



Model No.:	Stock No.:
Serial No.:	
Purchased From:	
Date Purchased:	Date Installed:

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

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1.0 Warranty and Service

Walter Meier (Manufacturing) Inc., warrants every product it sells. If one of our tools needs service or repair, one of our Authorized Service Centers located throughout the United States can give you quick service. In most cases, any of these Walter Meier Authorized Service Centers can authorize warranty repair, assist you in obtaining parts, or perform routine maintenance and major repair on your JET® tools. For the name of an Authorized Service Center in your area call 1-800-274-6848.

MORE INFORMATION

Walter Meier is consistently adding new products to the line. For complete, up-to-date product information, check with your local Walter Meier distributor, or visit waltermeier.com.

WARRANTY

JET products carry a limited warranty which varies in duration based upon the product (MW = Metalworking, WW = Woodworking).

90 DAY WARRANTY Lathe Accessories Machine Accessories Mobile Bases Safety Equipment Specialty Items Vise Accessories	1 YEAR WARRANTY Air Tools-Contractor Air Tools-Industrial Air Tools-Light Industrial Lubrication	2 YEAR WARRANTY Body Repair Kits Bottle Jacks Cable Pullers Cold Saws Hoists-Air Hoists-Electric Metal forming Mill/Drills Milling Machines MW Bandsaws MW Drill Presses MW Finishing Equipment MW Lathes MW Precision Vises	2 YEAR WARRANTY Palet Trucks Rigging Equip. Service Jacks Stackers Surface Grinders Tapping Trolleys-Air Trolleys-Electric Web Slings Winches-Electric	3 YEAR WARRANTY WW Benchtop Tools	5 YEAR WARRANTY Beam Clamps Chain Hoist-Manual Lever Hoists Pullers-JCH Models Scissor Lift Tables Screw Jacks Trolleys-Geared Trolleys-Plain Winches-Manual WW Air Filtration WW Bandsaws WW Buffers	5 YEAR WARRANTY WW Drill Presses WW Dust Collectors WW Dust Filters WW Dust Fittings WW Jointers WW Lathes WW Planers WW Sanders WW Shapers WW Tablesaws	LIFE WARRANTY Fastening Tools Mechanics Hand Tools Striking Tools Vises (no-precision) Clamps
Warranty reverts to 1 Year Warranty if woodworking (WW) products listed above are used for industrial or educational purposes.							

WHAT IS COVERED?

This warranty covers any defects in workmanship or materials subject to the exceptions stated below. Cutting tools, abrasives and other consumables are excluded from warranty coverage.

WHO IS COVERED?

This warranty covers only the initial purchaser of the product.

WHAT IS THE PERIOD OF COVERAGE?

The general JET warranty lasts for the time period specified in the product literature of each product.

WHAT IS NOT COVERED?

Five Year Warranties do not cover woodworking (WW) products used for commercial, industrial or educational purposes. Woodworking products with Five Year Warranties that are used for commercial, industrial or education purposes revert to a One Year Warranty. This warranty does not cover defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair or alterations, or lack of maintenance.

HOW TO GET SERVICE

The product or part must be returned for examination, postage prepaid, to a location designated by us. For the name of the location nearest you, please call 1-800-274-6848.

You must provide proof of initial purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will repair or replace the product, or refund the purchase price, at our option. We will return the repaired product or replacement at our expense unless it is determined by us that there is no defect, or that the defect resulted from causes not within the scope of our warranty in which case we will, at your direction, dispose of or return the product. In the event you choose to have the product returned, you will be responsible for the shipping and handling costs of the return.

HOW STATE LAW APPLIES

This warranty gives you specific legal rights; you may also have other rights which vary from state to state.

LIMITATIONS ON THIS WARRANTY

WALTER MEIER (MANUFACTURING) INC., LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF THE LIMITED WARRANTY FOR EACH PRODUCT. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS ARE EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG THE IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

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3.0 Safety warnings

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, Walter Meier (Manufacturing) Inc., 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. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contain chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - Lead from lead based paint.
 - Crystalline silica from bricks, cement and other masonry products.
 - Arsenic and chromium from chemically treated lumber.Your risk of exposure varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area and work with approved safety equipment, such as face or dust masks that are specifically designed to filter out microscopic particles.
10. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
11. Make certain the switch is in the **OFF** position before connecting the machine to the power supply.
12. Make certain the machine is properly grounded.
13. Make all machine adjustments or maintenance with the machine unplugged from the power source.
14. 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.
15. 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.
16. 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.
17. Provide for adequate space surrounding work area and non-glare, overhead lighting.
18. Keep the floor around the machine clean and free of scrap material, oil and grease.
19. Keep visitors a safe distance from the work area. **Keep children away.**
20. Make your workshop child proof with padlocks, master switches or by removing starter keys.

21. Give your work undivided attention. Looking around, carrying on a conversation and “horse-play” are careless acts that can result in serious injury.
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. 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.
24. 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.
25. Use recommended accessories; improper accessories may be hazardous.
26. Maintain tools with care. Keep cutting tools sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
27. Do not attempt to adjust or remove tools during operation.
28. Never stop a rotating chuck or workpiece with your hands.
29. Choose a low spindle speed when working unbalanced workpieces, and for threading and tapping operations.
30. Do not exceed the maximum speed of the workholding device.
31. Do not exceed the clamping capacity of the chuck.
32. Workpieces longer than 3 times the chucking diameter must be supported by the tailstock or a steady rest.
33. Avoid small chuck diameters with large turning diameters.
34. Avoid short chucking lengths and small chucking contact.
35. Turn off the machine and disconnect from power before cleaning. Use a brush to remove shavings or debris — do not use your hands.
36. Do not stand on the machine. Serious injury could occur if the machine tips over.
37. Never leave the machine running unattended. Turn the power off and do not leave the machine until moving parts come to a complete stop.
38. Remove loose items and unnecessary work pieces from the area before starting the machine.
39. Do not operate the lathe in flammable or explosive environments. Do not use in a damp environment or expose to rain.

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



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



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

4.0 Specifications

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

General Capacities:

Maximum Swing over Bed	26" (660 mm)	26" (660 mm)
Maximum Swing over Cross Slide.....	16-1/2" (420 mm)	16-1/2" (420 mm)
Maximum Swing Through Gap.....	34" (870 mm)	34" (870 mm)
Length of Gap	8-1/32" (204 mm)	8-1/32" (204 mm)
Distance between Centers.....	80" (2030 mm)	120" (3050 mm)
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" (105 mm)	4-1/8" (105 mm)
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.).....	46-1/2".....	46-1/2"
3-Jaw Scroll Chuck:		
Load Capacity	661 lb (300 kg).....	661 lb (300 kg)
Inside Diameter	4-1/8" (105 mm).....	4-1/8" (105 mm)
4-Jaw Independent Chuck:		
Load Capacity	1476 lb (669.5 kg).....	1476 lb (669.5 kg)
Inside Diameter	4-7/8" (124 mm).....	4-7/8" (124 mm)

Carriage:

Maximum Tool Size.....	1-1/4" x 1-1/4" (31.75 x 31.75 mm)	1-1/4" x 1-1/4" (31.75 x 31.75 mm)
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	14-9/16" (370 mm).....	14-9/16" (370 mm)
Maximum Carriage Travel.....	68-7/8" (1750mm).....	108-9/32" (2750 mm)

Gearbox:

Number of Longitudinal Feeds	65	65
Range of Longitudinal Feeds ..0.0023 – 0.0937 in./rev. (0.063-2.52 mm/rev).....	0.0023 – 0.0937 (0.063-2.52 mm)	
Number of Cross Feeds.....	63	63
Range of Cross Feeds	0.0010 – 0.0404 in/rev. (0.027-1.07 mm/rev).....	0.0010 – 0.404 (0.027-1.07 mm)
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	0.5-7 mm.....	0.5-7 mm
Leadscrew Pitch.....	1/2" (12.7 mm).....	1/2" (12.7 mm)

Tailstock:

Tailstock Spindle Travel	6" (150 mm).....	6" (150 mm)
Tailstock Taper.....	MT-5	MT-5
Maximum Tailstock Cross Displacement	+/- 0.40" (10 mm).....	+/- 0.40" (10 mm)

Other:

Small Steady Rest Capacity.....	3/4" – 5" (20-125 mm).....	3/4" – 5" (20-125 mm)
Large Steady Rest Capacity	4" – 9.5" (100-240 mm).....	4" – 9.5" (100-240 mm)
Follow Rest Capacity.....	3/4" – 4" (20-100 mm).....	3/4" – 4" (20-100 mm)
Coolant tank capacity	4 gal. (15L).....	4 gal. (15L)
Noise emission (idling at max. speed) ¹	82.4 dB.....	82.4 dB
Overall Dimensions	137-13/16"L x 53-5/32"W x 55-1/2"H.....	177-5/32"L x 47-1/4"W x 55-1/2"H
	(3500 x 1350 x 1410 mm)	(4500 x 1200 x 1410 mm)
Approximate Net Weight.....	8532 lbs. (3870 kg).....	9369 lbs. (4250 kg)

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, Walter Meier (Manufacturing) Inc., reserves the right to change specifications at any time and without prior notice, without incurring obligations.

5.0 Dimensions and mounting hole centers

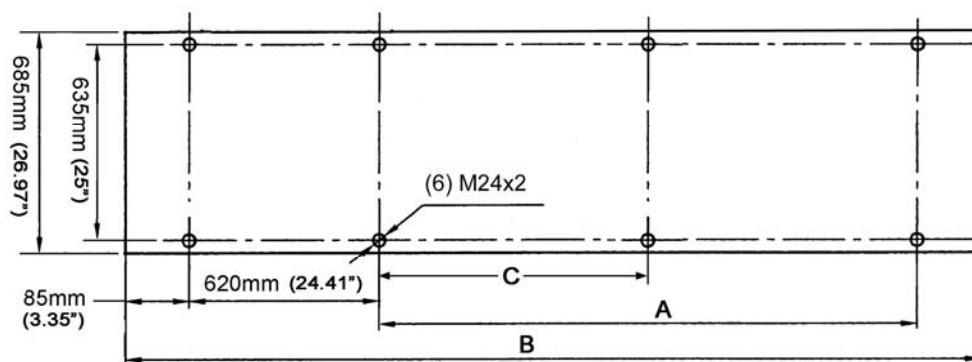


Figure 1

Lathe Size	80 inch (GH-2680ZH)	120 inch (GH-26120ZH)
A	2560mm (100.8 in.)	3565mm (140.4 in.)
B	3495mm (137.60 in.)	4500mm (177.2 in.)
C		1721.5mm (67.8 in)

Table 1

6.0 General description and nomenclature

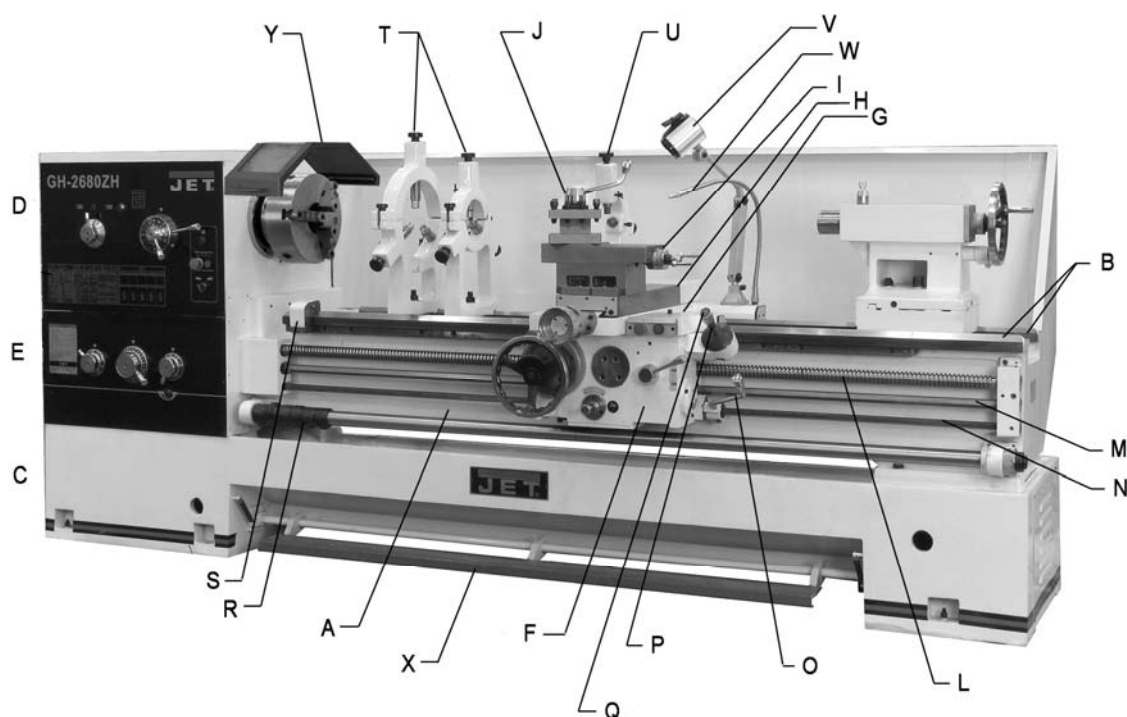


Figure 2 – General Description (GH-2680ZH shown)

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 frequency 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 slide which 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.

Four-Way Tool Post. The tool post (J) is a turret design, mounted to the compound rest. It holds up to four tools simultaneously, and includes an indexing function.

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 Lathe is 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.

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**
- 1 Four Jaw Independent Chuck, 15-23/32" – **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**
 - 1 Tool Post Wrench – **M**
 - 1 Gap Bridge Pin Driver – **N**
 - 1 Drift Key – **O**
 - 1 Round Nut Spanner (45-52 mm) – **P**
 - 1 Hex Key Set (6,8,10,12 mm) – **Q**
 - 3 Fuses (2A,3A,4A) – **R**
 - 6 Leveling Bolts with Hex Nuts – **S**
(qty. 8 for GH-26120ZH)
 - 6 Leveling Pads – **T**
(qty. 8 for GH-26120ZH)
 - 1 Flat Blade Screwdriver – **U**
 - 1 Cross Point Screwdriver – **V**
 - 2 Open End Wrenches (17/19,19/22) – **W**
 - 1 White Touch-up Paint Can – **X**
 - 1 Oil Gun – **Y**
 - 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 Walter Meier (Manufacturing) Inc., 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.

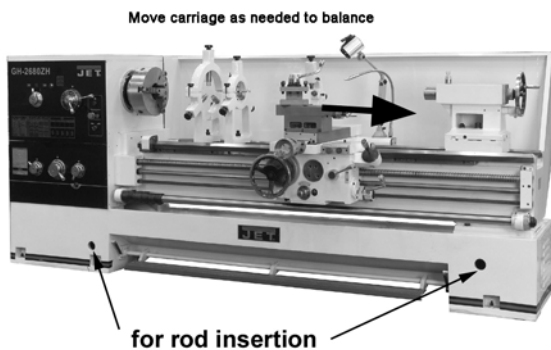


Figure 4 – Lifting preparation

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 using bolts placed 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.

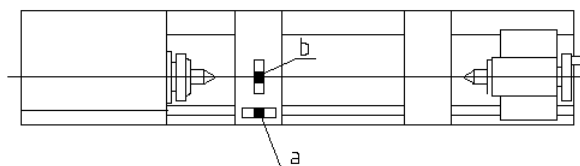


Figure 5 – Leveling

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.

The four-jaw chuck has independently adjustable jaws, and permits the holding of square and asymmetrical pieces. It also enables accurate concentric set-up of cylindrical pieces.

⚠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.

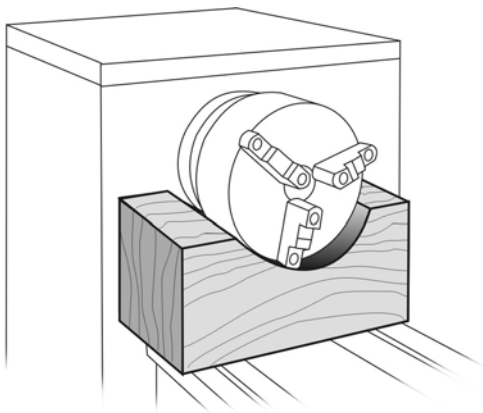


Figure 6 – Chuck cradle (not included)

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.

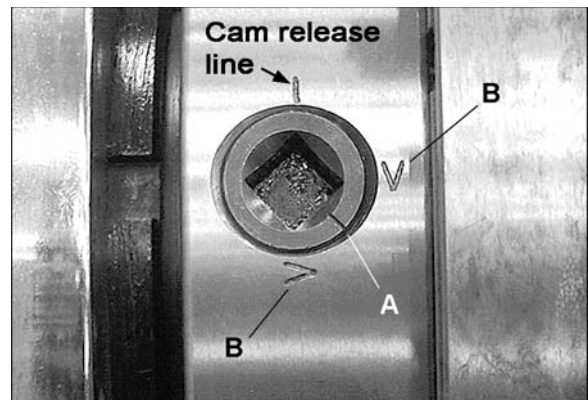


Figure 7 – Camlocks

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. **Chuck** – In addition to the lubrication already described under *Chuck Preparation*, daily lubricate the chuck with SAE 20W oil through the ball oiler, shown in Figure 8.



Figure 8 – Chuck lubrication

2. **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 9) 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.
3. To drain the headstock, remove the nut on the drain pipe (C, figure 10). 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.

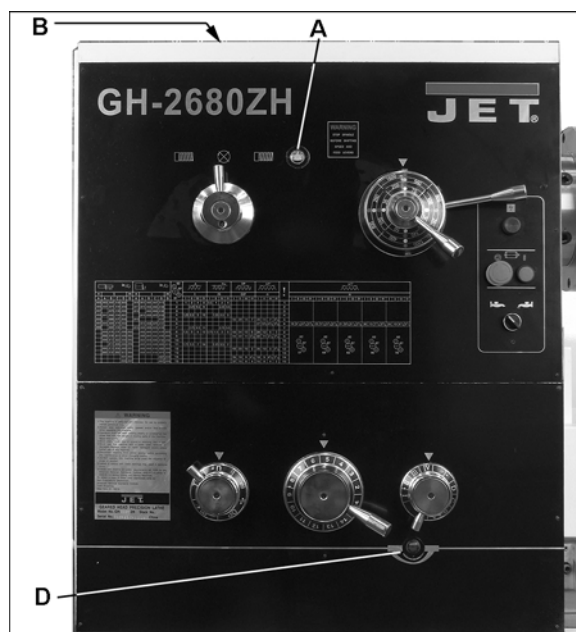


Figure 9 – Headstock lubrication

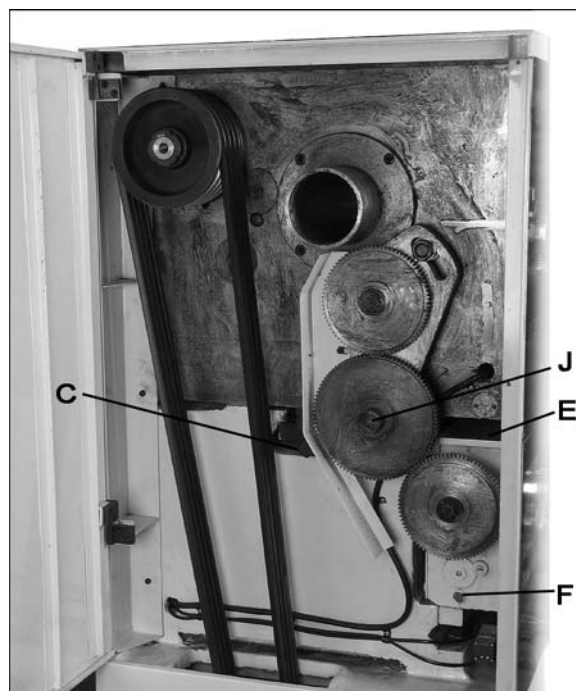


Figure 10 – Lubrication points

4. **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 11. Use a brush to clean.

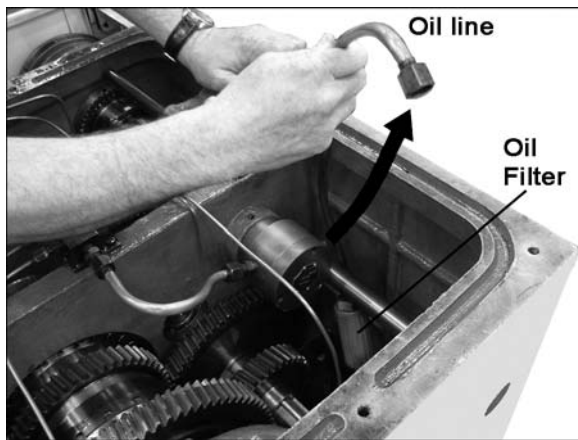


Figure 11 – Oil filter access

5. **Change Gear Axle** – Periodically remove end plug (J, Figure 10) and press #2 lithium grease into the axle to lubricate the gear axle and sleeve. Coat all gears with non-slinging grease.
6. **Gearbox** – Oil must be up to indicator mark in oil sight glass (D, Figure 9). Top off with SAE 20W oil. To add oil to the gearbox, pour it into the pan (E, Figure 10). To drain, remove drain plug (F, Figure 10). Drain oil completely and refill after the first three months of operation. Then change oil in the gearbox every six months.
7. **Apron** – Oil must be between indicator marks in the oil sight glass (G, Figure 12). Top off with SAE 20W oil. Unscrew oil plug (H, Figure 12) 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.

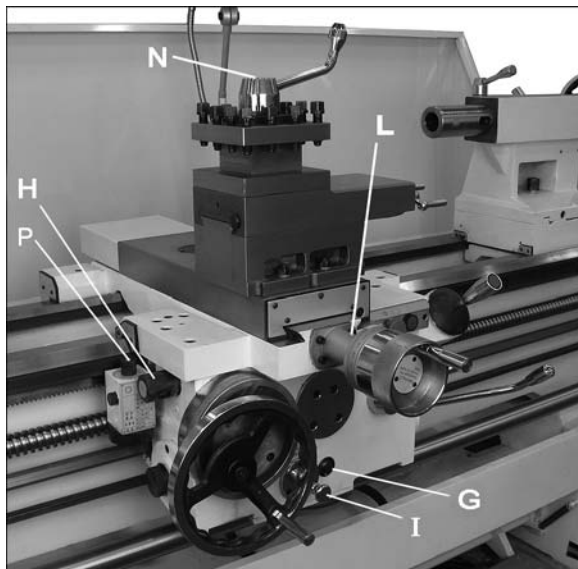


Figure 12 – Lubrication points

One-shot Lube System: Pull knob (I, Figure 12) 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 12) on top of the dial with SAE 20W oil.
9. **Cross Slide** – Daily lubricate one ball oiler on the handwheel housing (L, Figure 12) and three ball oilers on the platform (K, Figure 13), with SAE 20W oil.

