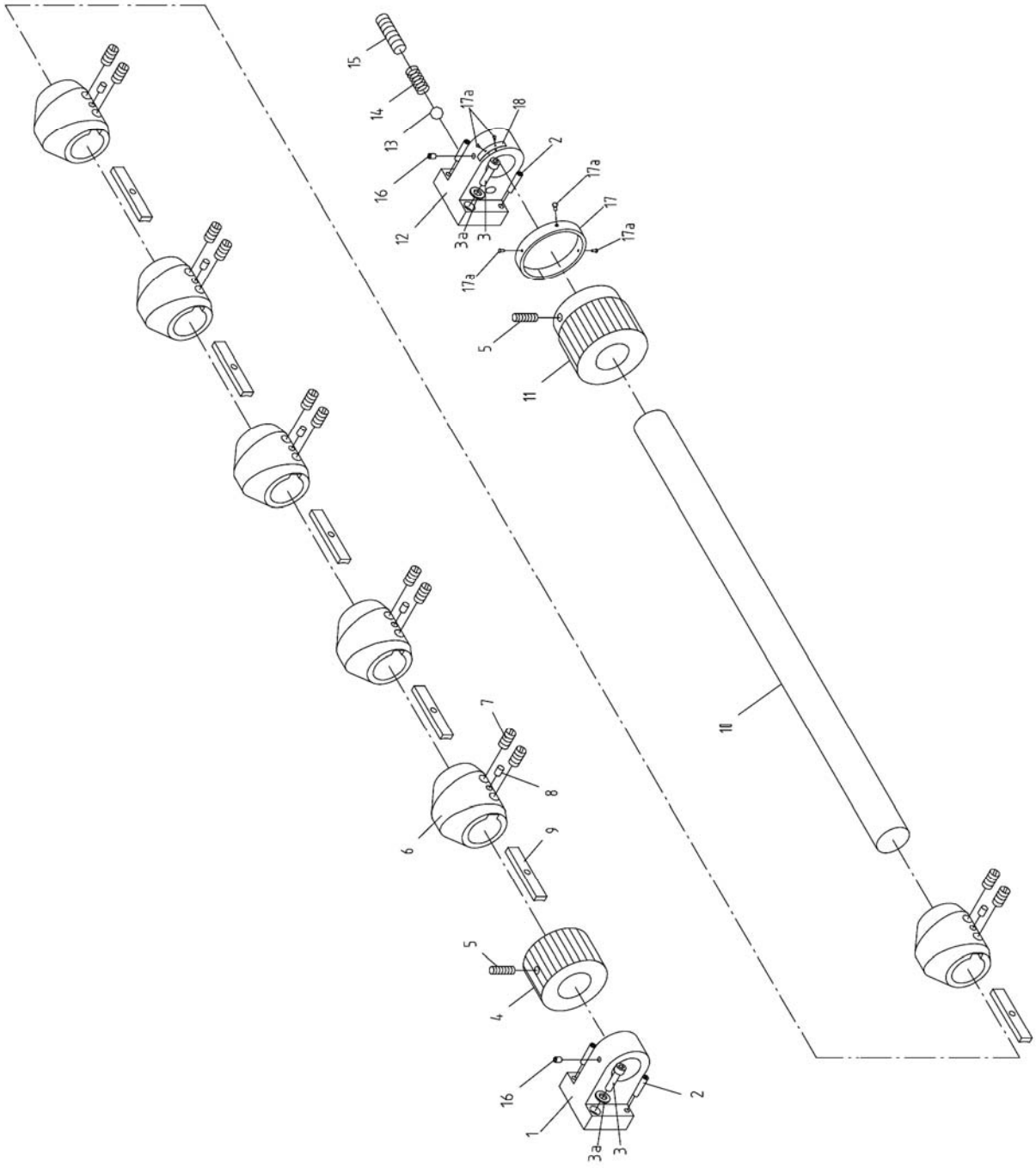
23.1 **Coolant and Work Light Assembly – Exploded View**