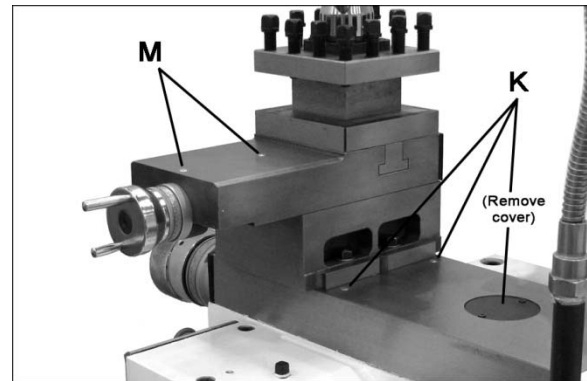


Figure 13 – Lubrication points

10. **Saddle** – The anti-dust felt on both ends of the v-guide ways (Figure 14) should be cleaned weekly with kerosene. If the felt becomes damaged, replace it.

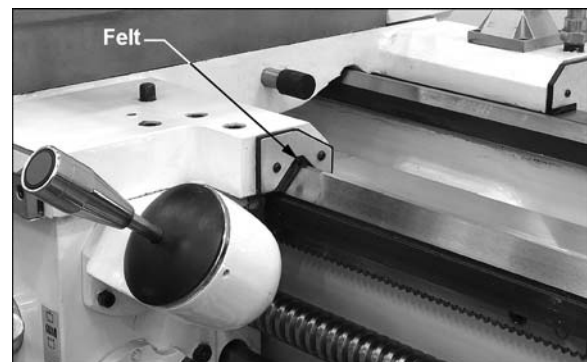


Figure 14 – Anti-dust felt

11. **Compound Rest** – Daily lubricate two ball oilers (M, Figure 13) 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. Daily lubricate one ball oiler on top the clamping hub (N, Figure 12) with SAE 20W oil.

13. **Leadscrew, Feed Rod, and Direction Control Axle** – Slide the cover on the right side bracket (Figure 15) 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 15 – 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 16) 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.

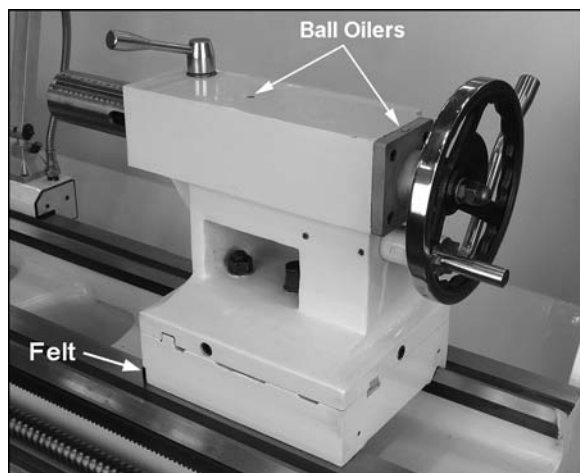


Figure 16 – Tailstock lubrication

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 recommendations 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 17). 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.

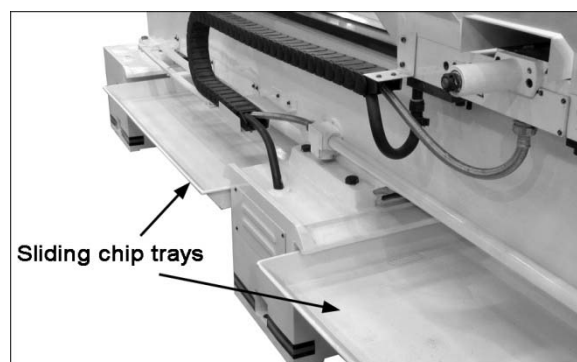


Figure 17 – GH-26120ZH chip trays

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 18).

Power Source Cable Receiver (Figure 18).

Make sure the lathe is properly grounded.



Figure 18 – 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 five 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 19) to rewire the rapid feed motor. The diagram is located on the right side of the apron near the directional lever. **It is not necessary to pull out the rapid feed motor for voltage conversion.**

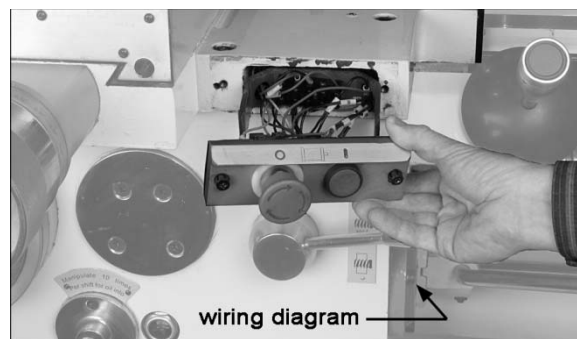


Figure 19 – Rapid feed motor wire access

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 20).
- 2) Remove rear panel on center stand then remove the two socket head screws (Figure 21) that secure the plate on which the coolant pump is mounted.

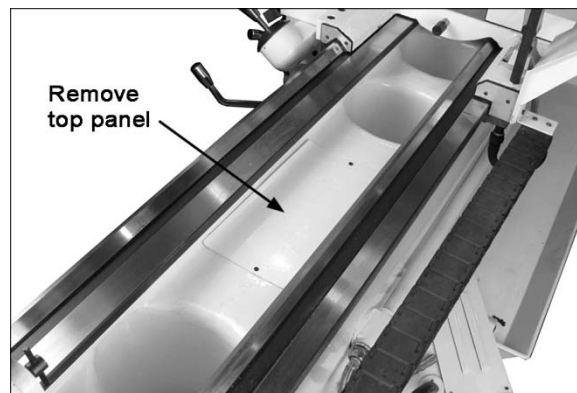


Figure 20 – Coolant pump access (GH-26120ZH)

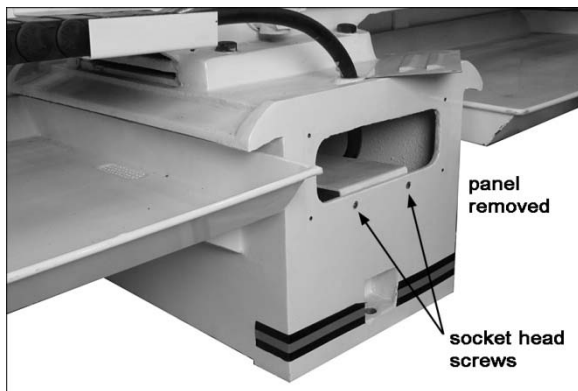


Figure 21 – Coolant pump access (GH-26120ZH)

- 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 (Figure 22).
5. **Overload Relays:** In the electrical box, turn down the dials on *both* of the relays (Figure 22) to the appropriate amperage. That is, from 4.0 to 2.5 on the first relay, and 1.0 to 0.63 on the second relay.

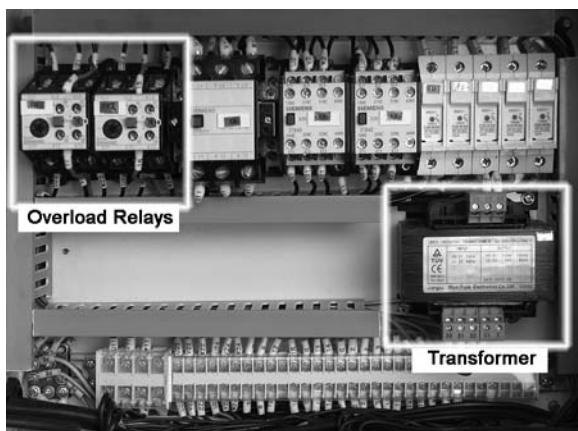


Figure 22 – Voltage conversion elements

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

11.0 Basic Controls

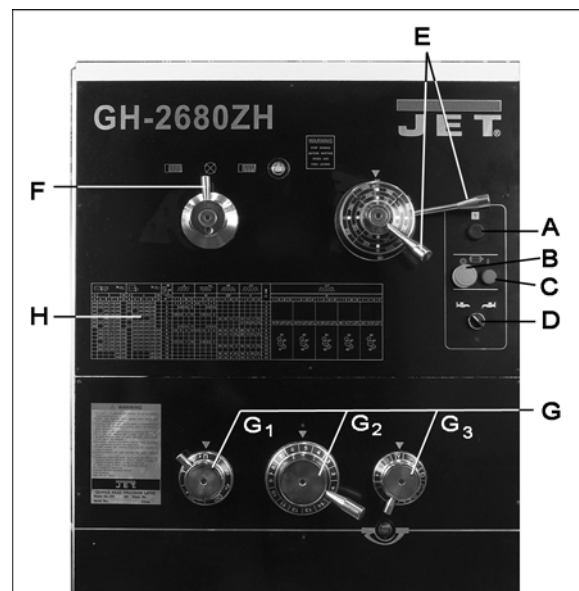


Figure 23 – Headstock Controls

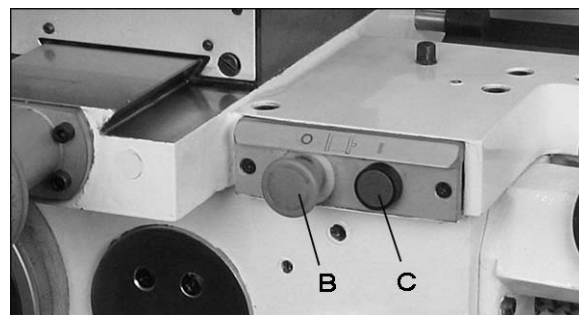


Figure 24 – Alternate controls

1. **Control Panel:** Located on front of headstock. An abbreviated control panel is also mounted to front of carriage.
 - **Power Indicator Light (A, Figure 23).** Illuminates whenever lathe is receiving power.
 - **Emergency Stop Button (B, Figure 23 and 24).** Shuts down all machine functions. **NOTE: Lathe will still have power.** Twist button clockwise to reset.
 - **ON Button (C, Figure 23 and 24).** Activates motor.
 - **Coolant On-Off Switch (D, Figure 23).** Activates coolant pump.
2. **Speed Selection Levers (E, Figure 23):** 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 23):** 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. **Lead and Feed Selector Levers (G, Figure 23):** Located on front of headstock. Used conjunctively to set up for threading or feeding, according to the accompanying chart (H).

Lever G₁ is the thread change control, and is also used for altering the feed setting. The symbols on the dial are identified as follows:

t = metric threads
n = inch threads
m = module threads
DP = diametral threads
 = for driving leadscrew directly, instead of through thread change device, when cutting non-standard threads.

Lever G₂ selects pitch and feed.

Lever G₃ doubles the pitch or feed differently at the following positions:

I/II/III/IV = The leadscrew works to cut threads.

A/B/C/D = The feed rod does the feeding.

The ratios between them are:

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

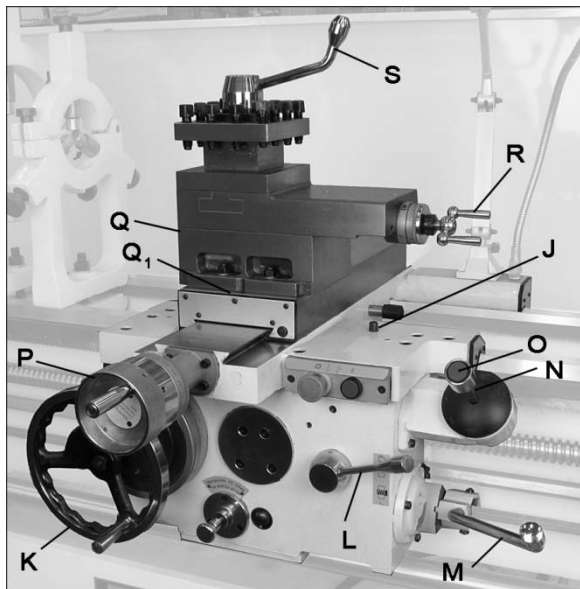


Figure 25 – Carriage controls and settings

5. **Carriage Lock (J, Figure 25):** 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 25):** 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 25):** Located on front of apron assembly. Engages the leadscrew for threading operations.
8. **Threading Dial (Figure 26):** Indicates the point on the leadscrew where the half nut can be re-engaged to continue inch threading.

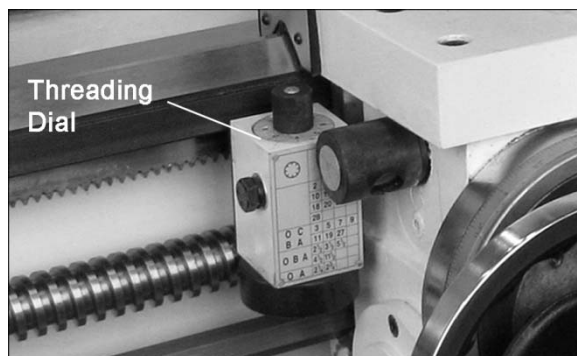


Figure 26

9. **Spindle Direction Control Lever (M, Figure 25):** 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 25):** 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 25):** 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 25): 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 25): 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 25) to assist in placement of the compound rest to the desired angle.
14. **Compound Rest Handle** (R, Figure 25): 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 25): Rotate counterclockwise to loosen and clockwise to tighten. Always use minimum of two clamping screws to secure a cutting tool.

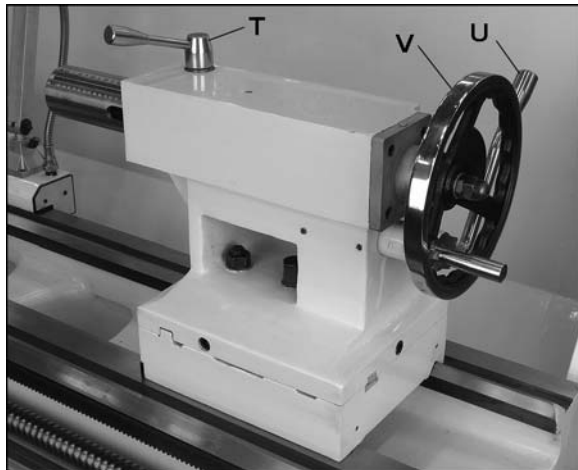


Figure 27 – Tailstock controls

16. **Tailstock Quill Clamping Lever** (T, Figure 27): Rotate clockwise to lock the sleeve. Rotate counterclockwise to unlock.
17. **Tailstock Clamping Lever** (U, Figure 27): Lift up to lock. Push down to unlock.

18. **Tailstock Quill Traverse Handwheel** (V, Figure 27): Rotate clockwise to advance the quill and counterclockwise to retract it. Fully retract it to eject a center or drill chuck.

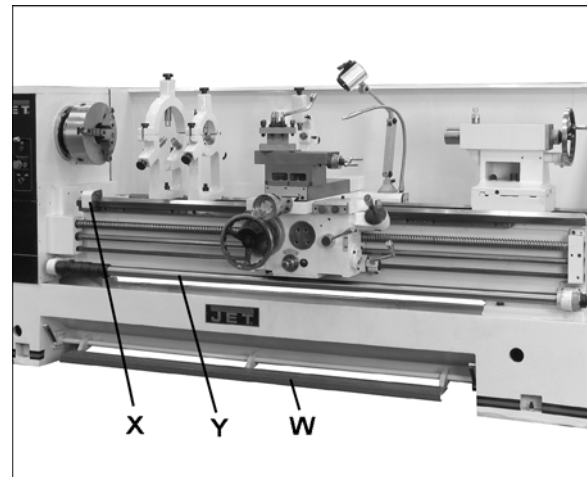


Figure 28 – Other controls

19. **Foot Brake** (W, Figure 28): 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 28): 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 28): Up to six pre-set configurations are possible for repetitive operations, without having to reposition 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 29).

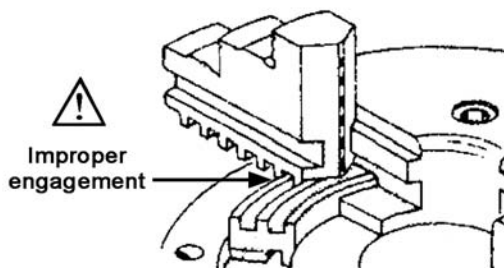


Figure 29 – Insufficient jaw tooth engagement

- Avoid long workpiece extensions, as parts may bend or fly off (see figure 30). Use rests or the tailstock for support.

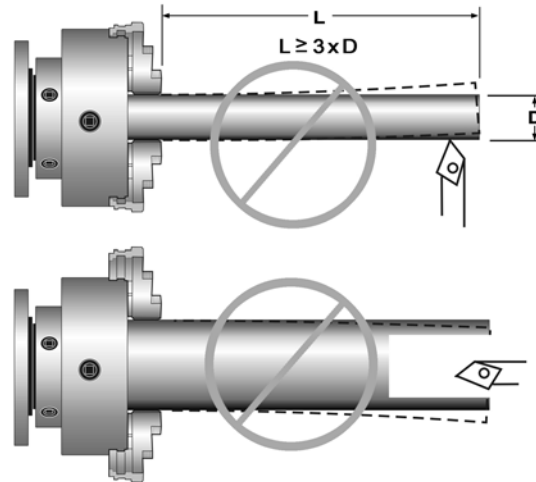


Figure 30 – Improper setups

- Avoid short clamping contact (Figure 31, A) or clamping on a minor part diameter (Figure 31, B). Face-locate the workpiece for added support.

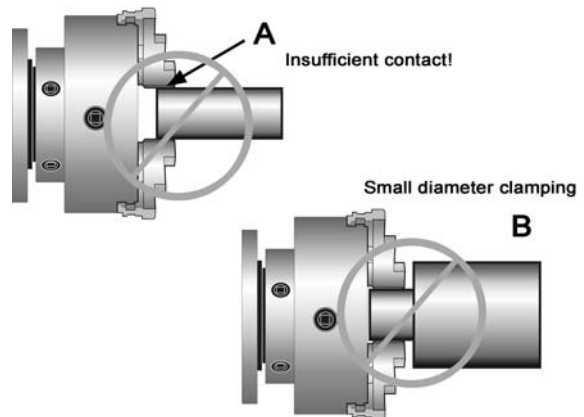


Figure 31 – Improper setups

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 32) 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 32

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 32). 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 32) 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 32) 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.*

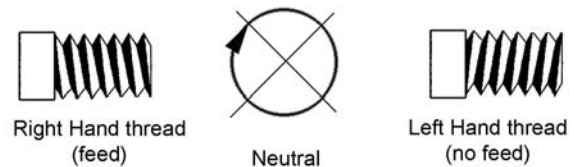


Figure 33

2. Set **speed levers** (E_1, E_2 , Figure 32) 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 32) 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 34). The half nut must be engaged during the entire threading process when doing metric, diametral, and modular threading.

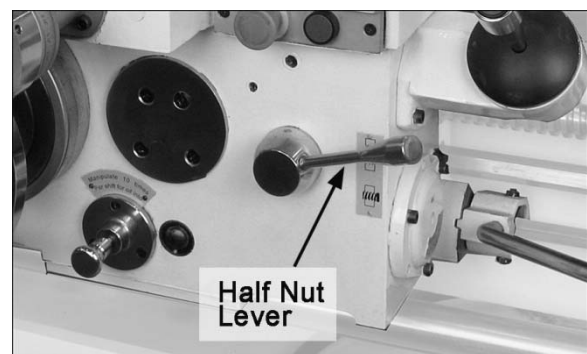


Figure 34

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 (G₁, Figure 32) to  position, and lever (G₃) 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 35. 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.

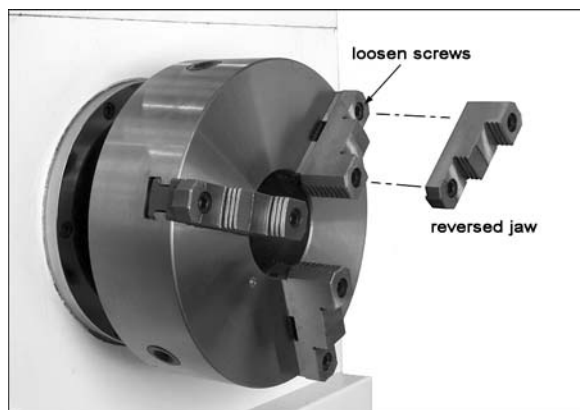


Figure 35 – Chuck jaw reversal

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 36) 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 37). 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.

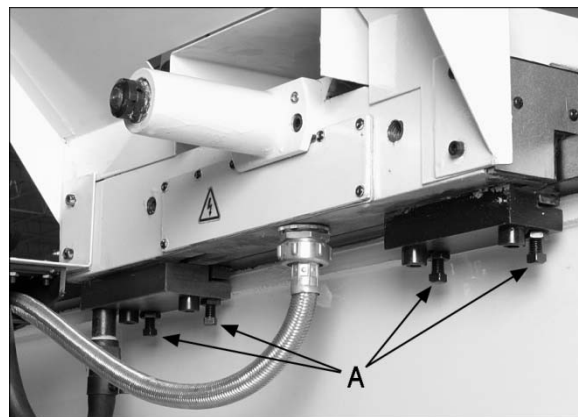


Figure 36 – Saddle sliding plate adjustment

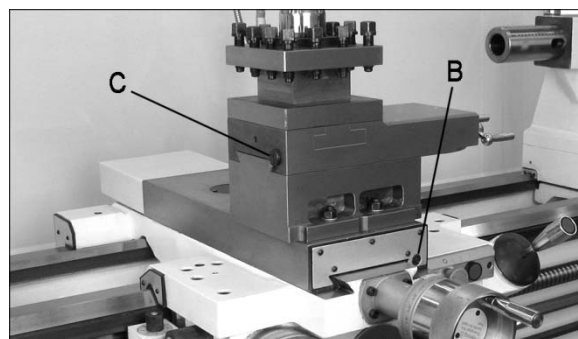


Figure 37 – Gib adjustments, slide and rest

Compound Rest – Gib screws are located at front and rear of the compound rest (C, Figure 37). 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 38). Loosen the jam nuts and rotate the screws clockwise until any backlash is corrected. Then retighten nuts.

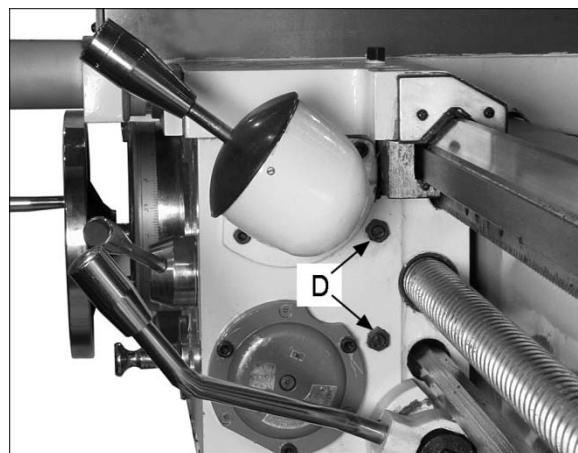


Figure 38 – Half Nut gib adjustment

13.3 Tailstock Adjustments

The tailstock can be offset to cut shallow tapers up to 5° angle. See Figure 39.

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.

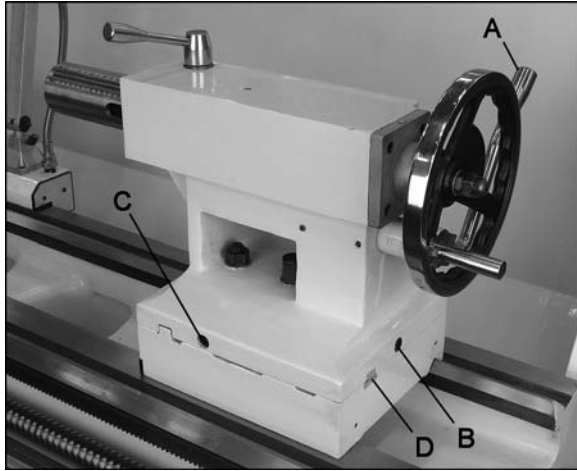


Figure 39 – Tailstock adjustments

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 40) 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.

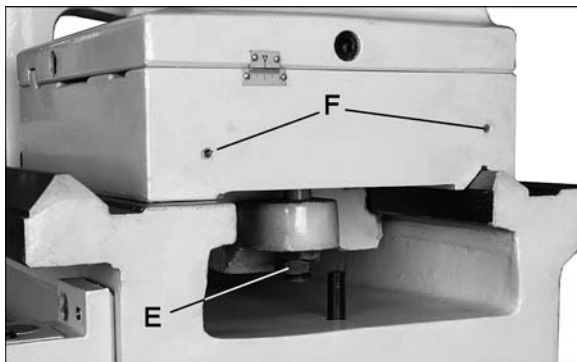


Figure 40 – Tailstock bearing adjustment

13.4 Gap Section

1. To remove the gap section (A, Figure 41), 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 (E₁) down into them, until the pins are loosened enough to be pulled out.
3. Remove the gap section.

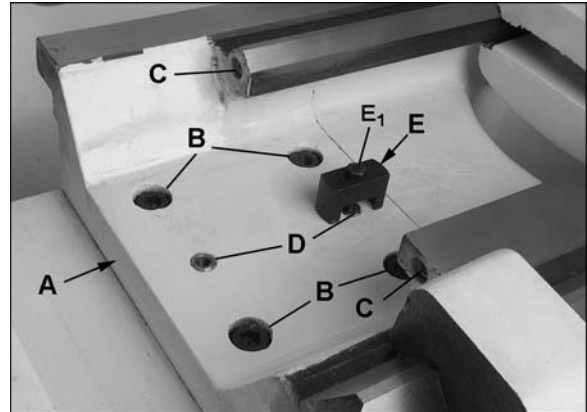


Figure 41 – Gap section

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 42). 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 42) and tightening down upper nut (A, Figure 42) until light finger pressure causes approximately 3/4" deflection on each belt.
7. Install covers and connect lathe to the power source.

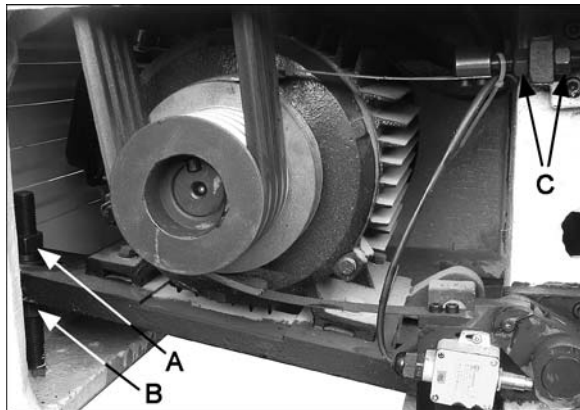


Figure 42 – Belt and brake strap adjustment

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 42) 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.

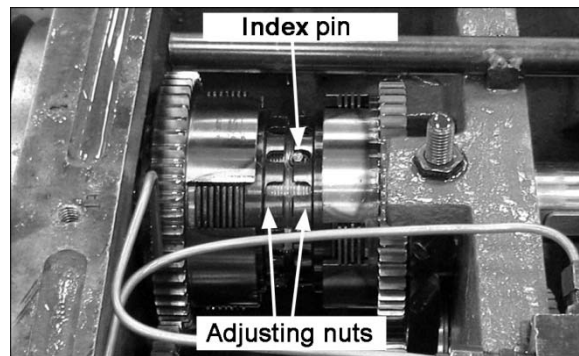


Figure 43 – Spindle Clutch Adjustment

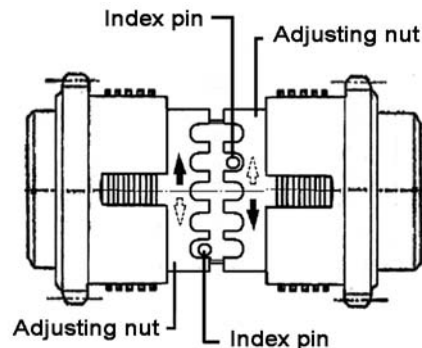


Figure 44 – Spindle Clutch Adjustment

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 43 and 44). 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 45).
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 39) until the tailstock is aligned.

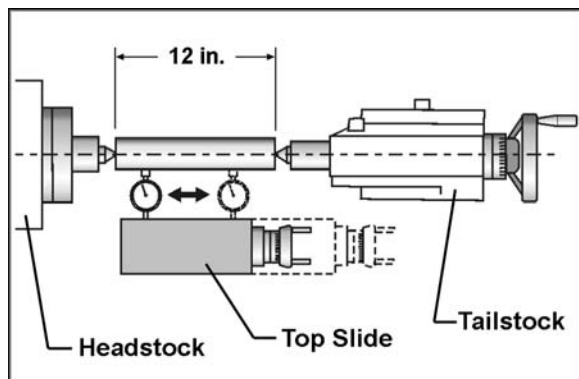


Figure 45 – Tailstock/Headstock alignment

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 46):

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.

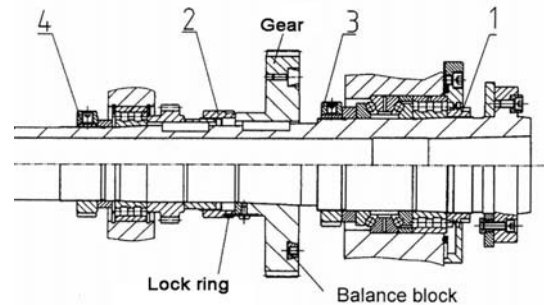


Figure 46 – Spindle bearing adjustment

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 47).

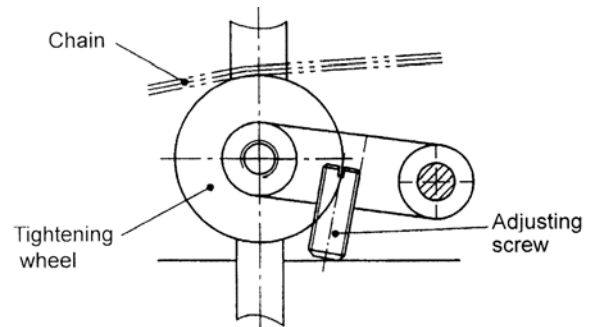


Figure 47 – Speed control chain adjustment

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 48. This is achieved by adjusting the thrust bearings (2 and 3) using the nut (1).

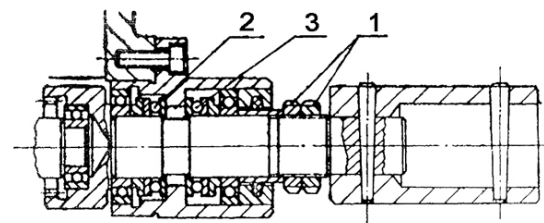


Figure 48 – Lead screw runout adjustment

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 49).

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.

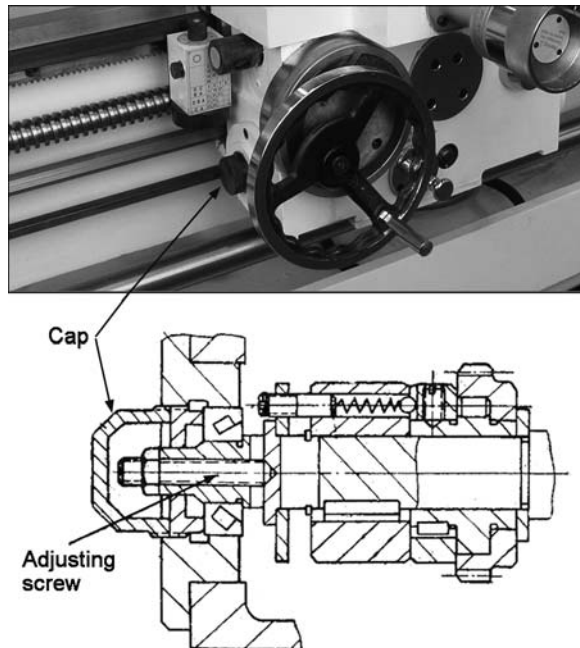


Figure 49 – Feed clutch adjustment

13.13 Tool Post

To allow insertion of tools, the tool post has a one way tooth that elevates a cam and pin, raising the tool post in conjunction with a

positioning pin. The tool post will rise slightly. This raised distance should remain the same after repeated tool changes.

To clamp the tool post, turn the lever clockwise until it tightens.

If the tool post elevation is incorrect, adjust as follows (referring to Figure 50).

1. If the tool post will *not rise far enough* to insert tools, turn the set screw (2) counterclockwise to loosen the spring (3) and steel ball (4).
2. If the tool post *rises too much*, turn the set screw (2) clockwise to tighten the spring (3) and steel ball (4).

To disassemble the tool post, remove screws (1) and (2), take out spring (3) and ball (4). Then remove lever and tool post.

Reverse the above procedure to reinstall the tool post.

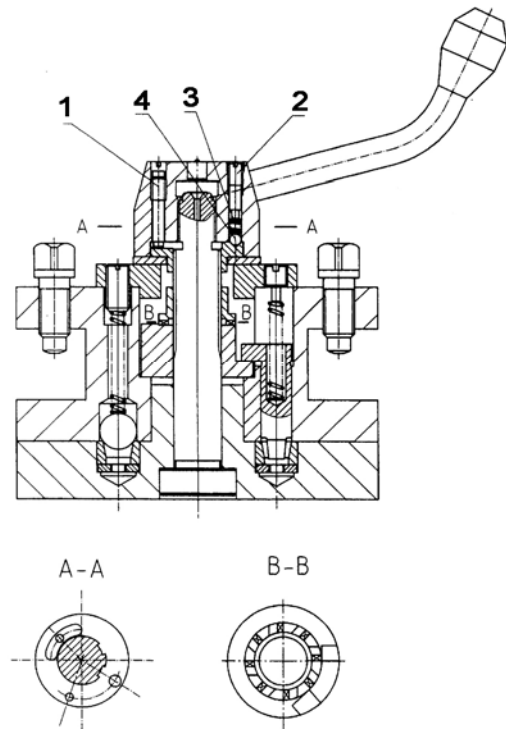


Figure 50 – Tool post adjustment

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 51).

1. Remove dust cover (3).
2. Loosen set screw (1).
3. Tighten socket 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.

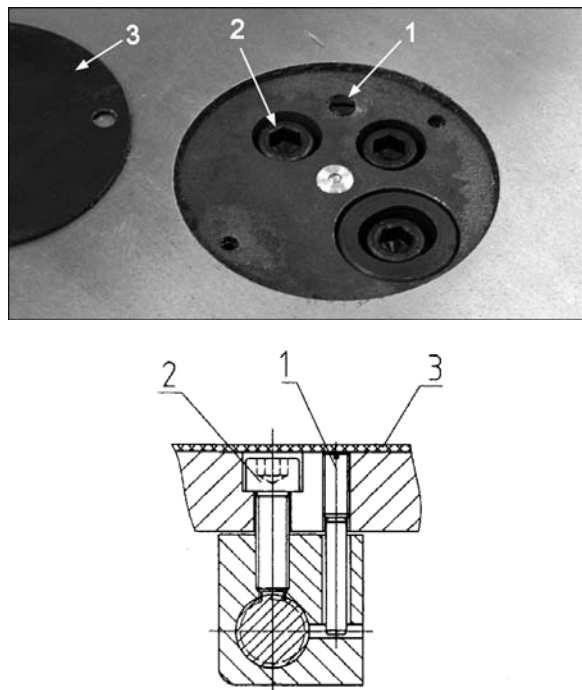


Figure 51 – Cross slide nut adjustment

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 52):

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.*

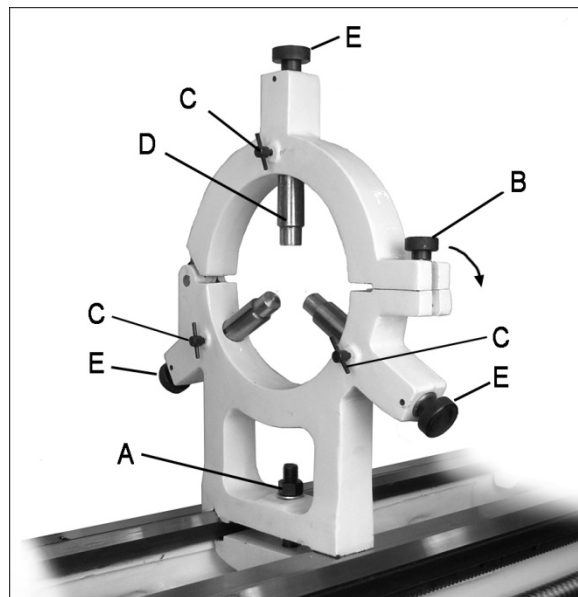


Figure 52 – Steady rest adjustment

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.

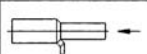
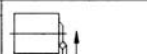
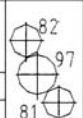
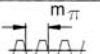
Table 3

Figure/Sect.	Element	Action	Lubricant	Frequency
sect 8.3	Chuck	Grease jaws and scroll	#2 lithium tube grease	periodically
Figure 8		Fill at (1) ball oiler	SAE-20W machine oil	daily
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 12	Tool Post	Fill at (1) ball oiler	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

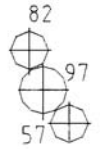
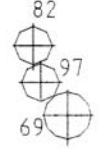
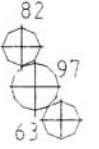
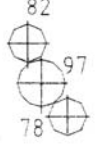
Table 4

																										
n					n					81	t				m				DP				n			
A	A	B	C	D	A	A	B	C	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
.0023	.0033	.0067	.0134	.0264	.0010	.0015	.0029	.0057	.0113	1	1	2	4	8	.05	1	2	4								
.0026	.0037	.0074	.0149	.0298	.0011	.0016	.0032	.0064	.0128	2		2.25	4.5	9			2.25	4.5								
.0027		.0078	.0156	.0309	.0012		.0034	.0068	.0132	3																
.0029	.0041	.0082	.0164	.0331		.0018	.0036	.0072	.0143	4	1.25	2.5	5	10	1.25	2.5	5									
.0030		.0086	.0171	.0342	.0013				.0147	5									56	28	14	7	28	14	7	3½
.0031	.0045	.0089	.0179	.0353		.0019	.0038	.0076	.0151	6													27	13½	6¾	3⅜
.0032		.0093	.0183	.0365	.0014	.0020	.0039	.0079	.0159	7		2.75	5.5	11			2.75	5.5								
.0048	.0100	.0197	.0398	.0625	.0022	.0043	.0087	.0174	.0272	8	1.5	3	6	12	.075	1.5	3	6	48	24	12	6	24	12	6	3
.0052	.0108	.0215	.0435	.0684	.0023	.0047	.0091	.0185	.0295	9									44	22	11	5½	22	11	5½	2¾
.0056	.0112	.0223	.0450	.0713	.0024	.0048	.0095	.0192	.0302	10																
	.0115	.0231	.0465	.0729	.0025	.0050	.0098	.0200	.0314	11	1.75	3.5	7	14	1.75	3.5	7									
.0060	.0119	.0238	.0480	.0751	.0026	.0052	.0102	.0208	.0325	12									40	20	10	5	20	10	5	2½
.0063	.0126	.0252	.0513	.0814	.0028	.0055	.0109	.0219	.0348	13																
			.0531	.0833				.0227	.0359	14									36	18	9	4½	18	9	4½	2¾
			.0599	.0937				.0257	.0404	15									32	16	8	4	16	8	4	2

t = metric threads
n = inch threads
m = modular threads
DP = diametral threads

16.2 Special Inch Lead And Feed

Table 5

																			
n																			
I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
19	9 1/2	4 3/4	2 3/8	23	11 1/2	5 3/4	2 7/8	21	10 1/2	5 1/4	2 5/8	30	15	7 1/2	3 3/4	26	13	6 1/2	3 1/4
																			

16.3 Speed Selection Lever Positions

Table 6

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

17.0 Electrical – 230 volt to 460 volt Conversion

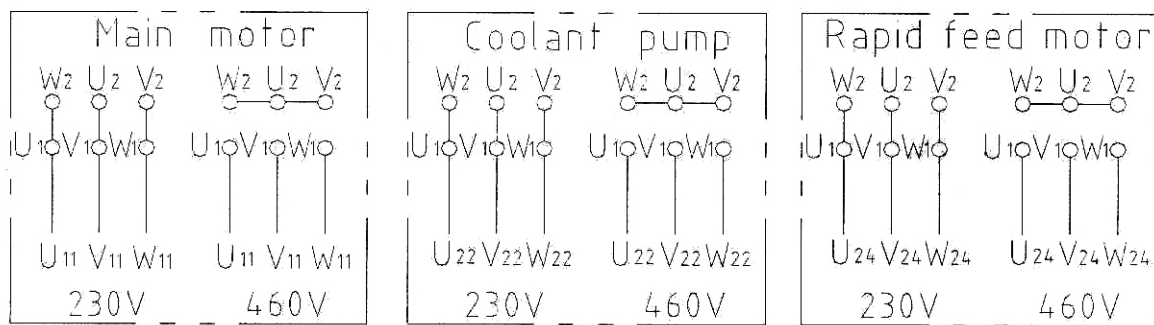


Figure 53

18.0 Change Gear Diagram

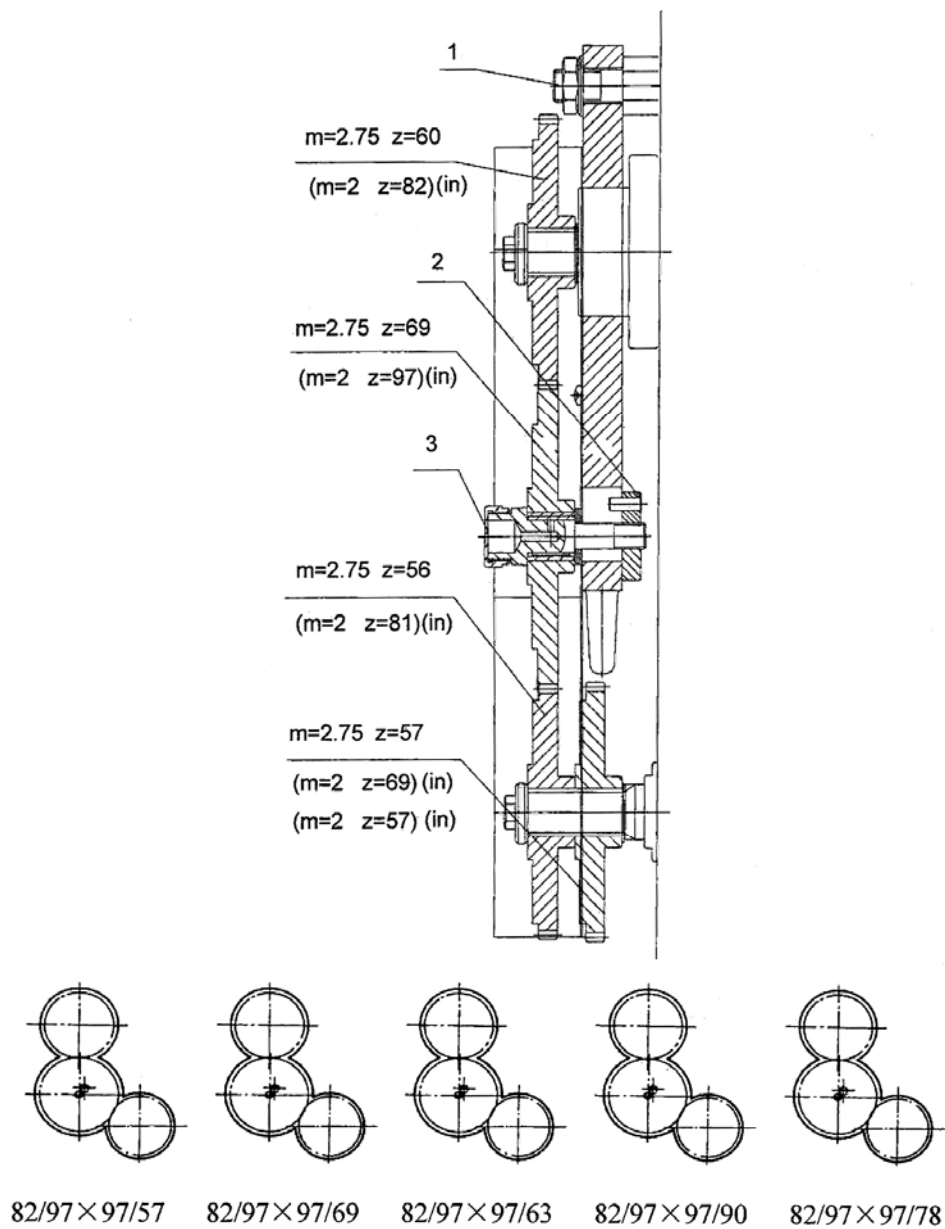


Figure 54

NOTES

NOTES



WALTER MEIER (Manufacturing) Inc.