23.2 **Coolant and Work Light Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	RT-001C	Rubber Tube (for 80” ZH only)	ID 1/2" x 2280	1
	RT-001C	Rubber Tube (for 120” ZH only)	ID 1/2" x 3000	1
2	TS-2205201	Hex Cap Screw (for 80” ZH only)	M6x16	4
	GB70-M6x16	Hex Socket Cap Screw (for 120” ZH only)	M6x16	4
3	GB6172-M6	Hex Nut	M6	4
4	ZX-CW04	Coolant Pump （serial #141020ZH0102and lower）		1
	ZX-CW04A	Coolant Pump （serial #141220ZH0103 and higher）		1
5	TS-1540041	Hex Nut	M6	2
6	ZX-01727	Clip for Rubber Tube		1
7	TS-2286202	Phillips Pan Head Machine Screw	M6x20	2
8	C6140W01731	Fitting		1
9	C6140W01730	Flow Pipe		1
10	ZH-CT	Coolant Tube	1/2"x16x700	1
11	TS-1503051	Hex Socket Head Cap Screw	M6x20	4
12	JC52	Work Lamp (serial #160315ZH0144 and lower)	24V, 50W	1
	JC52B	Work Lamp (serial #160415ZH0145 and higher)	24V, 50W	1
13	ZX01510	Coolant Tank (for 80” ZH only)		1
14	GH1640ZX18502-2	Label (serial #160315ZH0144 and lower)		1
	GH1640ZX18502-4	Label (serial #160415ZH0145 and higher)		1

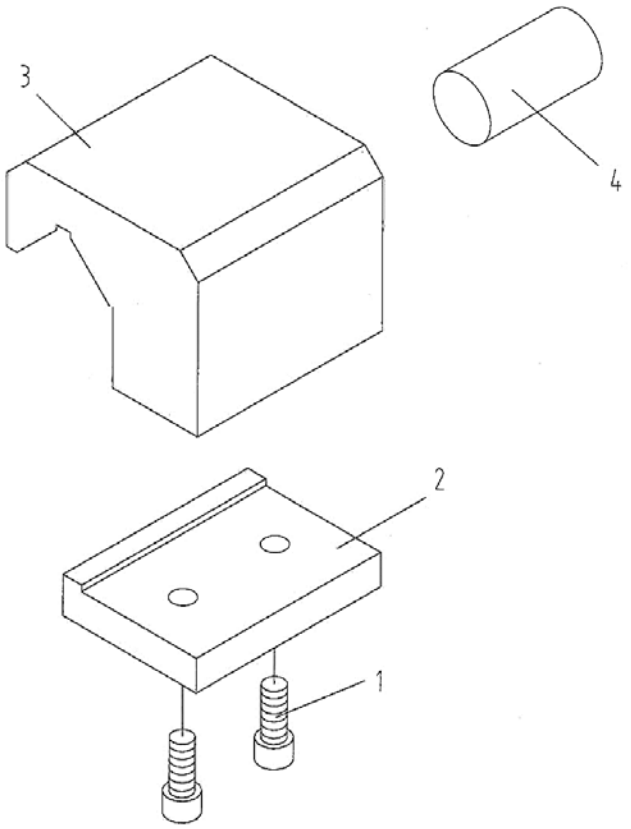
24.1 **Travel Stop Assembly – Exploded View**



24.2 **Travel Stop Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	C6266C26A102-G	Left Support		1
2	GB118-8x40	Pin	8x40 mm	4
3	TS-1504081	Hex Socket Head Cap Screw	M10x40	4
3a	GB97.2-10	Washer	10 mm	4
4	C6266C26A721-G	Left Control Circle		1
5	GB79-M8x16	Hex Socket Set Screw (Dog Pt.)	M8x16	2
6	C6266C26712	Eccentric Travel Setting Ring		6
7	GB77-M8x8	Hex Socket Set Screw (Cone Pt.)	M8x8	12
8	GB119-4x10	Pin	4x10 mm	6
9	C6266C26713	Locking Key		6
10	C6266C26A707C	Travel Set Rod (for 80” Size only)		1
	C6266C26A707D	Travel Set Rod (for 120” Size only)		1
11	C6266C26A720-G	Right Control Circle		1
12	C6266C26A101-G	Right Support		1
13	SB-8MM	Steel Ball	8 mm	1
14	GB2089-1.5x8x20	Spring	1.5x8x20 mm	1
15	GB77-M10x20	Hex Socket Set Screw	M10x20	1
16	ZX-CS16	Oil Cup	8 mm	1
17	C6266C26301	Label		1
17a	GB867-3x8	Half Round Head Rivet	3x8 mm	5
18	C6136ZK03303B	Plate		1