427 New Sanford Road
LaVergne, Tennessee 37086
Phone: 800-274-6848
www.waltermeier.com



Model No.:	Stock No.:
Serial No.:	
Purchased From:	
Date Purchased:	Date Installed:

Parts List and Electrical Diagrams

ZH Series Large Bore Lathes

Models GH-2680ZH; GH-26120ZH



Model GH-2680ZH shown

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

WALTER MEIER (Manufacturing) Inc.

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Part No. M-321860-1

Revision B 07/2012

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1.0 Warranty and Service

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WARRANTY

JET products carry a limited warranty which varies in duration based upon the product (MW = Metalworking, WW = Woodworking).

90 DAY WARRANTY Lathe Accessories Machine Accessories Mobile Bases Safety Equipment Specialty Items Vise Accessories	1 YEAR WARRANTY Air Tools-Contractor Air Tools-Industrial Air Tools-Light Industrial Lubrication	Body Repair Kits Bottle Jacks Cable Pullers Cold Saws Hoists-Air Hoists-Electric Metal forming Mill/Drills Milling Machines MW Bandsaws MW Drill Presses MW Finishing Equipment MW Lathes MW Precision Vises	2 YEAR WARRANTY Palet Trucks Rigging Equip. Service Jacks Stackers Surface Grinders Tapping Trolleys-Air Trolleys-Electric Web Slings Winches-Electric	3 YEAR WARRANTY WW Benchtop Tools	Beam Clamps Chain Hoist-Manual Lever Hoists Pullers-JCH Models Scissor Lift Tables Screw Jacks Trolleys-Geared Trolleys-Plain Winches-Manual WW Air Filtration WW Bandsaws WW Buffers	5 YEAR WARRANTY WW Drill Presses WW Dust Collectors WW Dust Filters WW Dust Fittings WW Jointers WW Lathes WW Planers WW Sanders WW Shapers WW Tablesaws	LIFE WARRANTY Fastening Tools Mechanics Hand Tools Striking Tools Vises (no-precision) Clamps
Warranty reverts to 1 Year Warranty if woodworking (WW) products listed above are used for industrial or educational purposes.							

WHAT IS COVERED?

This warranty covers any defects in workmanship or materials subject to the exceptions stated below. Cutting tools, abrasives and other consumables are excluded from warranty coverage.

WHO IS COVERED?

This warranty covers only the initial purchaser of the product.

WHAT IS THE PERIOD OF COVERAGE?

The general JET warranty lasts for the time period specified in the product literature of each product.

WHAT IS NOT COVERED?

Five Year Warranties do not cover woodworking (WW) products used for commercial, industrial or educational purposes. Woodworking products with Five Year Warranties that are used for commercial, industrial or education purposes revert to a One Year Warranty. This warranty does not cover defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair or alterations, or lack of maintenance.

HOW TO GET SERVICE

The product or part must be returned for examination, postage prepaid, to a location designated by us. For the name of the location nearest you, please call 1-800-274-6848.

You must provide proof of initial purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will repair or replace the product, or refund the purchase price, at our option. We will return the repaired product or replacement at our expense unless it is determined by us that there is no defect, or that the defect resulted from causes not within the scope of our warranty in which case we will, at your direction, dispose of or return the product. In the event you choose to have the product returned, you will be responsible for the shipping and handling costs of the return.

HOW STATE LAW APPLIES

This warranty gives you specific legal rights; you may also have other rights which vary from state to state.

LIMITATIONS ON THIS WARRANTY

WALTER MEIER (MANUFACTURING) INC., LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF THE LIMITED WARRANTY FOR EACH PRODUCT. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS ARE EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG THE IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

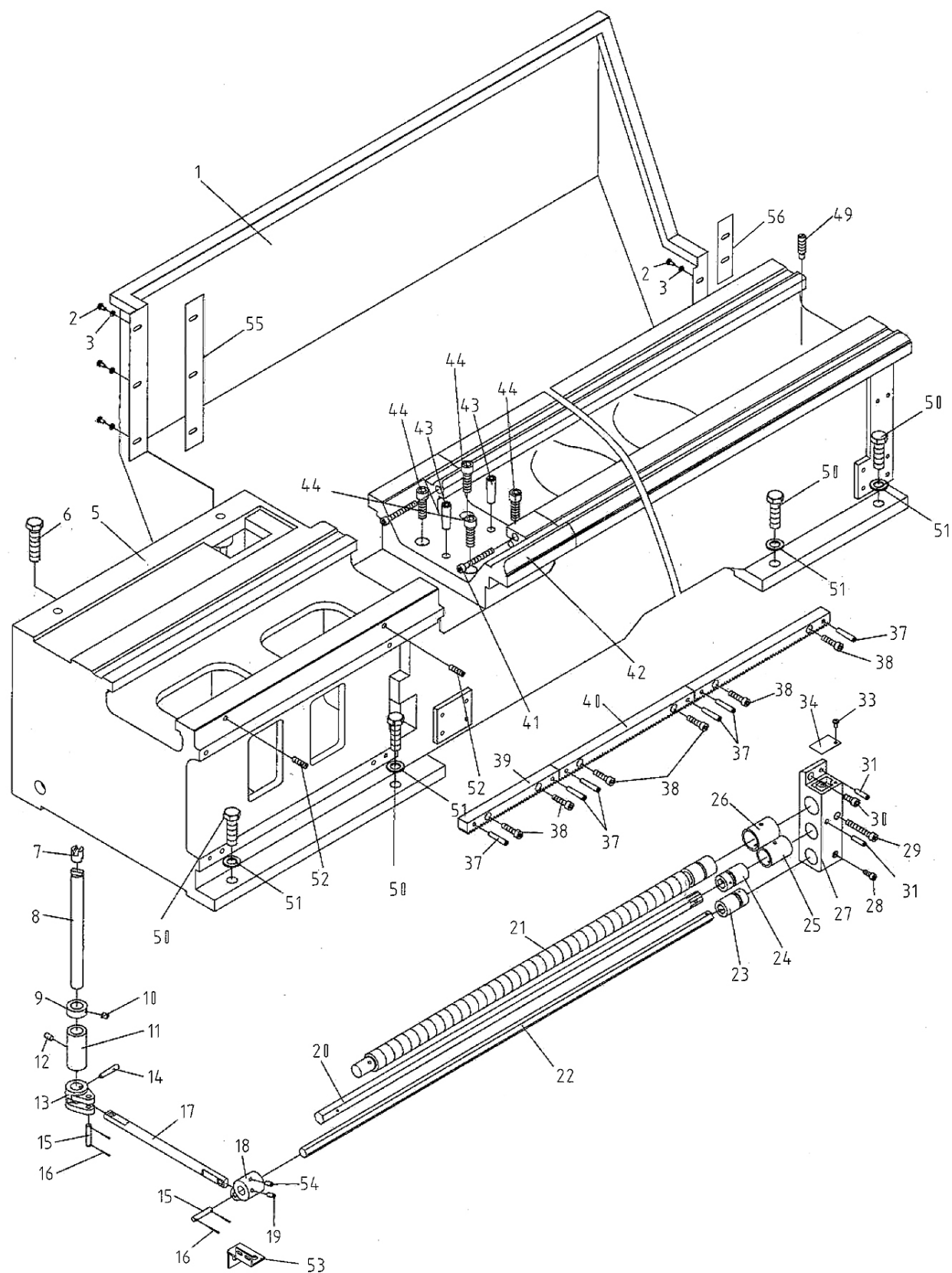
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Walter Meier sells through distributors only. The specifications in Walter Meier catalogs are given as general information and are not binding. Members of Walter Meier reserve the right to effect at any time, without prior notice, those alterations to parts, fittings, and accessory equipment which they may deem necessary for any reason whatsoever. JET®-branded products are not sold in Canada by Walter Meier.

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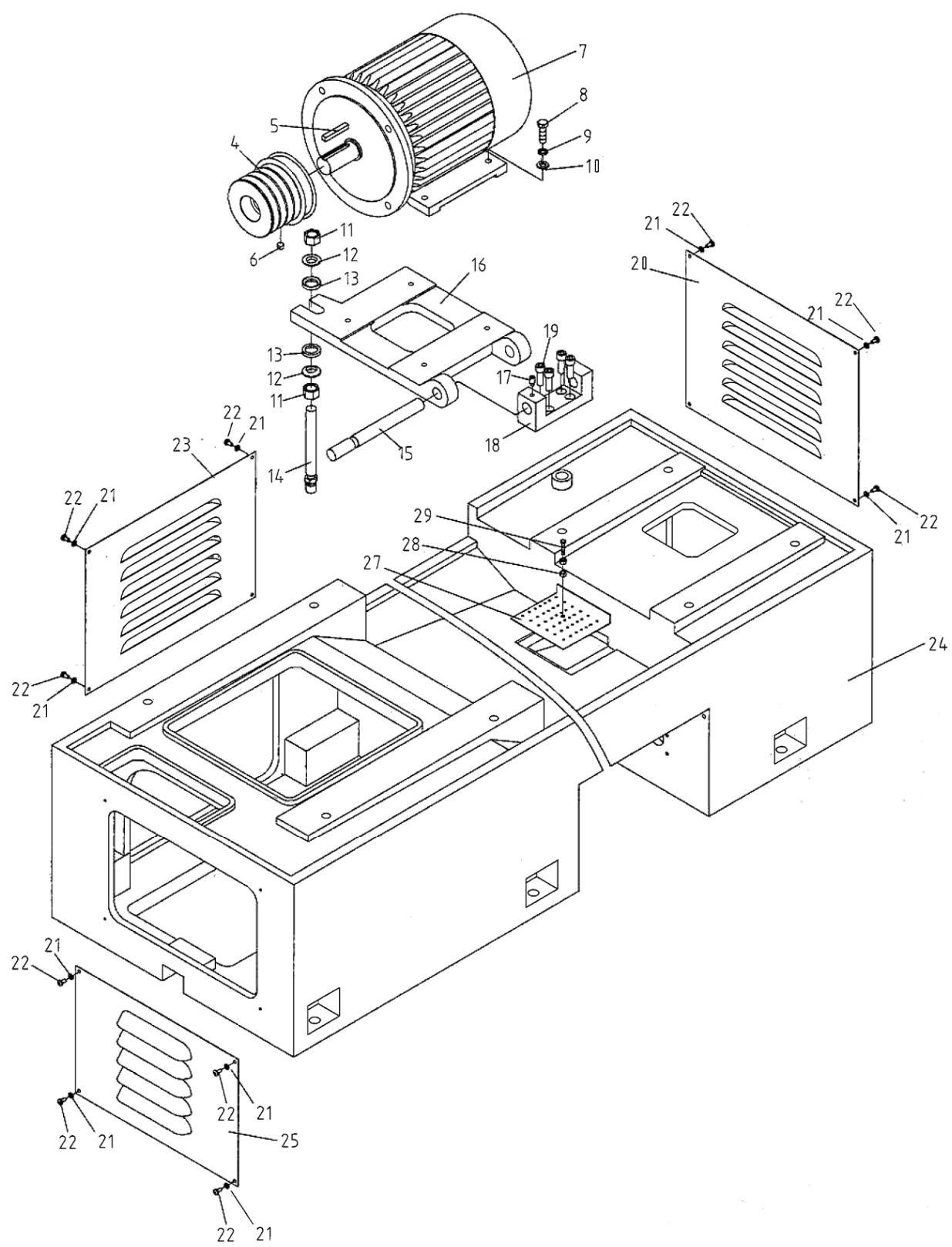
3.0 Bed Assembly I – Exploded View



3.1 Bed Assembly I – Parts List

Index No.	Part No.	Description	Size	Qty
1	C6266C12701C	Splash Guard (80" ZH only)	80"	1
	C6266C12701D	Traveling Splash Guard (120" ZH only)	24"	1
2	TS-1503011	Hex Socket Cap Screw	M6x8	8
3	TS-1550041	Flat Washer	6 mm	8
5	C6266C01101C	Bed (for 80" ZH only)	80"	1
	C6266C01101D	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	GB71-M10x20	Slotted Set Screw	M10x20	1
13	C6140W01104	Crank		1
14	GB118-8x50	Taper Pin	8x50 mm	1
15	GB71-M10x14	Slotted Set Screw	M10x14	2
16	GB91-2x16	Split Pin	2x16 mm	4
17	C6140W01711A	Pulling Rod		1
18	C6266C01106	Sleeve		1
19	GB71-M8x16	Slotted Set Screw	M8x16	1
20	C6266C01703C	Hex Feed Rod (for 80" ZH only)		1
	C6266C01703D	Hex Feed Rod (for 120" ZH only)		1
21	C6266C01702C	Lead Screw (for 80" ZH only)		1
	C6266C01702D	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
24	C6140W01725	Sleeve		1
25	C6140W01302	Bronze Bushing		1
26	C6140W01301	Bronze Bushing		1
27	C6140W01109	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
32	TS-1550041	Flat Washer	6 mm	8
33	TS-1503011	Hex Socket Cap Screw	M6x8	8
34	C6140W01726	Cover		1
37	C-GB11876845	Taper Pin	8x45 mm	6
38	TS-1505051	Hex Socket Cap Screw	M10x35	6
39	C6266C01704	Rack (both models)		1
40	C6140W01719	Rack (for 80" ZH)		5
	C6140W01719	Rack (for 120" ZH)		8
41	GB70-M10x85	Hex Socket Cap Screw	M10x85	2
42	C6266C01103	Gap		1
43	C-GB11876845	Taper Pin	16x60 mm	2
44	GB70-M16x50	Hex Socket Cap Screw	M16x50	4
49	C6140W01733	Pin		1
50	GB5782-M20x80	Hex Bolt	M20x80	4
51	GB97.2-20	Flat Washer	20 mm	8
52	GB85-M12x75	Set Screw	M12x75	2
53	C6266C18716	Bracket		1
54	C6266C01718	Nut		1
55	C6266CLRG80	Rubber Gasket (for 80" ZH only)		1

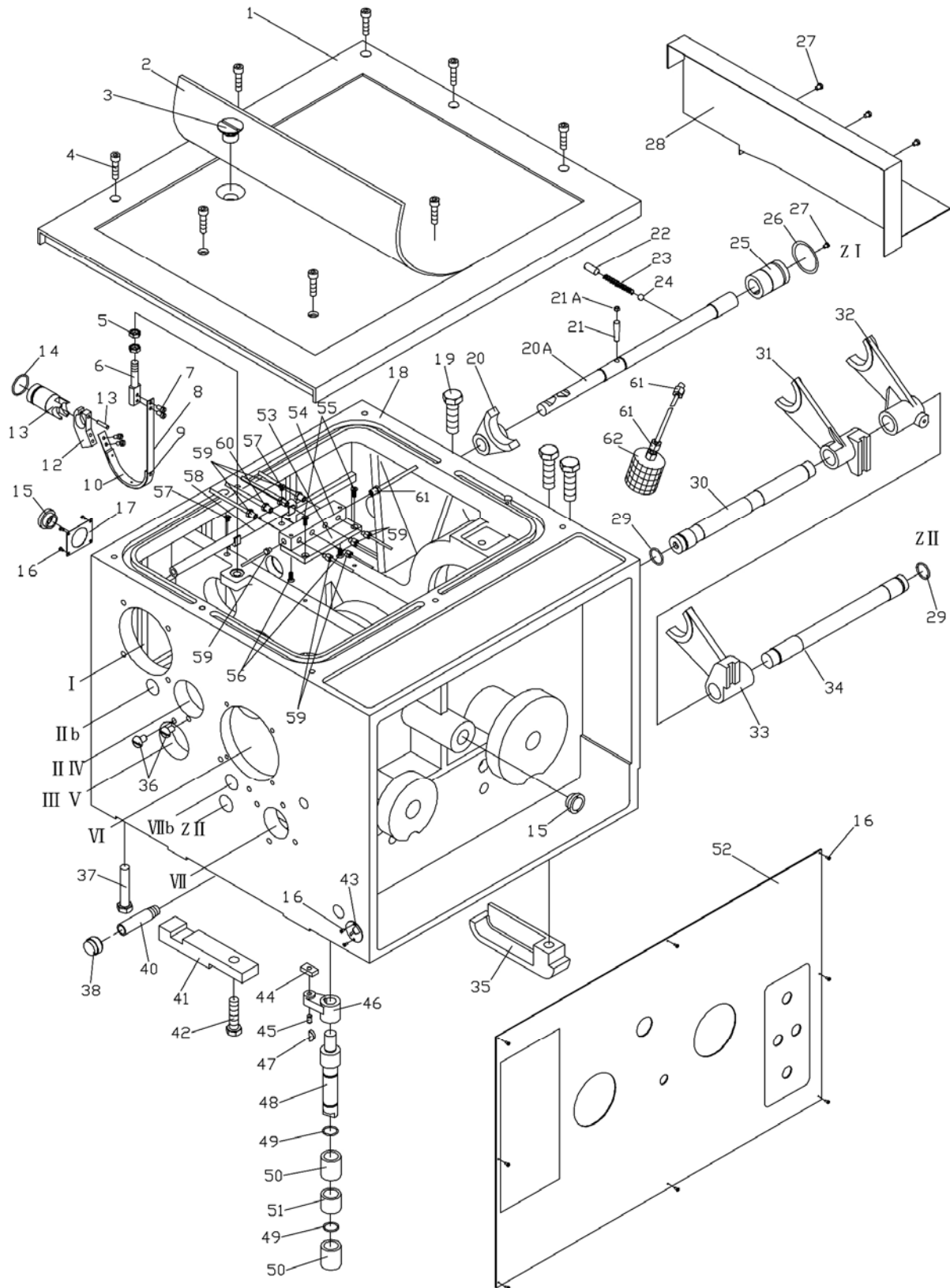
4.0 Bed Assembly II – Exploded View



4.1 Bed Assembly II – Parts List

Index No.	Part No.	Description	Size	Qty
4.....	C6266C01105.....	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.....	GB850-20	Taper Washer	20 mm.....	2
13.....	GB849-20	Spherical Washer	20 mm.....	2
14.....	C6140W01714.....	Double Bolt		1
15.....	C6266C01711.....	Shaft		1
16.....	C6266C01104.....	Motor Mounting Plate		1
17.....	GB75-M10x14.....	Slotted Set Screw.....	M10x14	1
18.....	C6266C01107.....	Support		1
19.....	TS-1506041	Hex Socket Cap Screw.....	M12x35	4
20.....	C6266C01701.....	Cover.....		1
21.....	TS-1550041.....	Flat Washer.....	6 mm	12
22.....	GB818-M6x5.....	Cross Head Screw	M6x5	12
23.....	C6266C01710.....	Cover.....		1
24.....	C6266C01102C	Bed Stand (for 80" ZH only).....		1
.....	C6266C01108.....	Front Bed Stand (for 120" ZH only).....		1
.....	C6266C01109.....	Middle Bed Stand (for 120" ZH only).....		1
.....	C6266C01110.....	Rear Bed Stand (for 120" ZH only)		1
25.....	C6266C01707.....	Cover.....		1
27.....	1440R01705	Drain Plate		1
28.....	TS-1540041	Hex Nut.....	M6.....	1
29.....	TS-1482041	Hex Cap Screw	M6x20	1
30.....	JETLOGO-1.....	JET Nameplate (not shown)		1
31.....	STRIPE-1-3/4	Stripe (not shown)		per ft.

5.0 Headstock Assembly I – Exploded View

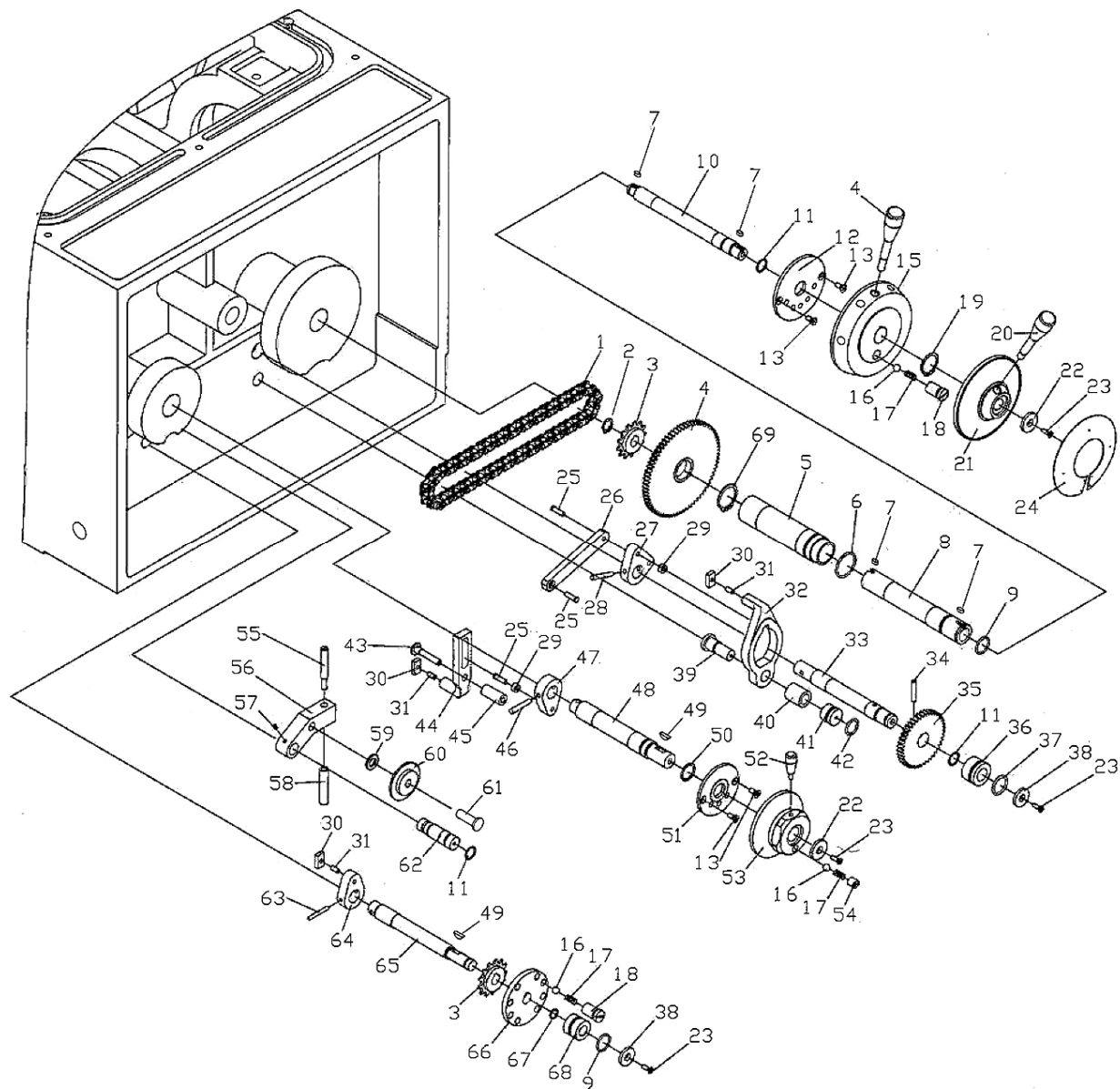


5.1 Headstock Assembly I – Parts List

Index No.	Part No.	Description	Size	Qty
1	C6266C02502	Headstock Cover		1
2	C6266C02501	Rubber Mat		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	Oil Glass		2
16	GB818-M3x4	Cross Recessed Pan Head Screw	M3x4	7
17	C6266C02306	Sign Plate – Oil Level		1
18	C6266C02101	Headstock		1
19	GB5782-M20x75	Hexagon Head Bolt	M20x75	3
20	C6266C02125	Fork		1
20A	C6266C02721	Control Shaft		1
21	GB118-8x40	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 mm	1
24	SB-10MM	Steel Ball	10 mm	1
25	C6140W02105	Bushing		1
26	GB3452.1-38.7x3.55	O-Ring	38.7x3.55 mm	1
27	GB818-M6x8	Cross Head Screw	M6x8	1
28	C6266C02757	Cover		1
29	GB3452.1-26.5x2.65	O-Ring	26.5x2.65 mm	1
30	C6266C02761	Control Shaft		1
31	C6266C02128	Fork		1
32	C6266C02124	Fork		1
33	C6266C02120	Fork		1
34	C6266C02762	Control Shaft		1
35	C6140W02141	Front Cover		1
36	C6140W02711	Screw		3
37	GB5782-M16x80	Hexagon Head Bolt	M16x80	2
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 Plate		1
44	C6140W02143	Sliding Block		1
45	GB119-N6x20	Pin	n6x20 mm	1
46	C6140W02129	Rocker		1
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)		1
	GH26120ZH-52	Headstock Label Panel (for 120" ZH only)		1
53	C6140W02837	Board		1
54	C6140W02836	Oil Distributor		1

Index No.	Part No.	Description	Size	Qty
55.....	GB819-M5x10.....	Cross Recessed Hd Countersunk Screw M5x10.....		2
56.....	GB819-M6x14.....	Cross Recessed Hd 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

6.0 Headstock Assembly II – Exploded View

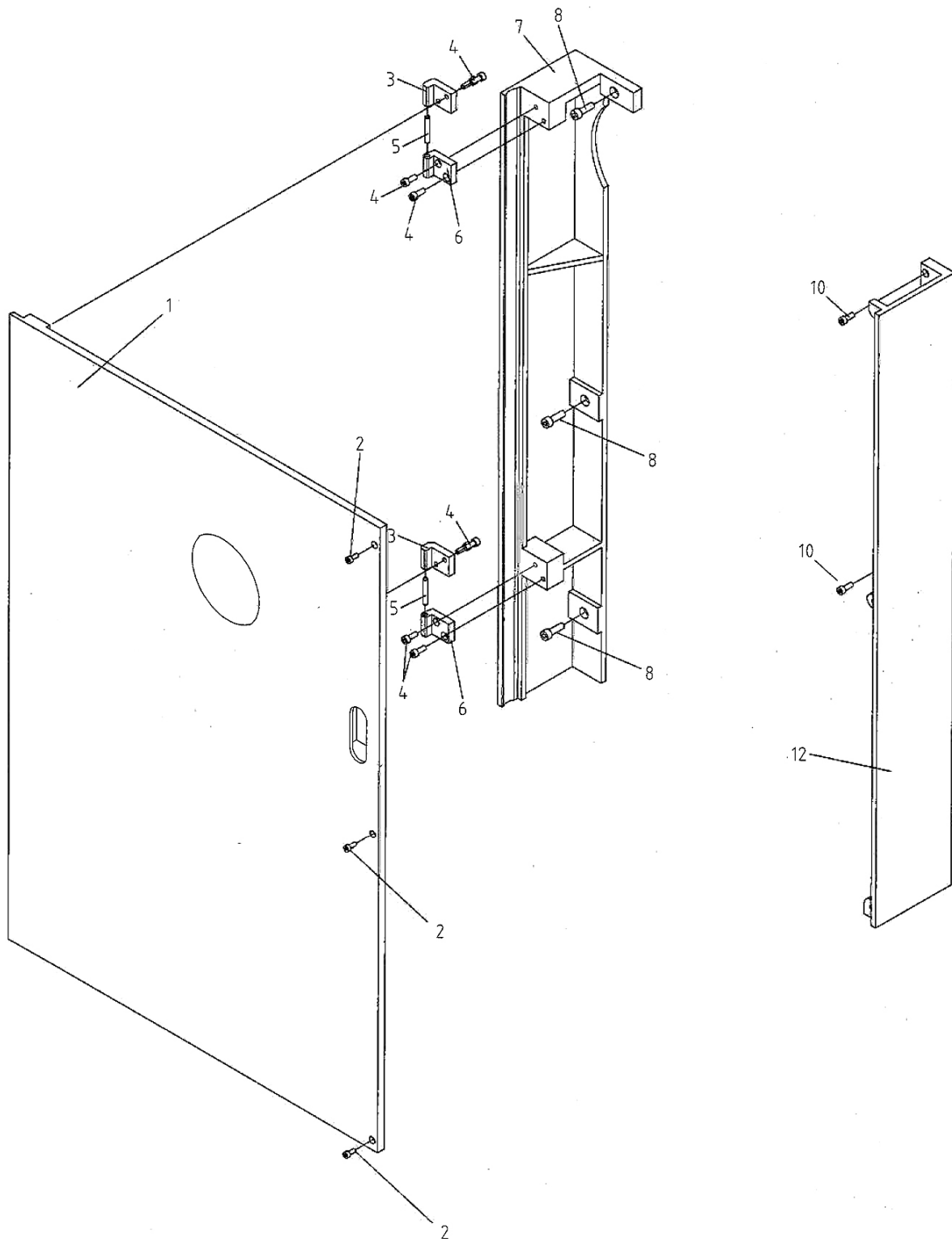


6.1 Headstock Assembly II – Parts List

Index No.	Part No.	Description	Size	Qty
1	C6266CHA01	Chain	12.7 x 58	1
2	GB894.1-16	Circlip 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 Hd Countersunk Screw	M6x14	4
14	C6140W02799	Lever		1
15	C6266C02114	Lever Support		1
16	SB-10MM	Steel Ball	10 mm	3
17	Q81-1-1.6x8x18	Spring	1.6x8x18 mm	3
18	C6266C02754	Positioning Screw		2
19	GB894.1-30	Circlip for Shaft	30 mm	1
20	C6140W02801	Lever		1
21	C6140W02123	Lever Support		1
22	C6140W02821	Washer		2
23	GB819-M5x16	Cross Recessed Hd Countersunk Screw	M5x16	6
24	C6266C02304	Speed Label		1
25	C6140W02813	Pin		3
26	C6266C02775	Connector		1
27	C6266C02121	Rocker		1
28	GB117-6x45	Taper Pin	6x45 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	6x35 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	6x40 mm	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
52	C6140W02822	Lever		1
53	C6266C02115	Lever Support		1
54	GB73-M12x14	Set Screw	M12x14	1
55	C6266C02774	Bolt		1
56	C6266C02129	Rocker		1

Index No.	Part No.	Description	Size	Qty
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.....	5x40 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.....	Circlip for Shaft.....	35 mm.....	1

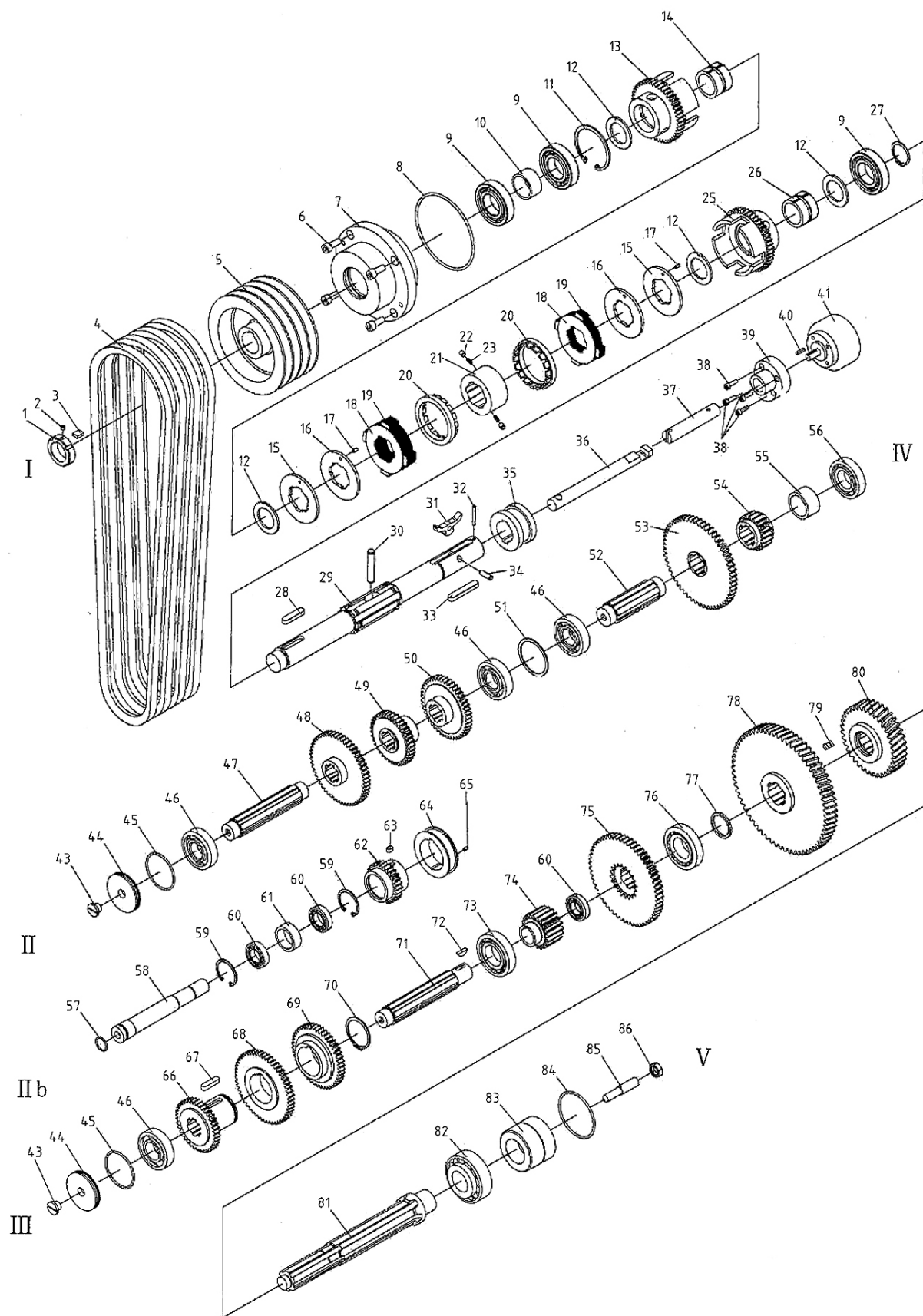
7.0 Headstock Assembly III – Exploded View



7.1 Headstock Assembly III – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	C6266C08501.....	Back Cover		1
2.....	TS-1502031	Hex Socket Cap Screw.....	M5x12	3
3.....	C6266C08706.....	Upper Hinge.....		2
4.....	TS-2205201	Hex Socket Cap Screw.....	5x20 mm	2
5.....	GB119-6h8x40.....	Pin	6h8x40 mm	2
6.....	C6266C08707.....	Lower Hinge.....		2
7.....	C6266C08504.....	Rear Side Plate.....		1
8.....	TS-1503041	Hex Socket Cap Screw.....	M6x16	8
10.....	TS-1503031	Hex Socket Cap Screw.....	M6x14	2
12.....	C6266C08711A	Lower Front Side Plate		1

8.0 Headstock Assembly IV – Exploded View

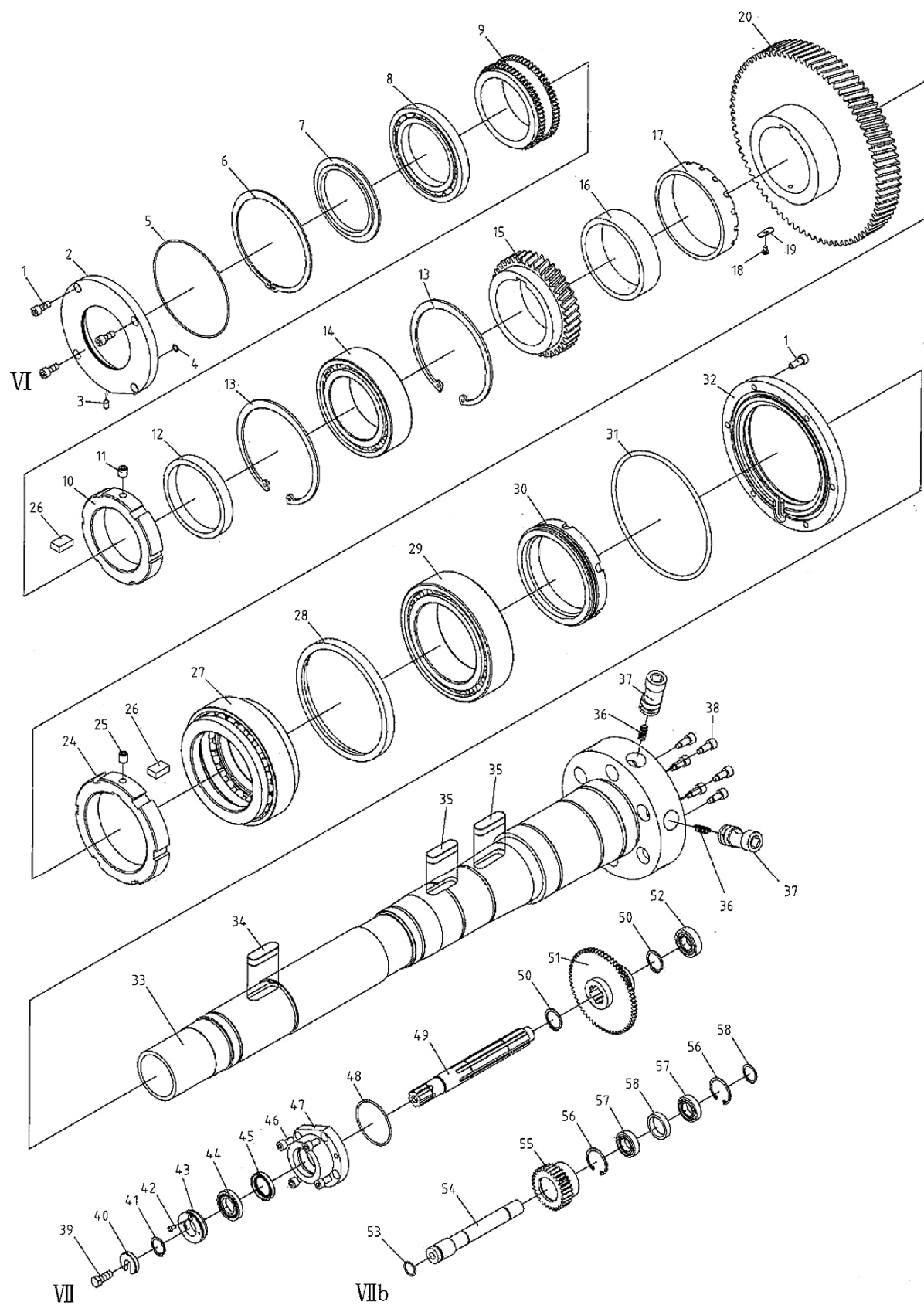


8.1 Headstock Assembly IV – Parts List

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	GB3452.1-125x3.55	O-Ring	125x3.55 mm	1
9	BB-6208	Ball Bearing	6208	3
10	C6266C02106	Spacer		1
11	GB894.1-40	Circlip 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		13
19	C6140W02745	Outer Friction Disc		11
20	C6140W02741	Adjusting Nut		2
21	C6266C02727	Spline Sleeve		1
22	C6140W02744	Stop Pin		2
23	Q81-1-0.8x5x16	Spring	0.8x5x16	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	C6266C02731	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
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
57	GB3452.1-25x2.65	O-Ring	25x2.65 mm	1
58	C6266C02729	Shaft (IIb)		1

Index No.	Part No.	Description	Size	Qty
59	GB893.1-47	Circlip	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
73	BB-6208	Ball Bearing	6208	1
74	C6266C02717	Gear		1
75	C6266C02716A	Gear		1
76	BB-32208	Bearing	32208	1
77	C6266C02779	Circlip 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

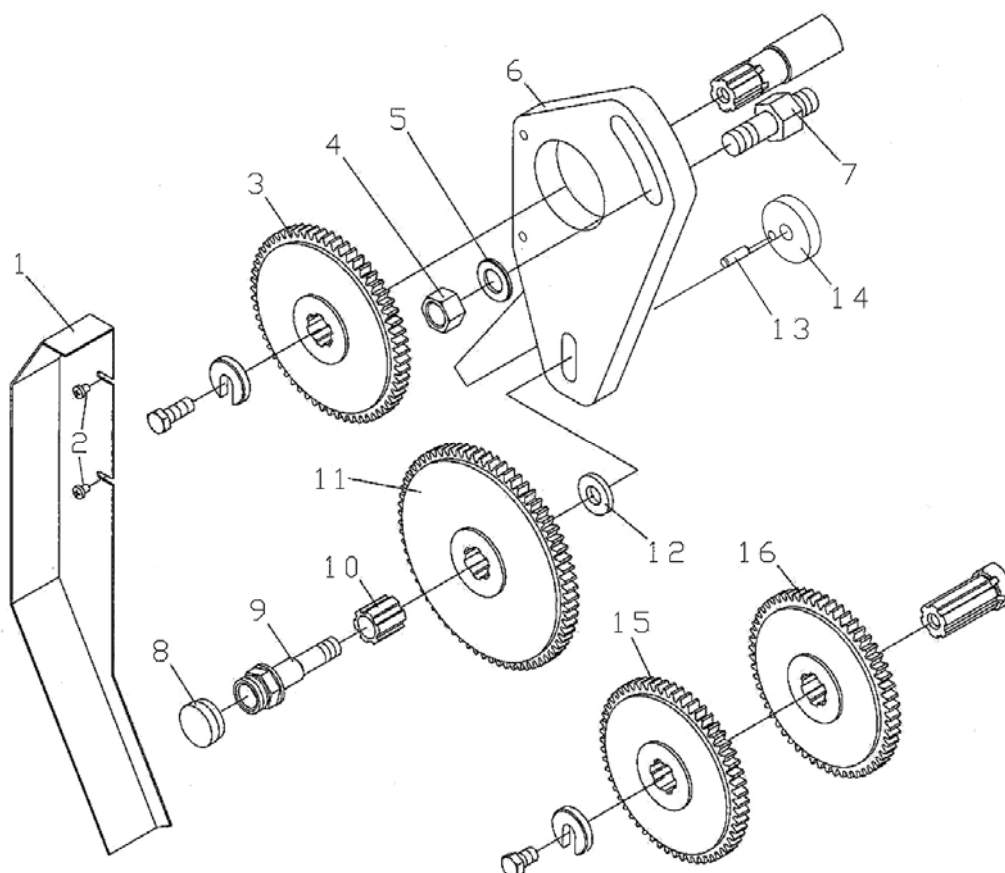
9.0 Headstock Assembly V – Exploded View



9.1 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 mm	1
4	G51-2A-12x1.9	O-Ring	12x1.9 mm	4
5	GB3452.1-180x2.65	O-Ring	18x2.65 mm	1
6	GB894.1-120	Circlip for Shaft	120 mm	1
7	C6266C02744	Bearing Back Circlip		1
8	16024	Ball Bearing	16024	1
9	C6266C02743	Double Gear		1
10	C6266C02702	Round Nut		1
11	TS-1526011	Hex Socket Cap Screw	M12x12	3
12	C6266C02703	Circlip		1
13	GB893.1-200	Circlip for Bore	200 mm	2
14	NN3026K	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		1
20	C6266C02707	Gear		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 Circlip		1
29	NN3030K	Bearing		1
30	C6266C02710	Round Nut		1
31	GB3452.1-250x5.3	O-Ring	250x5.3 mm	1
32	C6266C02102	Front Flange Cover		1
33	C6266C02701	Spindle		1
34	GB1096-10x40	Flat Key	10x40 mm	1
35	GB1096-10x50	Flat Key	10x50 mm	2
36	Q81-1-1x8x16	Spring	1x8x16	6
37	C6266C02711	Cam		6
38	C6266C02712	Positioning Screw		6
39	TS-1492021	Hex Cap Screw	M12x30	1
40	GB851-12	Split Washer	12 mm	1
41	GB894.1-30	Circlip for Shaft	30 mm	1
42	GB68-M5x12	Slotted Head Screw	M5x12	1
43	C6140W02776	Adjusting Screw		1
44	BB-6006	Ball Bearing	6006	1
45	GB13871-B-35x51x8	Oil Seal	B-35x51x8 mm	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	Circlip	35 mm	2
51	C6266C02746	Gear		1
52	BB-6205	Ball Bearing	6205	1
53	GB3452.1-25x2.65	O-Ring	25x2.65 mm	1
54	C6266C02748	Shaft (VIIb)		1
55	C6266C02745	Gear		1
56	GB893.1-47	Circlip for Bore	47 mm	2
57	BB-6005	Ball Bearing	6005	2
58	GB894.1-25	Circlip for Shaft	25 mm	1
59	C6266C02109	Sleeve		1