25.1 **Small Carriage Stop – Exploded View**



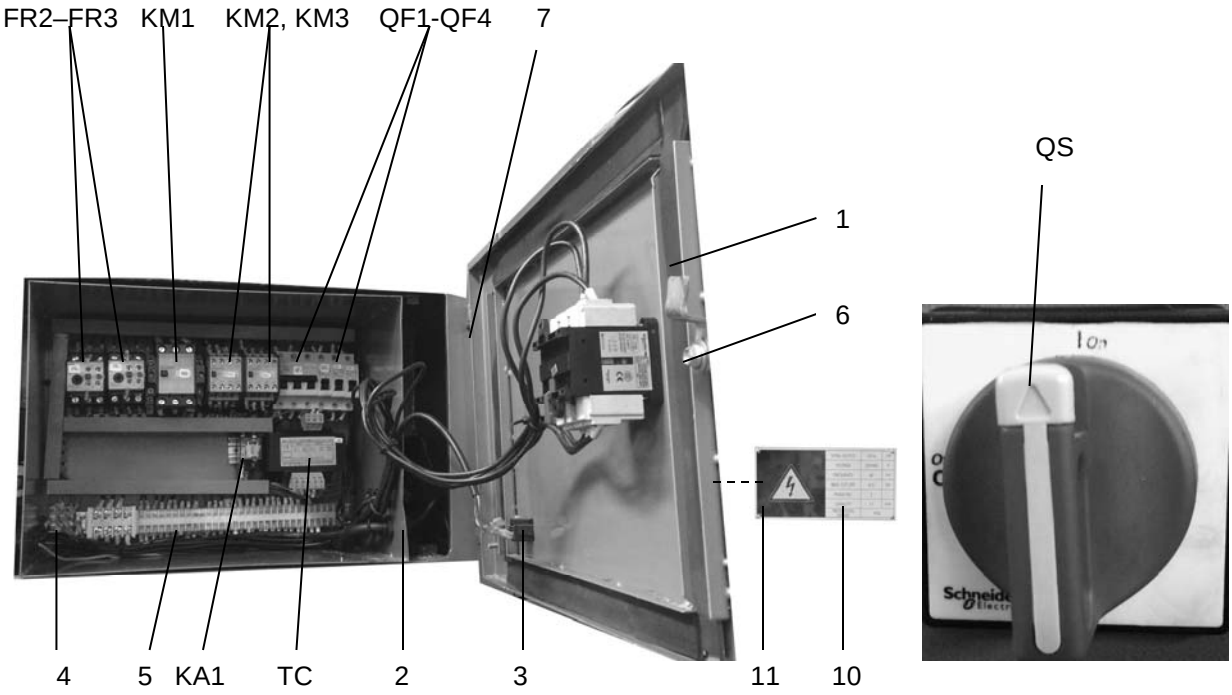
25.2 **Small Carriage Stop – Parts List**

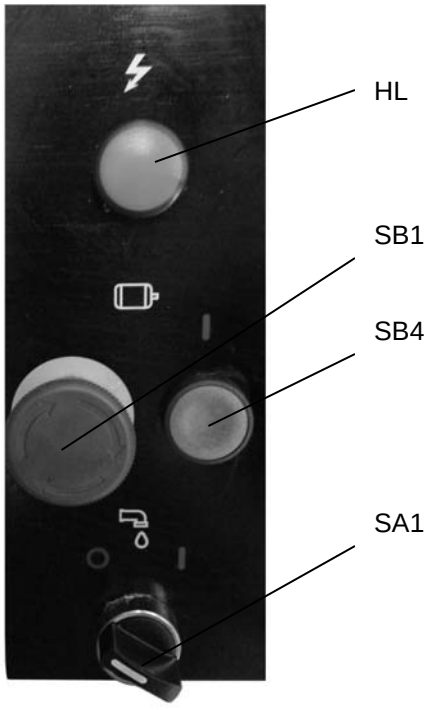
Index No.	Part No.	Description	Size	Qty
1	TS-1492031	Hex Cap Screw	M12x35	2
2	C6266C01112	Clamping Plate		1
3	C6266C01111-G	Stop		1
4	GB119-12x40	Pin	12x40 mm	1