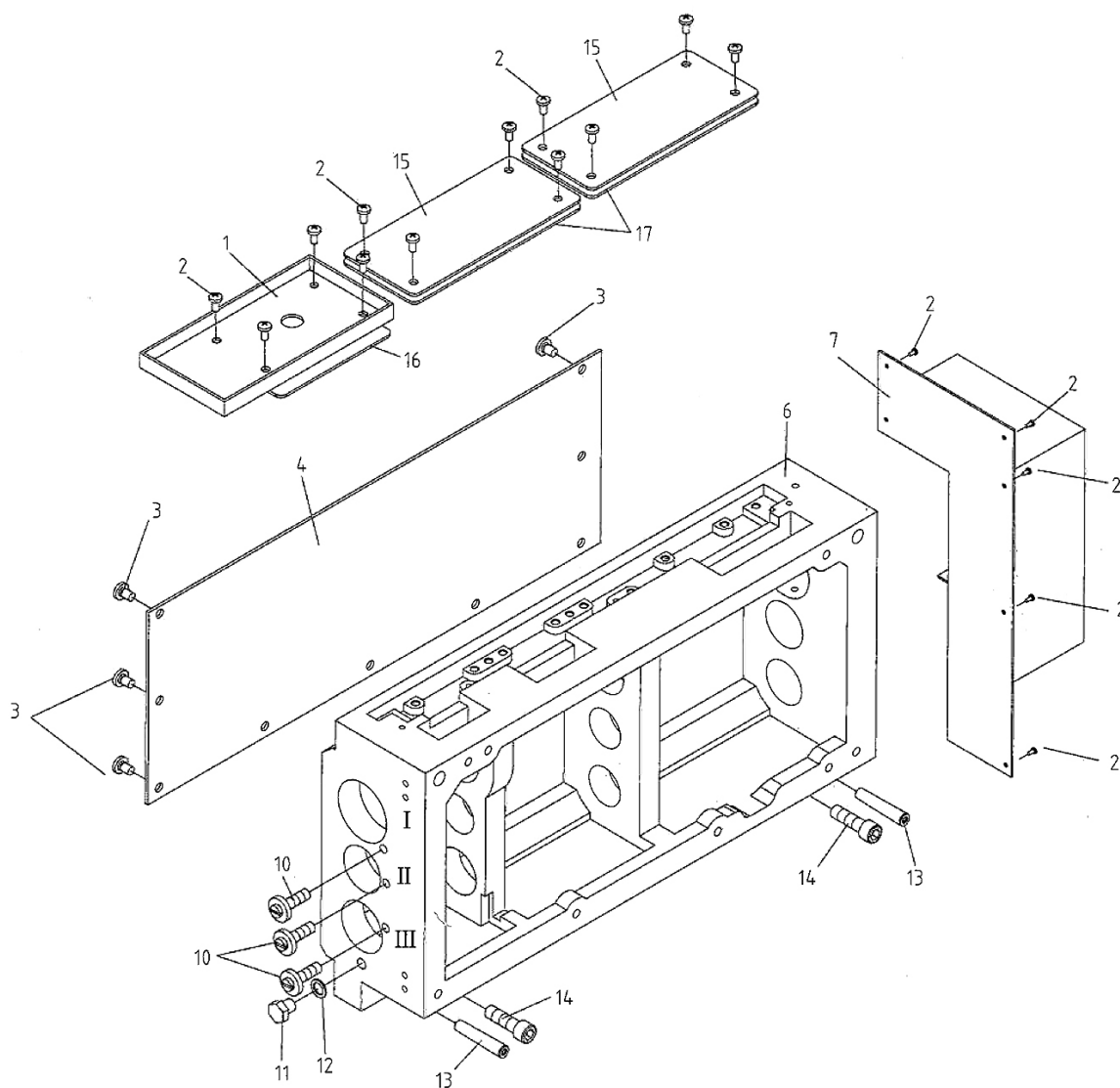
10.0 Gear Assembly – Exploded View



10.1 Gear Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	C6266C08708.....	Splash Guard.....		1
2.....	GB818-M6x8.....	Screw.....	M6x8.....	2
3.....	C6266C08702.....	Gear (in.).....	2m82T.....	1
4.....	GB6172-M20.....	Hex Nut.....	M20.....	1
5.....	GB97.2-20.....	Washer.....	20 mm.....	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 mm.....	1
14.....	C6140W08704.....	Position Nut.....		1
15.....	C6266C08703.....	Gear (in.).....	2m81T.....	1
16.....	C6266C08704.....	Gear (in.).....	2m57T.....	1
16-2.....	C6266C08716.....	Gear (in.).....	2m69T.....	1
16-3.....	C6266C08717-63.....	Gear (in.).....	2m63T.....	1
16-4.....	C6266C08717-90.....	Gear (in.).....	2m90T.....	1
16-5.....	C6266C08717-78.....	Gear (in.).....	2m78T.....	1

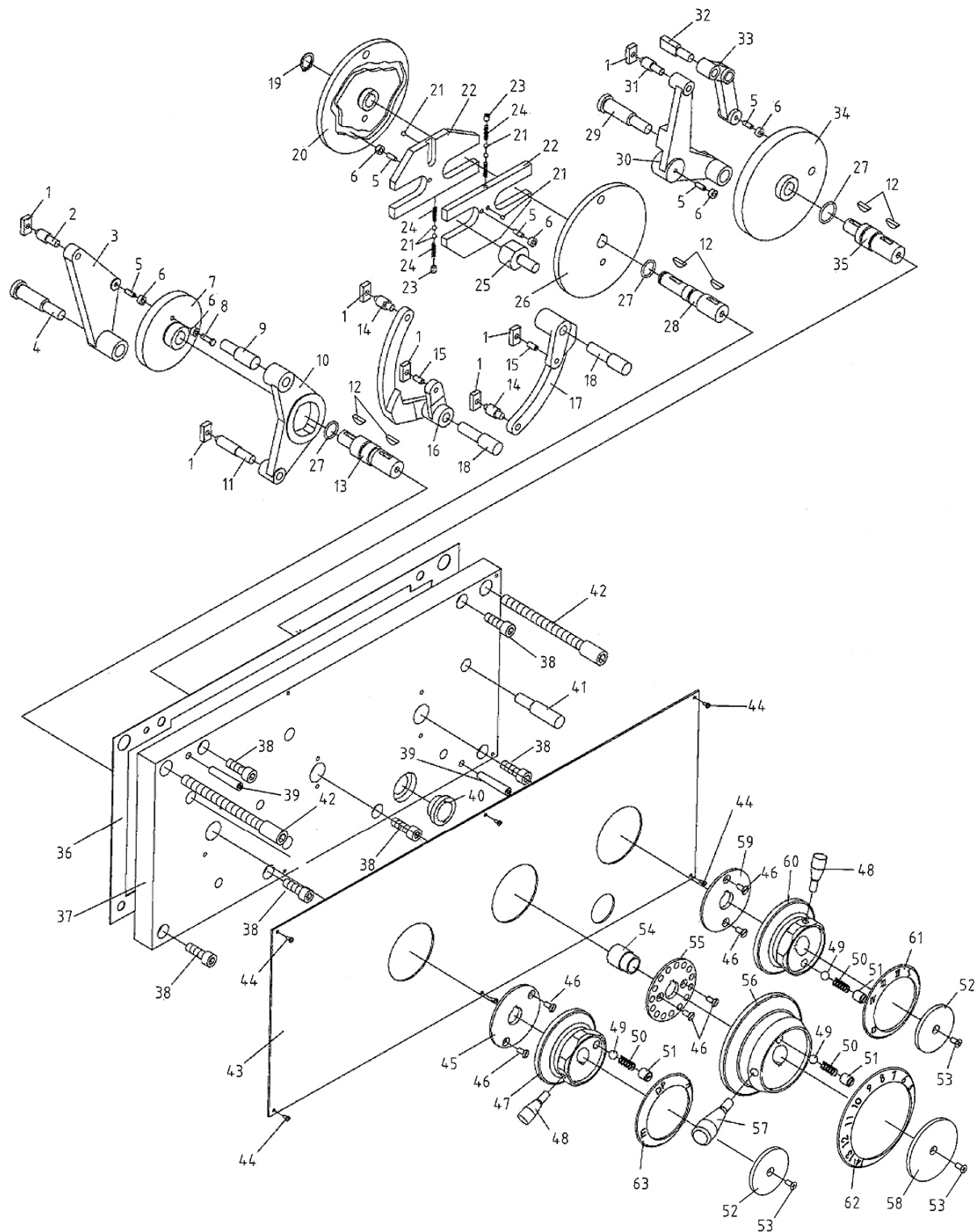
11.0 Gear Box Assembly I – Exploded View



11.1 Gear Box Assembly I – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	C6140W05504.....	Upper Cover.....		1
2.....	TS-1534032.....	Cross Recessed Pan Head Screw.....	M6x10.....	14
3.....	TS-1490011.....	Hex Cap Screw.....	M8x12.....	9
4.....	C6140W05A729.....	Back Cover.....		1
6.....	C6140W05A101.....	Feed Box Casting.....		1
7.....	C6266C05765J.....	Side Splash Guard.....		1
10.....	C6140W05A728.....	Bolt with Washer.....		3
11.....	G38-2A-M12x1.5.....	Hex Cap Screw.....	M12x1.5.....	1
12.....	TS-2360121.....	Washer.....	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

12.0 Gear Box Assembly II – Exploded View

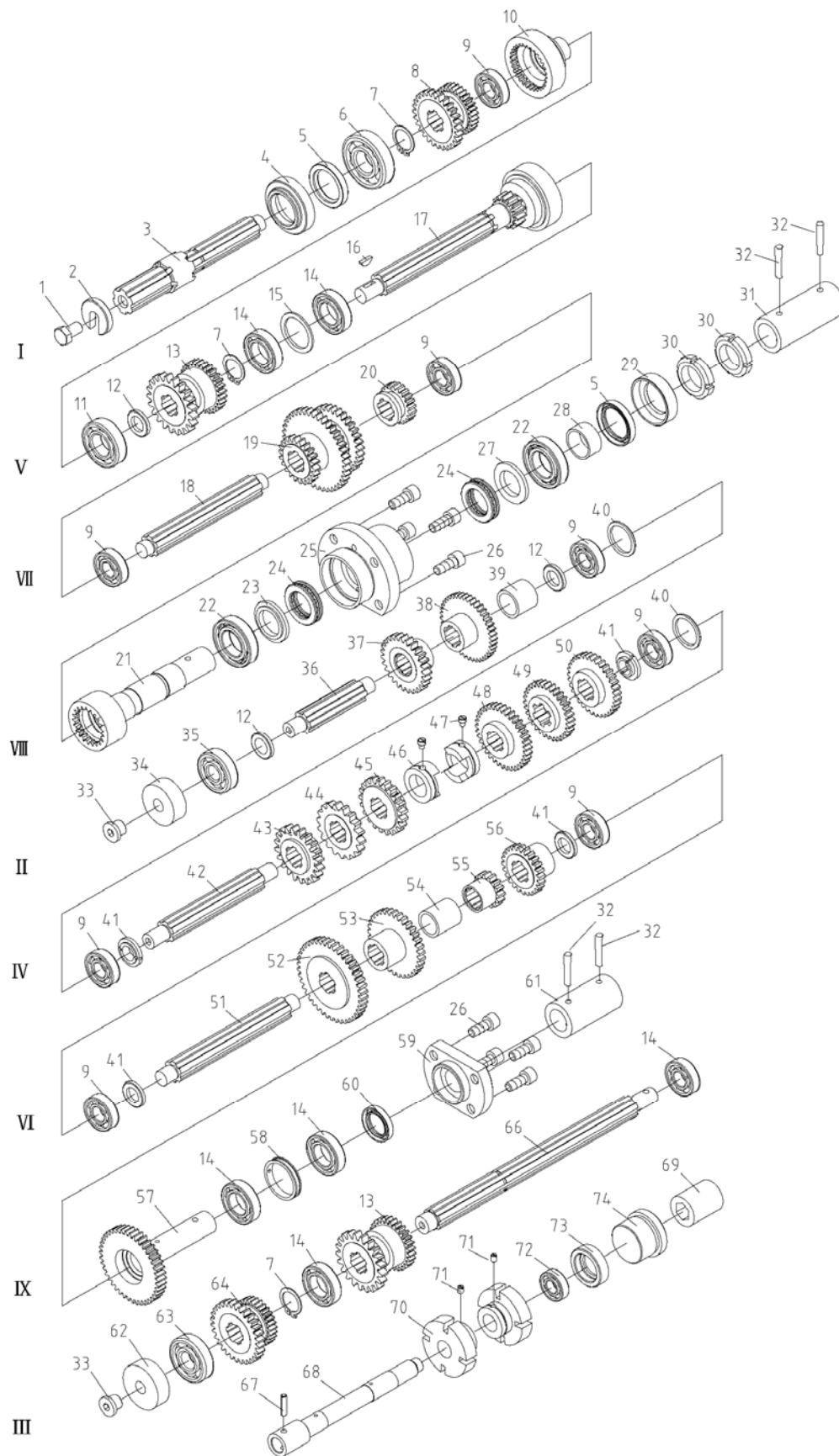


12.1 Gear Box Assembly II – Parts List

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	6
6	C6140W05720	Roller		6
7	C6140W05A708	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		1
15	GB119-6x14	Pin	6x14 mm	2
16	C6140W05A110	Shaft		1
17	C6140W05A106	Upper Rocker		1
18	C6140W05712	Shaft		2
19	GB894.1-16	Circlip for Shaft	16 mm	1
20	C6140W05A717	Cam		1
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
26	C6140W05109	Sliding Block		1
27	G51-2A-25x2.4	O-Ring	25x2.4 mm	3
28	C6140W05A716	Handle Axle		1
30	C6140W05A112	Rocker		1
31	C6140W05A721	Shaft		1
32	C6140W05A722	Shaft		1
33	C6140W05A111	Rocker		1
34	C6140W05A725	Cam		1
35	C6140W05A723	Shaft		1
36	C6140W05A501	Gasket		1
37	C6140W05A115	Front Cover		1
38	TS-1505041	Hex Socket Cap Screw	M10x30	6
39	GB118-8x50	Pin	8x50 mm	2
40	C6266CGBA40	Oil Sight Glass		1
41	C6140W05721	Shaft		1
42	C6140W05A727	Hex Socket Cap Screw		1
43	C6266C05301A-7	Gearbox Label Panel		1
44	TS-1531012	Cross Recessed Pan Head Screw	M3x6	6
45	C6140W05A704	Positioning Disc		1
46	GB68-M6x12	Slotted Head Screw	M6x12	6
47	C6140W05A104	Lever Support		1
48	C6140W05705	Lever		2
49	SB-10MM	Steel Ball	10 mm	3
50	Q81-1-1.6x8x28	Spring	1.6x8x28	3
51	GB73-M12x14	Slotted Set Screw	M12x14	3
52	C6140W05706	Disc		2
53	GB819-M5x12	Cross Recessed Head Screw	M5x12	3
54	C6140W05A108	Collar		1
55	C6140W05A713	Positioning Disc		1
56	C6140W05A107	Lever Support		1
57	C6140W05714	Lever		1

Index No.	Part No.	Description	Size	Qty
58.....	C6140W05715.....	Cover.....		1
59.....	C6140W05A724.....	Positioning Disc.....		1
60.....	C6140W05A113.....	Lever Support		1
61.....	C6140W05308.....	Handle Panel		1
62.....	C6140W05A307.....	Handle Panel		1
63.....	C6140W05306.....	Handle Panel		1

13.0 Gear Box Assembly III – Exploded View

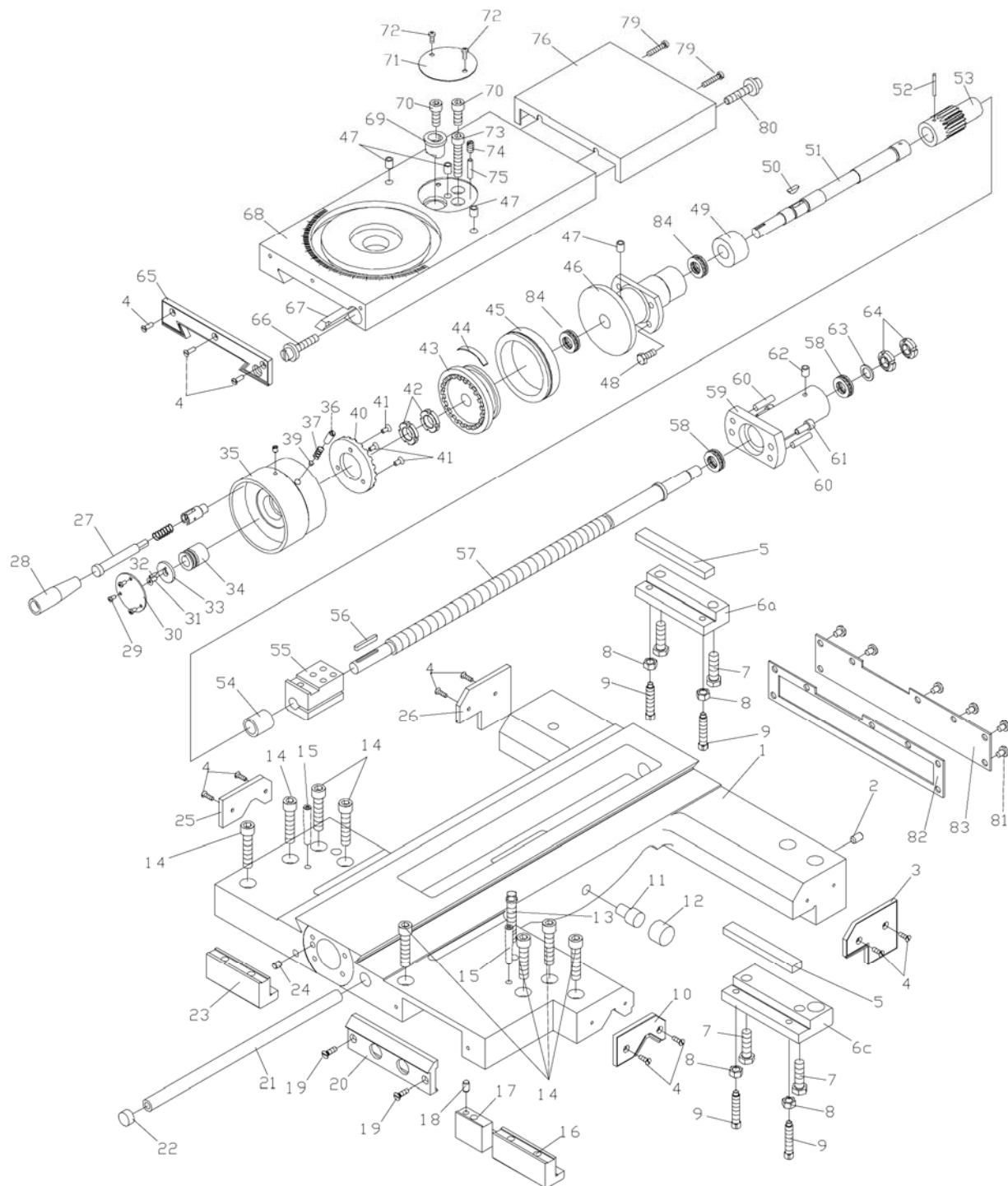


13.1 Gear Box Assembly III – Parts List

Index No.	Part No.	Description	Size	Qty
1	GB5783-M12x20	Hexagon Head Bolt	M12x20	1
2	GB851-A12x40	Split Washer	A12x40	1
3	C6140W05A730	Shaft (I)		1
4	C6266C05772J	Bearing Cover		1
5	G51-1-B35x50x8	Oil Seal	B-35x50x8	2
6	BB-6305	Ball Bearing	25x62x17	1
7	GB894.1-25	Circlip for Shaft	25 mm	3
8	C6140W05731	Double Gear		1
9	BB-6203	Ball Bearing	17x40x12 mm	7
10	C6140W05732	Gear		1
11	BB-6205	Ball Bearing	25x52x15	1
12	C6140W05127	Spacer		3
13	C6140W05733	Double Gear		2
14	BB-6005	Ball Bearing	25x47x12	4
15	C6140W05736	Spacer		2
16	GB1099-4x16	Woodruff Key	4x16 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	2
23	C6140W05740	Spacer		2
24	BB-51106	Thrust Bearing	30x47x11	2
25	C6140W05A117	Flange Sleeve		1
28	C6266C05773J	Sleeve		1
29	C6266C05741J	Bearing Cover		1
30	C6140W05742	Round Nut		2
31	C6140W05119	Shaft		1
32	GB117-6x40	Taper Pin	6x40 mm	4
33	G38-4A-M16x1.5	Plug	M16x1.5	2
34	C6140W05128	Bearing Cover		1
35	BB-6303	Ball Bearing	17x47x14	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		4
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
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
58	C6140W05A744	Sleeve		1
59	C6266C05121W	Flange Sleeve		1

Index No.	Part No.	Description	Size	Qty
60.....	G51-1-B-25x40x7.....	Oil Seal	B-25x40x7 mm	1
61.....	C6140W05120.....	Shaft Connector .....	.....	1
62.....	C6140W05126.....	Bearing Cover .....	.....	1
63.....	BB-6304.....	Ball Bearing.....	20x52x15.....	1
64.....	C6140W05761.....	Double Gear.....	.....	1
66.....	C6266C05760W	Shaft (III).....	.....	1
67.....	GB879-6x25.....	Straight Pin	6x25 mm	1
68.....	C6266C05770W	Shaft .....	.....	1
69.....	C6140W05122.....	Sleeve.....	.....	1
70.....	C6266C05130J.....	Oil Splash Ring .....	.....	2
71.....	GB71-M6x10.....	Slotted Set Screw.....	M6x10	2
72.....	BB-6002.....	Ball Bearing.....	15x32x9	1
73.....	C6266C05774J.....	Sleeve.....	.....	1
74.....	C6266C05123J.....	Sleeve.....	.....	1

14.0 Saddle and Cross Slide Assembly – Exploded View

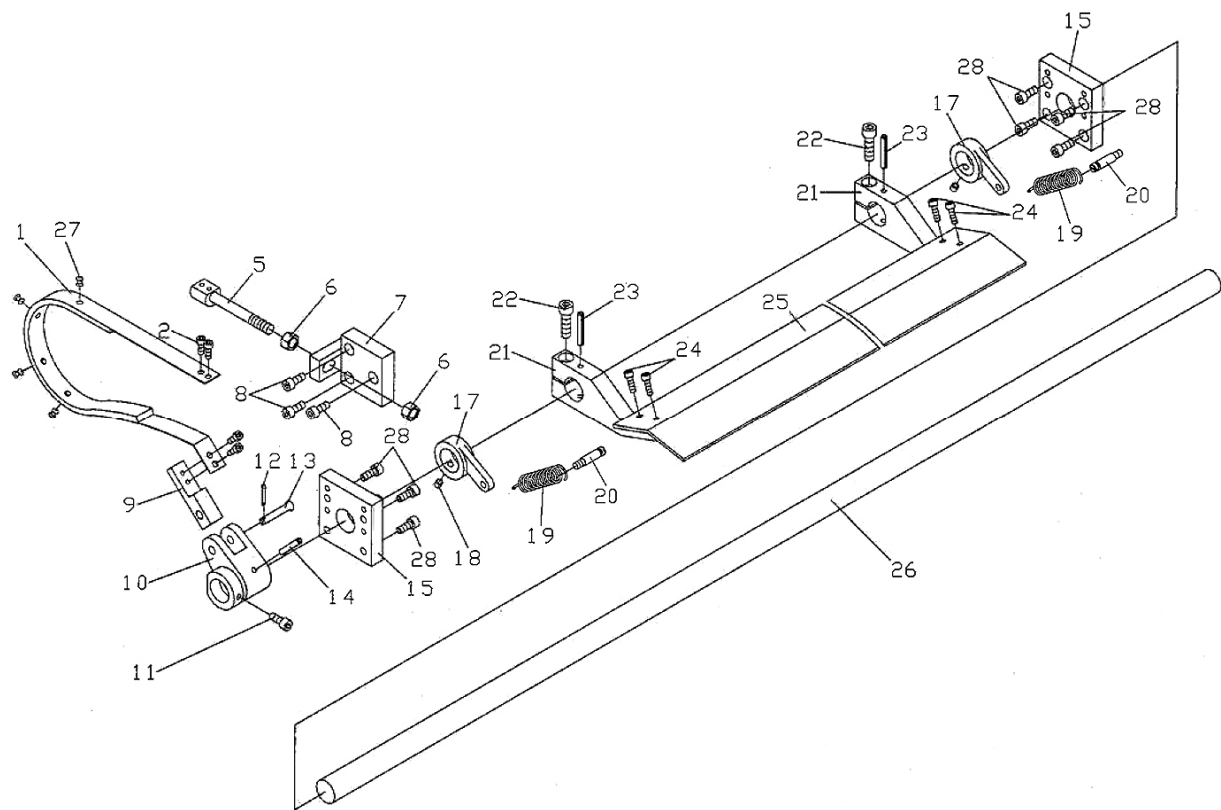


14.1 Saddle and Cross Slide Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1	C6266C04101A	Saddle		1
2	GB73-M10x16	Slotted Set Screw	M10x16	1
3	C614W04503	Wipe Plate		1
4	GB819-M5x16	Cross Recessed Flat Head Screw	M5x16	8
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-1540081	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	GB119-8x60	Pin	8x60 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		1
23	C6140W04720	Back Clamping Block		1
24	GB119-8n6x10	Pin	8n6x10	1
25	C6266C04503	Wipe Plate		1
26	C6140W04504	Wipe Plate		1
27	C6266C04756T	Lever Shaft		1
28	C6266C04757T	Lever Sleeve		1
29	GB818-M4x8	Cross Recessed Flat Head Screw	M4x8	3
30	C6266C04306	Panel		1
31	GB819-M5x12	Cross Recessed Flat Head Screw	M5x12	1
32	GB119-3n6x10	Pin	3n6x10	1
33	C6266C04725	Cover		1
34	C6266C04724J	Sleeve		1
35	C6266C04754J	Handle		1
36	GB73-M8x10	Slotted Set Screw	M8x10	1
37	Q81-1-0.8x6x12	Spring	0.8x6x12	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	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	GB1155-6	Oil Cup	6 mm	1
48	GB70-M8x45	Hex Socket Cap Screw	M8x45	4
49	C6266C04109J	Sleeve (serial #101129ZH0005 and lower)		1
	C6266C04109	Sleeve (serial #111105ZH0006 and higher)		1
50	GB1099-5x7.5x19	Woodruff Key	5x7.5x19	1
51	C6266C04726J	Shaft		1
52	GB117-4x35	Taper Pin	4x35 mm	1
53	C6266C04705	Shaft		8
54	C6266C04103	Sleeve		1

Index No.	Part No.	Description	Size	Qty
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	2
59	C6266C04110	Bracket		1
60	GHB1340-84	Taper Pin	8x40 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 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	Splash Guard		1
79	GB65-M6x12	Slotted Socket Cap Screw	M6x12	2
80	C6266C04727	Gib Adjusting Screw		1
81	GB818-M6x8	Cross Recessed Pan Head Screw	M6x8	7
82	C6266C04502A	Gasket		1
83	C6266C04729A	Cover		1
84	51104	Bearing (serial #111105ZH0006 and higher)		2

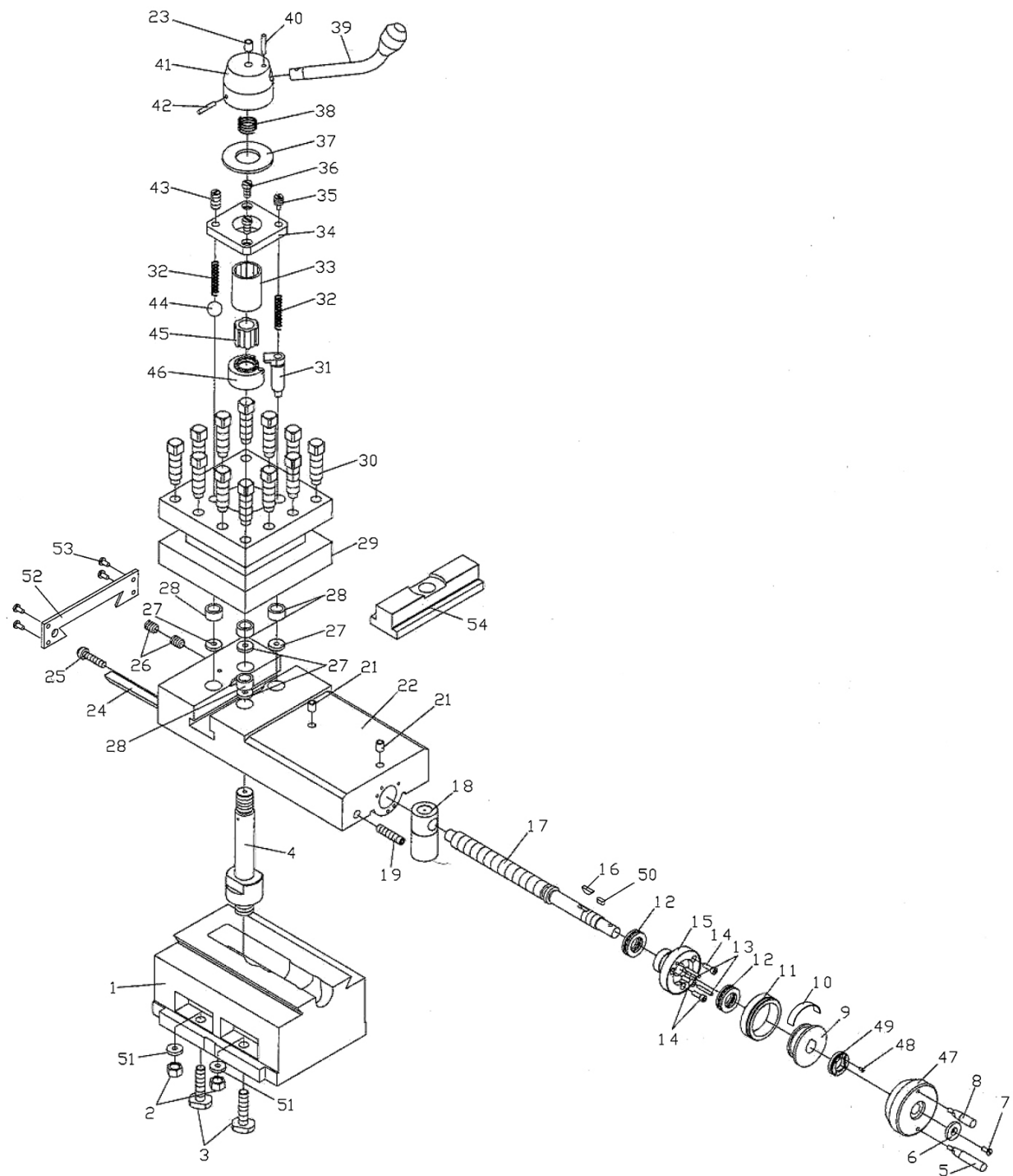
15.0 Brake Assembly – Exploded View



15.1 Brake Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	C6266C22705.....	Brake Belt		1
2.....	GB70-M6x14.....	Hex Socket Cap Screw.....	M6x14	4
5.....	C6266C22704.....	Bolt		1
6.....	TS-2311121	Hex Nut.....	M12	2
7.....	C6266C22103.....	Braking Belt Support		1
8.....	TS-1504041	Hex Socket Cap Screw.....	M8x20	3
9.....	C6266C22706.....	Brake Block.....		1
10.....	C6266C22104.....	Fork		1
11.....	TS-1504041	Hex Socket Cap Screw.....	M8x20	1
12.....	GB91-3x20	Cotter Pin.....	3 x 20 mm	1
13.....	C6266C22707.....	Clevis Pin.....		1
14.....	GB879-6x45.....	Spring Pin	6x45 mm	1
15.....	C6266C22101.....	Support (for 80" Lathe)		2
.....	C6266C22101.....	Support (for 120" Lathe)		4
17.....	C6266C22102.....	Brake Support (for 80" Lathe)		2
.....	C6266C22102.....	Brake Support (for 120" Lathe)		4
18.....	TS-1524041	Hex Socket Set Screw.....	M8x8	2
.....	TS-1524041	Hex Socket Set Screw.....	M8x84	4
19.....	Q81-1-2.5X18X80	Spring (for 80" Lathe)	2.5x18x80 mm.....	2
.....	Q81-1-2.5X18X80	Spring (for 120" Lathe)	2.5x18x80 mm.....	4
20.....	C6266C26702.....	Screw (for 80" Lathe).....		2
.....	C6266C26702.....	Screw (for 120" Lathe).....		4
21.....	C6266C22105.....	Brake Support (for 80" Lathe)		3
.....	C6266C22105.....	Brake Support (for 120" Lathe)		6
22.....	TS-1505051	Hex Socket Head Cap Screw	M10x35	3
.....	TS-1505051	Hex Socket Head Cap Screw	M10x35	6
23.....	GB879-6x45.....	Spring Pin (for 80" Lathe)	6x45 mm	3
.....	GB879-6x45.....	Spring Pin (for 120" Lathe)	6x45 mm	3
24.....	TS-1503051	Hex Socket Cap Screw (for 80" Lathe)....	M6x20	4
.....	TS-1503051	Hex Socket Cap Screw (for 120" Lathe)....	M6x20	8
25.....	C6266C22708C	Pedal (for 80" Lathe only)		1
.....	C6266C22708D	Pedal (for 120" Lathe only)		2
26.....	C6266C22703C	Shaft (for 80" Lathe only).....		1
.....	C6266C22703D	Shaft (for 120" Lathe only).....		1
27.....	GB869-M6x10.....	Rivet	M6x10	4
28.....	TS-1504041	Hex Socket Cap Screw (for 80" Lathe)....	M8x20	8
.....	TS-1504041	Hex Socket Cap Screw (for 120" Lathe)....	M8x20	16

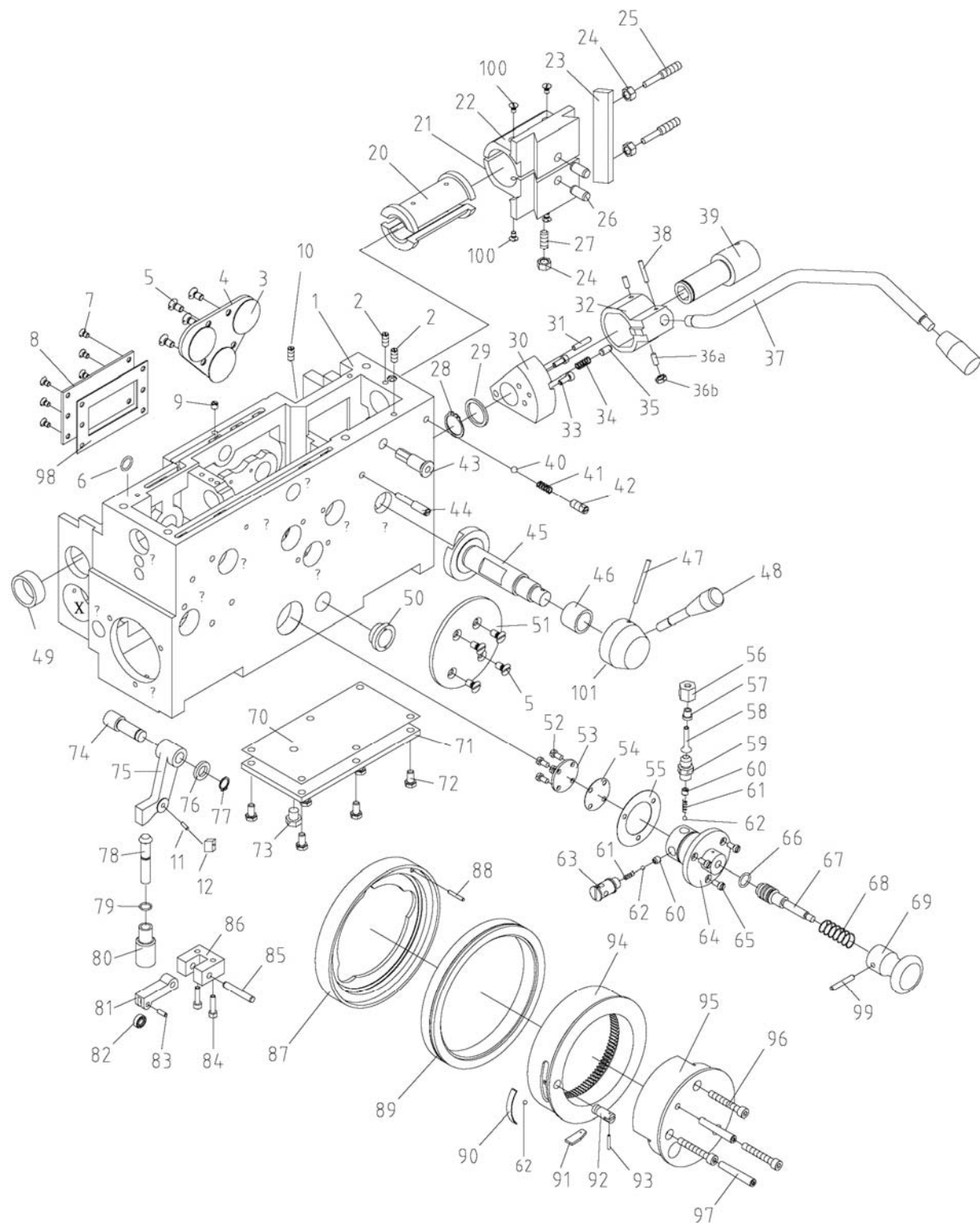
16.0 Tool Post and Compound Rest Assembly – Exploded View



16.1 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 #101129ZH0003 and higher)		1
5	C666C04758J	Handle		2
6	GB891-B25	Circlip	B25	1
7	GB819-M5x12	Cross Recessed Flat Head Screw	M5x12	1
8	C6266C04757J	Handle		1
9	C6140W04110	Dial		1
10	C6140W04739	Leaf Spring		1
11	C6266C04736A	Dial (inches)		1
12	BB-51104	Thrust Bearing	20x35x10	a2
13	GB117-4x25	Taper Pin	4x25	2
14	CL1640ZX-0221	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	1
22	C6266C04105	Longitudinal Slide (serial #100710ZH0002 and lower)		1
	C6266C04105K	Longitudinal Slide (serial #101129ZH0003 and higher)		1
23	GB1155-6	Oil Cup	6 mm	3
24	C6266C04717	Slide Gib		1
25	C6266C04716	Adjust Screw		1
26	GB73-M10x20	Slotted Set Screw	M10x20	2
27	C6140W04727	Washer		1
28	C6140W04728	Positioning Sleeve		1
29	C6266C04708J	Tool Post		1
30	GB83-M16x50	Square Cap Bolt	M16x50	12
31	C6266C04715	Positioning Pin		1
32	Q81-1-1.6x8x100	Spring		4
33	C6266C04712	Spline		1
34	C6266C04709	Flange Disc		1
35	C6140W04732	Bolt		1
36	TS-1504031	Hex Socket Cap Screw	M8x16	2
37	C6266C04710	Adjusting Washer		1
38	Q81-1-3x32x55	Spring	3x32x55 mm	1
39	C6266C04711	Handle		1
40	GB119-5n6x32	Pin	5n6x32 mm	1
41	C6266C04106	Lever Support		1
42	GB117-4x40	Taper Pin	4x40 mm	1
43	GB73-M12x14	Slotted Set Screw	M12x14	1
44	SB-19	Steel Ball	19 mm	1
45	C6266C04713	Connector		1
46	C6266C04714	Connector		1
47	C6266C04752JA	Handle Seat (serial #0811ZH0352 and higher)		1
48	GB68-M3x6	Slotted Head Screw (serial #0811ZH0352 and higher)	M3x6	1
49	C6266C04758T	Locking Nut (serial #0811ZH0352 and higher)		1
50	GB1096-5x12	Flat Key (serial #0811ZH0352 and higher)	5x12 mm	1
51	TS-2360121	Flat Washer	12 mm	4
52	C6266C04506	Wipe Plate		1
53	TS-1533052	Cross Recessed Pan Head Screw	M5x16	4
54	C6266C04707K-2	T-Groove Block (serial #101129ZH0003 and higher)		1

17.0 Apron Assembly I – Exploded View

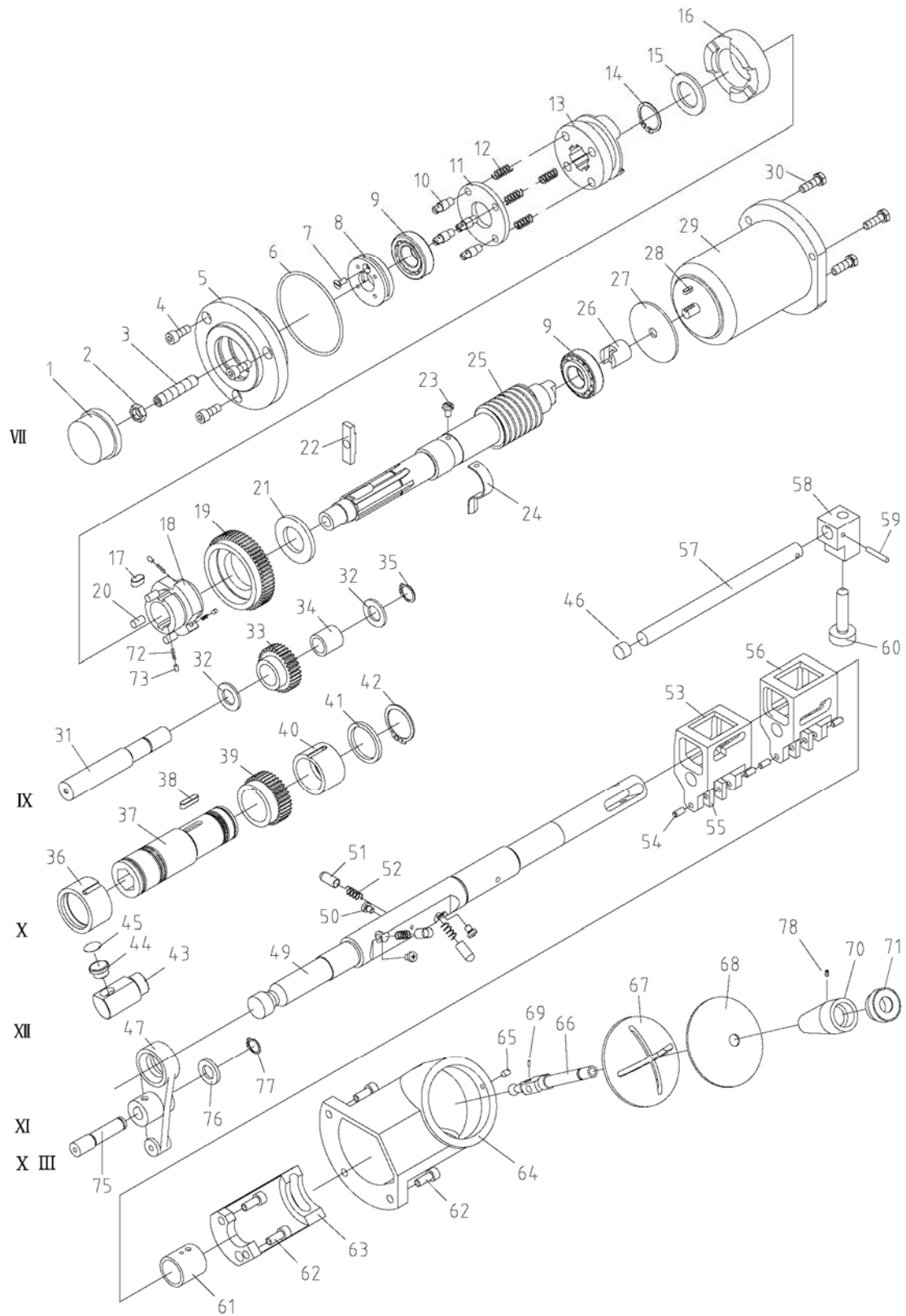


17.1 Apron Assembly I – Parts List

Index No.	Part No.	Description	Size	Qty
1	C6266C06101	Apron Casting		1
2	TS-1524051	Socket Set Screw	M8x20	1
3	C6266C06506	Gasket		3
4	C6140W06750	Back Cover		1
5	GB68-M6x12	Recessed Countersunk Head Screw	M6x12	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	C6266C06717	Positioning Screw		1
11	GB1096-6x14	Pin	6x14mm	1
12	C6140W06715	Block		1
20	C6140W06302	Half Nut		1
21	C6140W06107	Upper Nut		1
22	C6140W06108	Lower Nut		1
23	C6140W06759	Gib		1
24	TS-1540071	Hex Nut	M10	2
25	C6140W06758	Cylindrical End Set Screw		1
26	GB119-12x25	Pin	12x25 mm	2
27	GB73-M10x25	Slotted Set Screw	M10x25	1
28	GB894.1-30	Circlip for Shaft	30 mm	1
29	C6140W06755	Washer		1
30	C6266C06105	Positioning Block		1
31	GB117-6x35	Taper Pin	6x35 mm	1
32	C6266C06106	Lever Support		1
33	TS-1503041	Hex Socket Cap Screw	M6x16	2
34	Q81-1-1.2x8x22	Spring	1.2x8x22 mm	1
35	GB119-8x15	Pin	8x15 mm	1
36a	TS-1524051	Hex Socket Set Screw	M8x20	2
36b	GB6172-M8	Hex Nut	M8	2
37	C6266C06711J	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 mm	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	GB119-5x60	Pin	5x60 mm	1
48	C6140W02799	Handle		1
49	C6266C06104	Sleeve		1
50	M27x1.5	Oil Sight Glass	M27x1.5	1
51	C6140W06760	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	2
62	SB-5MM	Steel Ball	5 mm	4