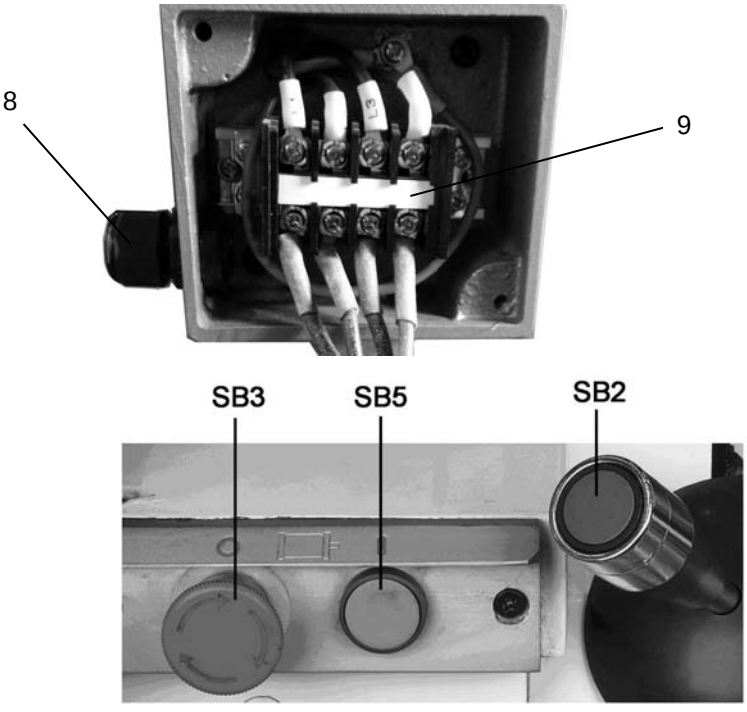
26.1 **Toolbox, Accessories, and Attachments**

Index No.	Part No.	Description	Size	Qty
1	ZH-2501	3-Jaw Scroll Chuck	13”, D1-8	1
2	ZH-2502	Drive Plate		1
3	RNS-170/210	Round Nut Spanner	170-210	1
5	ZH-2505	Face Plate	24-25/32”	1
6	C6266C08704	Gear (in.)	2m69T	1
7	C6266C08709	Gear (in.)	2m63T	1
8	C6266C08716	Gear (in.)	2m90T	1
9	C6266C08717	Gear (in.)	2m78T	1
10	ZH-OP-08	Reduction Sleeve *	113mm 1:20/MT5	1
11	ZX-OP-07N	Live Center *	MT5	1
12	ZX-OP-06	Dead Center *	MT5	1
13	ZH-2513	Drive Pin		2
14	ZX-OP-05	Cam Wrench *		1
15	ZX-OP-1B	Chuck Wrench *		1
17	ZH-2517	Gap Bridge Pin Driver *		1
18	ZH-2518	Drift Key *		1
19	RNS-45/52	Round Nut Spanner *	45-52	1
20		Hex Key Set *	2, 3, 4, 6, 8, 10, 12	one of each
21	ZH-2521	Leveling Bolt (ZH-2680) *	M20x80	6
	ZH-2521	Leveling Bolt (ZH-26120)	M20x80	8
22	ZH-2522	Hex Nut (ZH-2680) *	M20	6
	ZH-2522	Hex Nut (ZH-26120)	M20	8
23	ZX-01715	Leveling Pad (ZH-2680) *		6
	ZX-01715	Leveling Pad (ZH-26120)		8
24	ZX-OP-14	Flat Blade Screw Driver *		1
25	ZX-OP-15	Cross Point Screw Driver *		1
26		Open End Wrench Set *	17-19, 19-22	1
27	ZX-OP-10	Touchup Paint Can (JET Gray) *		1
28	ZX-OP-09	Oil Gun *		1
29	GB70-M16x50	Hex Socket Head Cap Screw	M16x50	2
30	ZX-250-502	Tool Holder (serial #160415ZH0145 and higher)		1
31	ZX-250-504	Tool Holder (serial #160415ZH0145 and higher)		1
32	ZX-250-507	Tool Holder (serial #160415ZH0145 and higher)		1
33	ZX-250-510	Tool Holder (serial #160415ZH0145 and higher)		1
34	ZH-TBC	Tool Box Complete, ZH Lathes *(includes items with asterisk *)*		

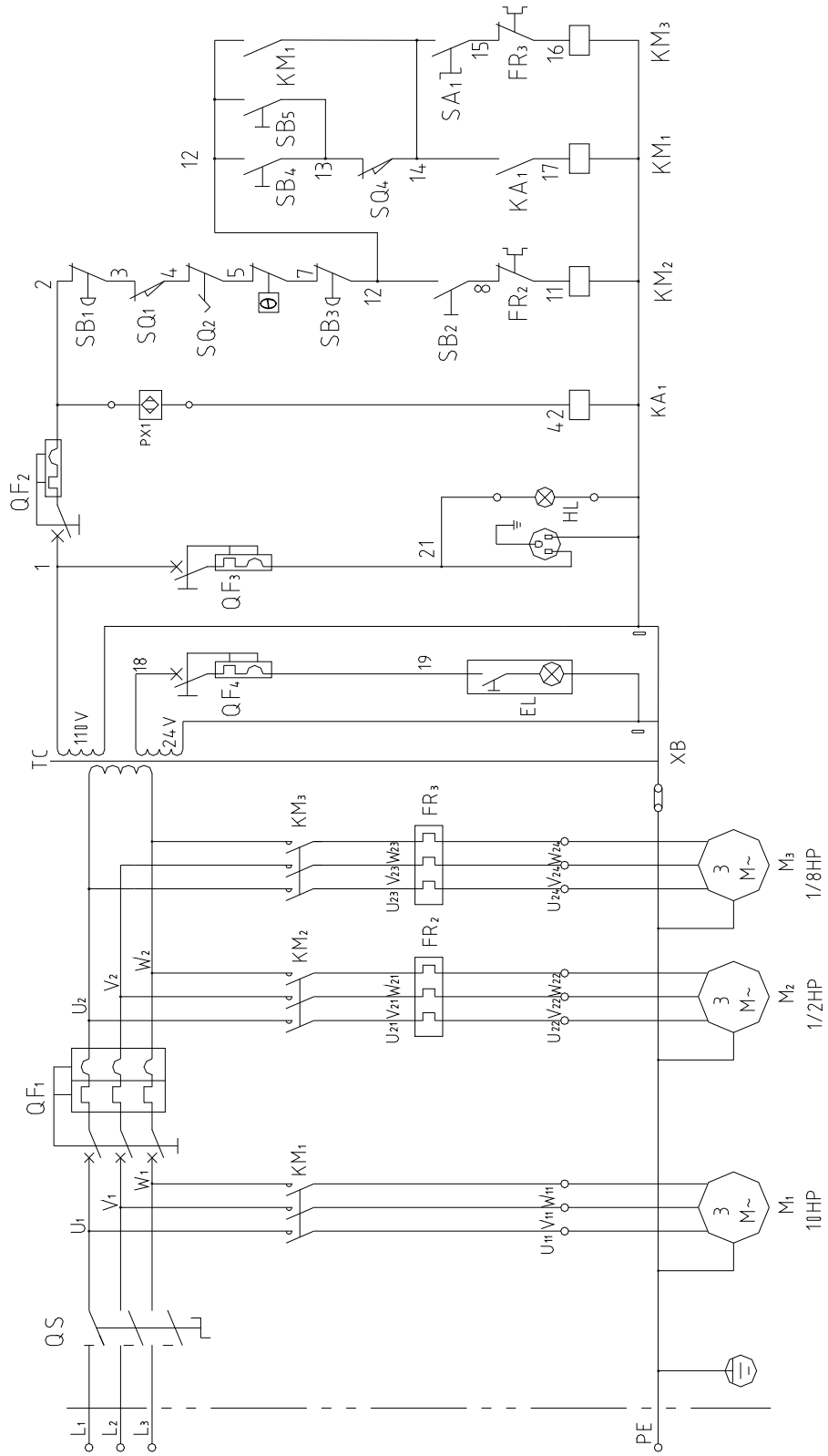
27.1 **Electrical Components**







27.2 **Electrical Diagram**

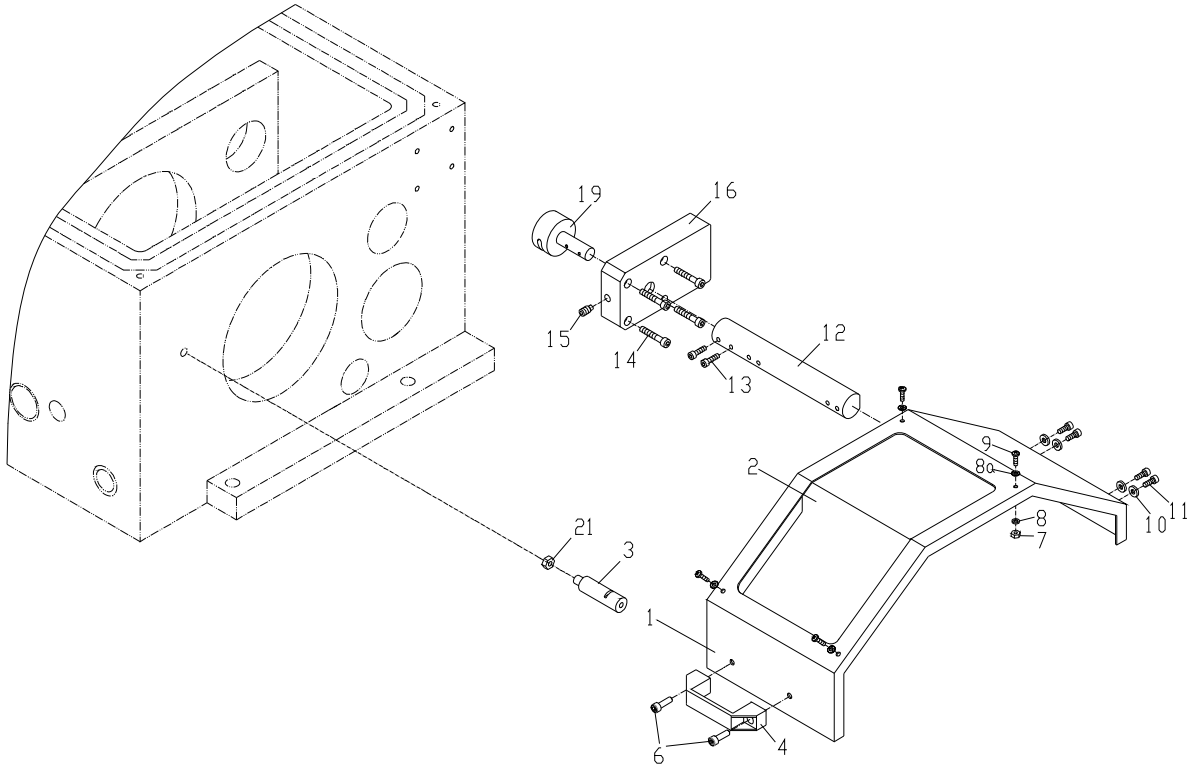


27.3 **Electrical Components – Parts List**

Index No.	Part No.	Description	Model	Size	Qty
M1	Y132M-4TH/B3	Main Motor	Y132M-4TH/B3	10HP, 3PH, 230/460V	1
M2	ZX-CW04	Coolant Pump (serial #141020ZH0102 and lower)			
			AB-12TH	1/8HP, 3PH, 230/460V	1
	ZX-CW04A	Coolant Pump (serial #141220ZH0103 and higher)			
			AB-12TH	1/8HP, 3PH, 230/460V	1
M3	YSS56BJ-G	Rapid Feed Motor	YSS5634	1/2HP, 3PH, 230/460V	1
QF	ZH-QF	Master Switch (serial #160315ZH0144 and lower)			
			JFD11	40A, 3P	1
QS	ZH-QS	Master Switch (serial #160415ZH0145 and higher)			
			VCF3	63A, 3P	1
TC	ZH-TC	Control Transformer	JBK5-160TH	460V, 230V/110V, 24V	1
FR3	ZH-FR3	Thermal Relay	3UA59	0.63-1A	1
FR2	ZH-FR2	Thermal Relay	3UA59	2.5-4A	1
KM1	ZX-KM3	A.C. Contactor	3TB44	Coil Voltage 110V, 22A	1
KM2, KM3	ZX-KM2	A.C. Contactor	3TB40	Coil Voltage 110V, 9A	2
QF1	ZH-QF1	Breaker (serial #160415ZH0145 and higher)			
			DZ47-63	6A	1
QF2	ZH-QF2	Breaker (serial #160415ZH0145 and higher)			
			DZ47-63	3A	1
QF3	ZH-QF3	Breaker (serial #160415ZH0145 and higher)			
			DZ47-63	3A	1
QF4	ZH-QF4	Breaker (serial #160415ZH0145 and higher)			
			DZ47-63	3A	1
θ	ZH-TR	Temperature Relay	JW6-125°C	Working Temp. 125°C	1
SQ1	ZH-SQ1	Door Switch	QKS8		1
SQ2	ZH-SQ2	Limit Switch	JW2-11H/W1		1
SQ4	ZH-SQ4	Micro Switch	LXW5-11Q1		1
SB1,SB3	ZH-SB1	Button	ZB2-BS54C	Red	2
SB2	ZH-SB2	Button	XB2BD53C	Green	1
SB4,SB5	ZH-SB4	Button	XB2-EA131	Green	2
SA1	ZH-SA1	Turning Switch	ZB2-BD2C	Black	1
EL	ZH-EL	Work Lamp	JC52B		1
HL	ZH-HL	Indicator Light	XB2EV163	110V, Green	1
KA1	ZH-KA1	Relay (serial #160415ZH0145 and higher)		HH52P	1
PX1	ZH-PX1	Proximity switch	LJ12A3-4-J/EZ	AC90~250V	1
1	C6266C18715	Electric Box Door (serial #160315ZH0144 and lower)			1
	C6266C18715A	Electric Box Door (serial #160415ZH0145 and higher)			1
2	C6266C18713-G	Electric Box			1
3	AS-04	Digital Display Plug (serial #160415ZH0145 and higher)			1
4	C613218306	Copper Plate (for grounding)			1
5	JH9-2.5/4+1.5/31	Wiring Board			1
6	MS-705	Lock			1
7	C6140W18705	Small Shaft			2
	C6140W18706	Pin Shaft			2
	GB6170-M8	Hex Nut		M8	2
8	PG13.5-M20x1.5	Sheathed Wire Head		M20x1.5	1
9	AZ1-2004	Wiring Board			1
	GB818-M4x6	Cross Recessed Pan Head Screw		M4x6	2
	GB97-4	Washer		4 mm	2
10	C6136ZK18304A (in)	Electrical Main Label (serial #160315ZH0144 and lower)			1
	C6266C18304-11(in)	Electrical Main Label (serial #160415ZH0145 and higher)			1
11	GB827-3x6	Rivet		3x6 mm	4

** See related parts lists for part numbers.*

28.1 **Chuck Guard Assembl – Exploded View y**

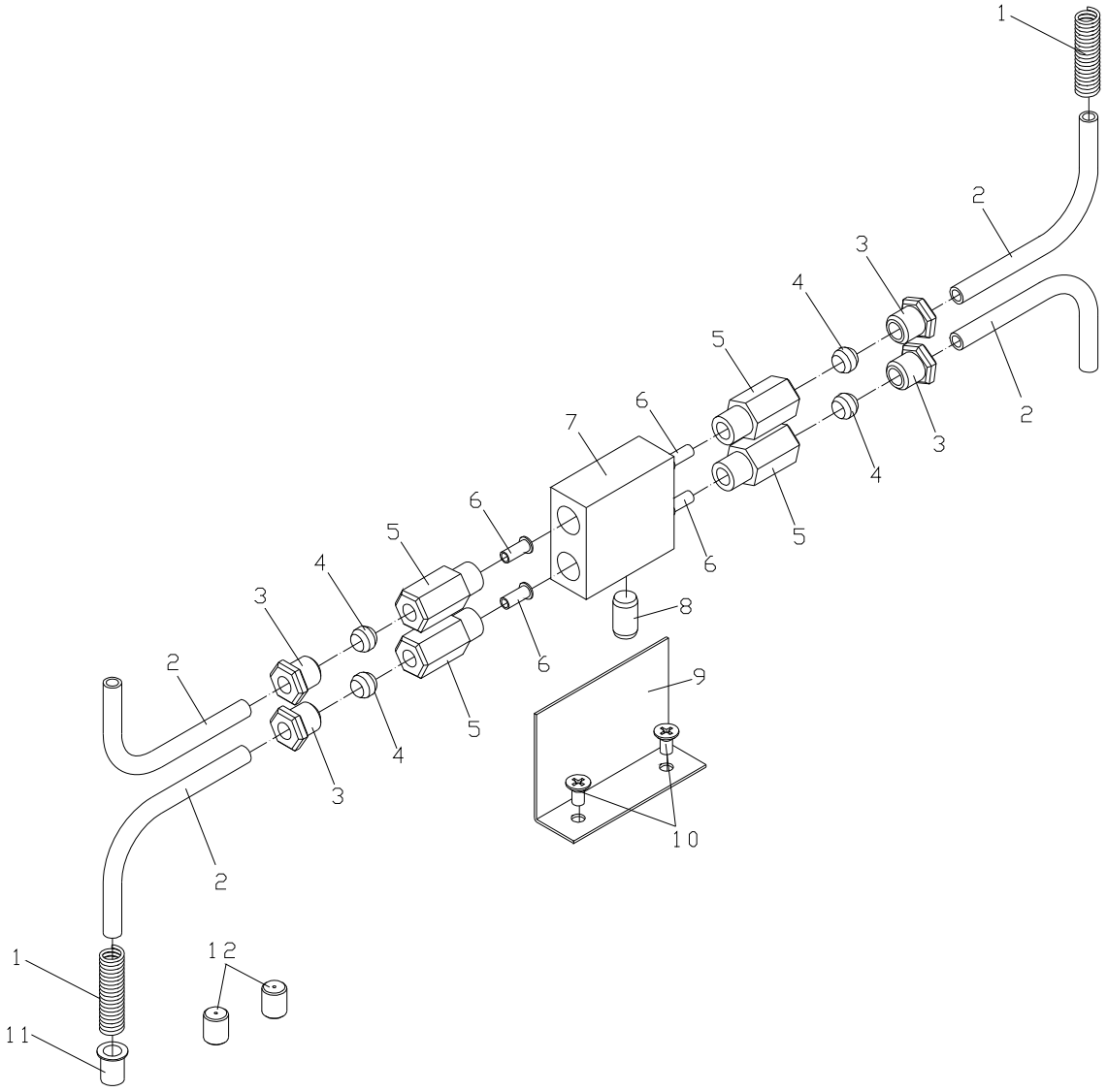


28.2 **Chuck Guard Assembly – Parts List**

Index No.	Part No.	Description	Size	Qty
1	GH1640ZX19701	Protection Guard (serial #160315ZH0144 and lower)		1
	GH1640ZX19701A	Protection Guard (serial #160415ZH0145 and higher)		1
2	ZX-19501E	Protection Guard Visual Glass		1
3	ZX-19704E	Fixing Rod		1
4	ZX-S04E	Handle (serial #160315ZH0144 and lower)		1
	A=90 Black	Handle (serial #160415ZH0145 and higher)		1
5	ZX-S05E	Plain Washer (serial #160315ZH0144 and lower)	6 mm	2
6	ZX-S06E	Cross Recessed Pan Head Screw (serial #160315ZH0144 and lower)	M6x12	2
	GB70-M6x12	Hex Socket Cap Screw (serial #160415ZH0145 and higher)	M6x12	2
7	ZX-S07E	Hexagon Thin Nut	M4	4
8	ZX-S08E	Plain Washer	4 mm	4
8a	GB96-4	Large Plain Washer	4 mm	4
9	ZX-S09E	Cross Recessed Pan Head Screw	M4x12	4
10	ZX-S10E	Plain Washer	5 mm	4
11	ZX-S11E	Hexagon Socket Cap Screw	M5x16	4
12	ZX-19703E	Rest Bar		1
13	ZX-S13E	Slotted Set Screw	M8x10	2
14	GB70-M6x30	Hexagon Socket Cap Screw	M6x30	4
15	ZX-S15E	Hexagon Socket Set Screw	M8x16	1
16	GH1440A19101E	Switch Box		1
19	ZX-19702E	Shaft		1
21	C6266CCGA21-M12	Nut	M12	1

(Note:This device is installed from serial #111105ZH0006)

29.1 **Carriage Lubrication – Exploded View**



29.2 **Carriage Lubrication– Parts List**

Index No.	Part No.	Description	Size	Qty
1	GB2089-1x8x30	Spring	1x8x30 mm	2
2		Nylon Pipe	Ø 6x1 mm	4
3	CB-6	Vitta Tie-in	M10x1	4
4	CS-6	Clip Sleeve	Ø 6 mm	4
5		Tie-in	M10x1	4
6	T1-6	Bushing	Ø 6 mm	4
7	C6266C04730	Connector		1
8	GB119-8x10	Pin	8x10 mm	1
9	C6266C04731	Cover		1
10	GB819-M4x8	Cross Recessed Countersunk Head Screw	M4x8	2
11	C6266C04302Y	Bushing		1
12	C6266C04303Y	Plug		2