Index No.	Part No.	Description	Size	Qty
63	C6266C06715	Oil Purifier		1
64	C6266C06107	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	1440R4783	Nut		1
70	C6266C06502	Gasket		1
71	C6266C06103	Button 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	Washer		1
77	GB894.1-15	Circlip 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	BB-606	Bearing	6x17x6 mm	1
83	GB119-6x14	Pin	6x14 mm	1
84	GB75-M5x16	Slotted Socket Set Screw	M5x16	1
85	GB119-8n6x45	Pin	8n6x45	1
86	C6266C06110	Positioning Block		1
87	C6140W06116	Bracket Disc		1
88	GB119-6x25	Pin	6x25 mm	1
89	C6140W06761	Dial		1
90	C6140W06769	Leaf Spring		1
91	C6140W06767	Lock Knob		1
92	C6140W06768	Eccentric Shaft		1
93	GB119-3x12	Pin	3x12 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 mm	1
98	C6266C06501	Gasket		1
99	GB117-4x18	Taper Pin	4x18	1
100	GB68-M6x12	Recessed Countersunk Head Screw	M6x12	4
101	C6140W06109	Handle Seat		1

18.0 Apron Assembly II – Exploded View

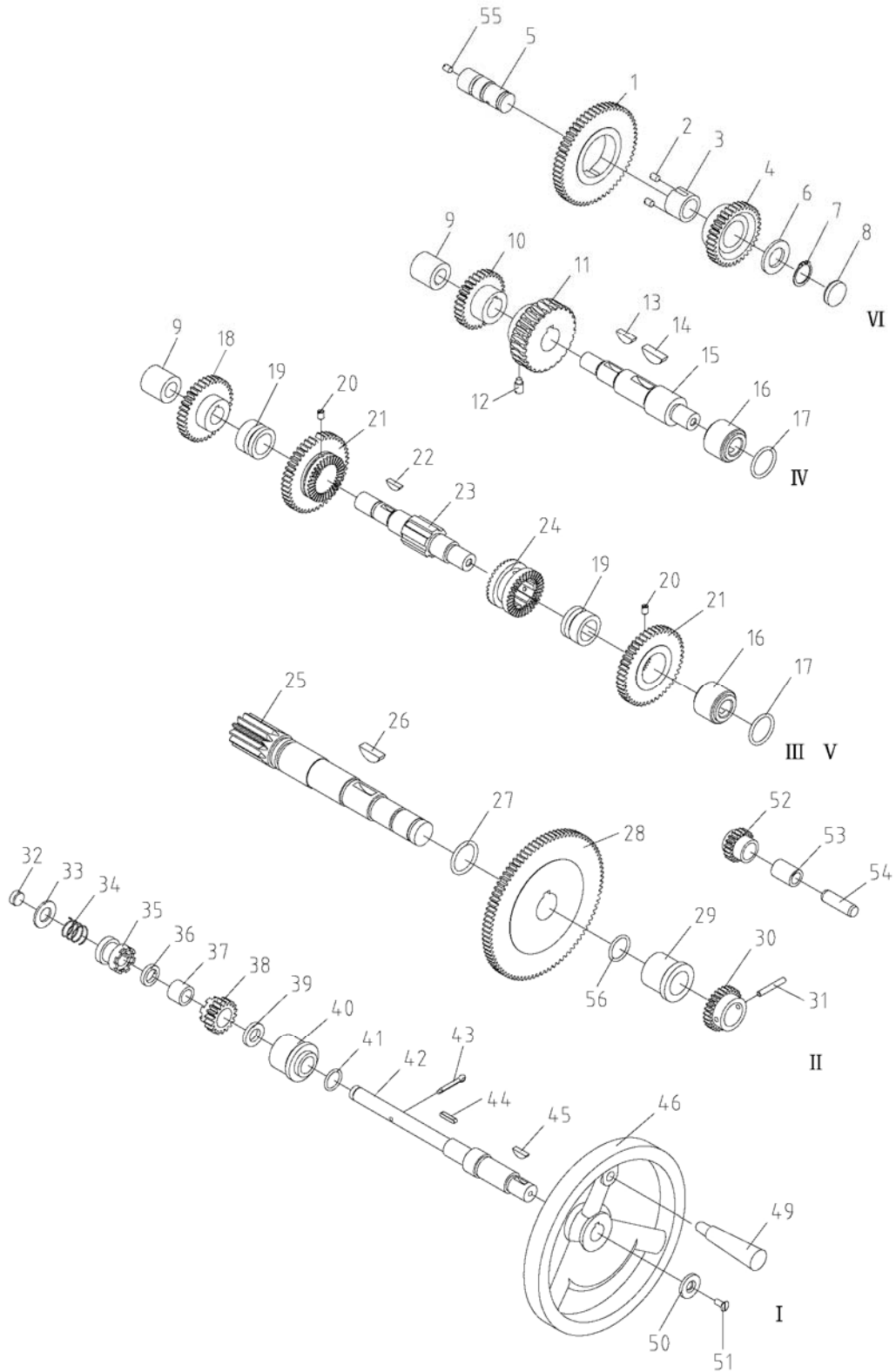


18.1 Apron Assembly II – Parts List

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	M12x60	1
4	TS-1504041	Hex Socket Cap Screw	M8x20	3
5	C6140W06111	Flange		1
6	G51-2A-90x3.1	O-Ring	90x3.1 mm	1
7	GB68-M5x12	Recessed Countersunk Head Screw	M5x12	1
8	C6140W06739	Adjusting Circlip		1
9	30502/P6-25x52x15	Bearing	25x52x15 mm	2
10	C6266C06734	Bolt		4
11	C6140W06740	Washer		1
12	Q81-1-1x10x35	Spring	1x10x35 mm	4
13	C6266C06707	Clutch		1
14	GB894.1-30	Circlip for Shaft	30 mm	1
15	C6266C06708	Washer		1
16	C6266C06706	Clutch		1
17	GB1096-8x16	Flat Key	8x16 mm	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		1
26	C6140W06728	Motor Connector		1
27	C6266C06503	Washer		1
28	GB1096-4x14	Flat Key	4x14 mm	1
29	YSS56BJ	Rapid Feed Motor	1/2HP, 230/460V	1
30	TS-1490051	Hex 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 mm	1
36	C6140W06305	Sleeve		1
37	C6140W06733	Shaft (X)		1
38	GB1096-6x25	Flat Key	6x25 mm	1
39	C6140W06732	Gear		1
40	C6140W06304	Sleeve		1
41	C6140W06730	Washer		1
42	GB894.1-38	Circlip for Shaft	38 mm	1
43	C6266C6704A	Oil Tap Cover		1
44	C6266C06705A	Oil Tap		1
45	C6266C04A311	Label		1
46	C6266C06102	Plug		1
47	C6140W06103	Fork		1
49	C6266C06712	Control Shaft		1
50	GB67-M6x8	Slotted Pan Head Screw	M6x8	3
51	C6140W06701	Pin		3
52	Q81-1-1.6x8x22	Spring	1.6x8x22 mm	3
53	C6140W06713	Fork		1
54	GB119-6n6x14	Pin	6n6x14	6
55	C6140W06715	Sliding Block		6
56	C6140W06714	Right Fork		1

Index No.	Part No.	Description	Size	Qty
57.....	C6140W06717.....	Shaft.....		1
58.....	C6140W06104.....	Interlocking Block.....		1
59.....	GB117-5x30.....	Taper Pin.....	5x30 mm.....	1
60.....	C6140W06718.....	Shaft.....		1
61.....	C626C06304.....	Sleeve.....		1
62.....	TS-1504041.....	Hex Socket Cap Screw.....	M8x20.....	5
63.....	C6140W06719.....	Bracket.....		1
64.....	C6140W06105.....	Bracket.....		1
65.....	GB71-M6x10.....	Slotted Set Screw.....	M6x10.....	1
66.....	C6140W06722.....	Handle.....		1
67.....	C6140W06106.....	Cross Cover.....		1
68.....	C6140W06501.....	Washer.....		1
69.....	GB6173-M12x1.25.....	Hex Flat Nut.....	M12x1.25.....	1
70.....	C6140W06721.....	Handle.....		1
71.....	C6140W06720.....	Washer.....		1
72.....	Q81-1-0.3x3x12.....	Spring.....	0.3x3x12 mm.....	3
73.....	C6140W06727.....	Pin.....		3
75.....	C6140W06704.....	Shaft (XIII).....		1
76.....	C6140W06705.....	Washer.....		1
77.....	GB894.1-14.....	Circlip For Shaft.....	14.....	1
78.....	GB71-M5x6.....	Slotted Set Screw.....	M5x6.....	1

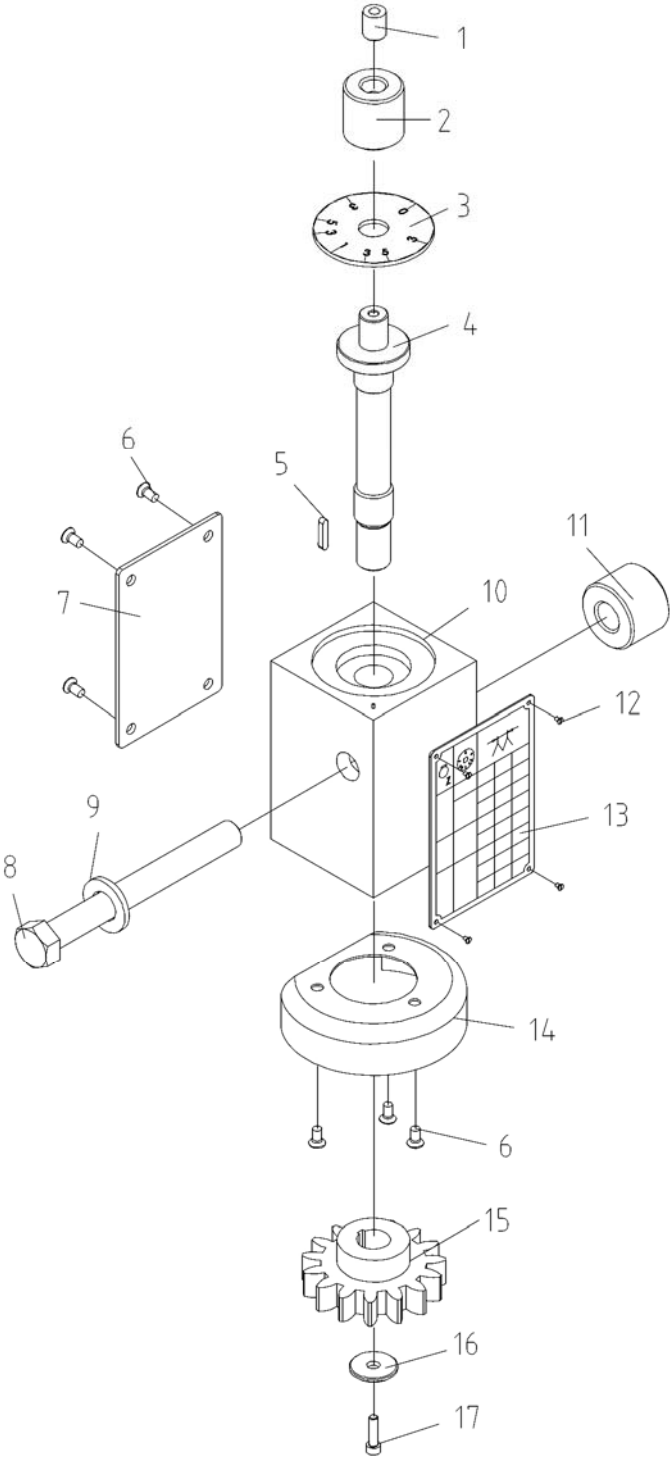
19.0 Apron Assembly III – Exploded View



19.1 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 mm	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 mm	1
14	GB1099-8x28	Woodruff Key	8x28 mm	1
15	C6140W06748	Shaft (IV)		1
16	C6140W06115	Sleeve		3
17	G51-2A-35x3.1	O-Ring	35x3.1 mm	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 mm	2
23	C6140W06747	Shaft (III)		2
24	C6140W06745	Connector		2
25	C6140W06743	Shaft (II)		1
26	GB1099-8x28	Woodruff Key	8x28 mm	1
27	G51-2A-35x3.1	O-Ring	35x3.1 mm	1
28	C6140W06742	Gear		1
29	C6140W06118	Sleeve		1
30	C6266C06764	Gear (in.)		1
31	ZX-Q66	Taper Pin	5x35 mm	1
32	C6140W06112	Plug		1
33	C6140W06774	Washer		1
34	Q81-1-1.6x18x25	Spring	1.6x18x25 mm	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	18x2.4 mm	1
42	C6140W06775	Shaft (I)		1
43	GB91-4X25	Pin	4X25mm	1
44	GB1096-4x20	Flat Key	4x20 mm	1
45	GB1099-5x16	Woodruff Key	5x16 mm	1
46	C6266C06111	Handwheel		1
49	C6140W06765	Lever Sleeve		1
50	GB891-5x12	Circlip	5x12 mm	1
51	GB68-25	Recessed Countersunk Head Screw	25 mm	1
52	C6266C06763	Gear (in.)		1
53	C6140W06310Y	Sleeve		1
54	GB119-12n6x40	Pin	12n6x40	1
55	GB71-M6x8	Slotted Set Screw	M6x8	1
56	G51-2A-25X2.4	O-Ring	25x2.4 mm	1

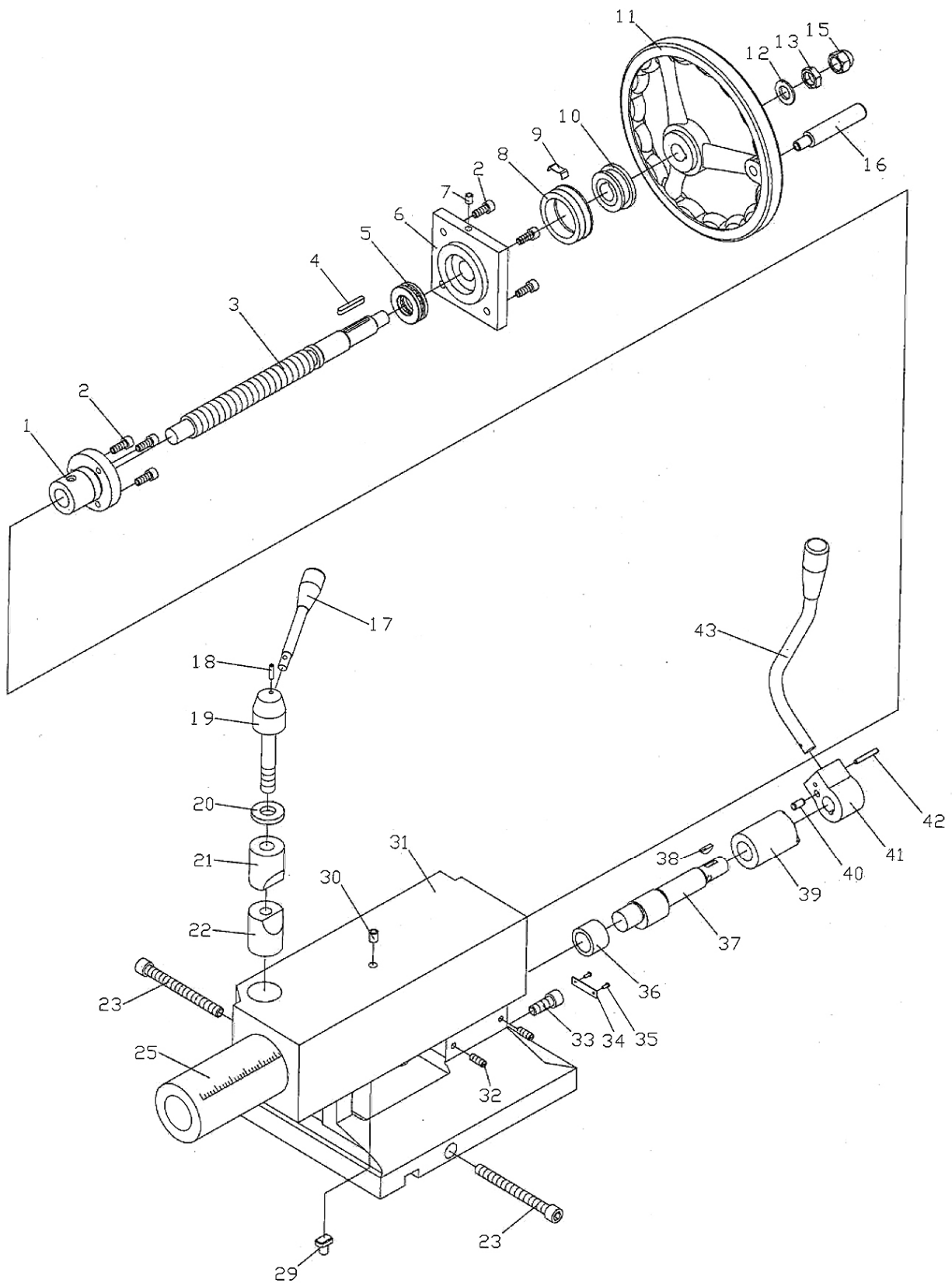
20.0 Apron Assembly IV – Exploded View



20.1 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.....	Label .....	.....	1
4.....	C6266C11702.....	Shaft .....	.....	1
5.....	GB1096-4x15.....	Key	4x15 mm	1
6.....	TS-2284082	Cross Recessed Pan Head Screw.....	M4x8	7
7.....	C6266C11701.....	Cover.....	.....	1
8.....	GB5782- M12x110.....	Hex Cap Bolt.....	M12x110 mm.....	1
9.....	TS-2360121	Flat Washer.....	12 mm.....	1
10.....	C6266C11101.....	Casting.....	.....	1
11.....	C6266C11705.....	Sleeve.....	.....	1
12.....	GB827-2x5	Aluminum Rivet.....	2x5 mm	4
13.....	C6266C11306.....	Label, Thread Chaser (inches) .....	.....	1
14.....	C6266C11704.....	Cover Casting .....	.....	1
15.....	C6266C11104.....	Helical Gear .....	.....	1
16.....	C6266C11706.....	Washer .....	.....	1
17.....	TS-1502021	Hex Socket Cap Screw.....	M5x10	1

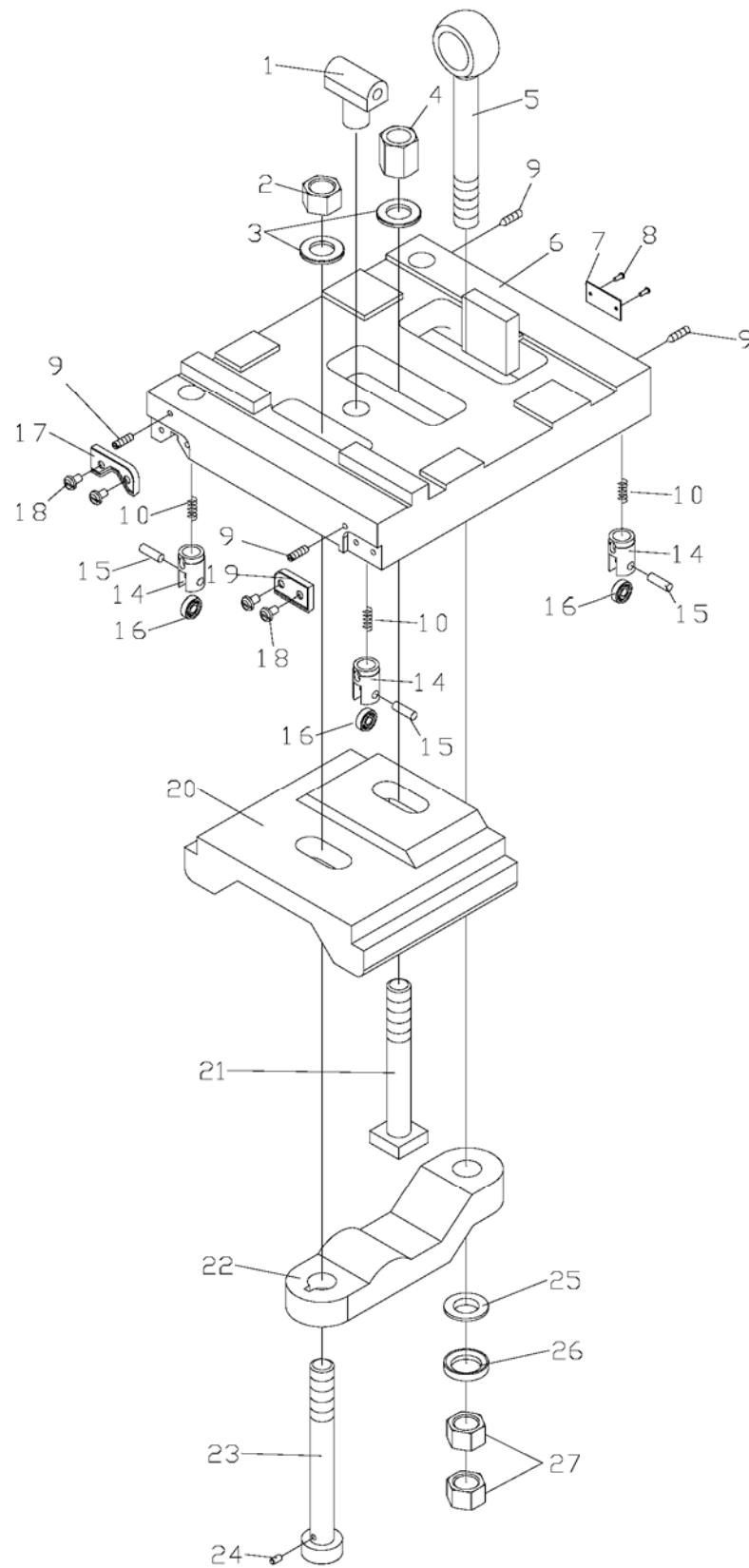
21.0 Tailstock Assembly I – Exploded View



21.1 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	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	C613206710A	Lever		1
17	C6140W03710	Lever		1
18	GB117-5x20	Straight Pin	5x20 mm	1
19	C6140W03715	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	Tailstock Casting		1
32	GB75-M8x25	Slotted Cylindrical End Set Screw	M8x25	2
33	TS-1506021	Hex Socket Cap Screw	M12x25	1
34	C613203303	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	Lever Sleeve		1
42	GB117-5x40	Taper Pin	5x40 mm	1
43	C6250B03705	Lock Handle		1

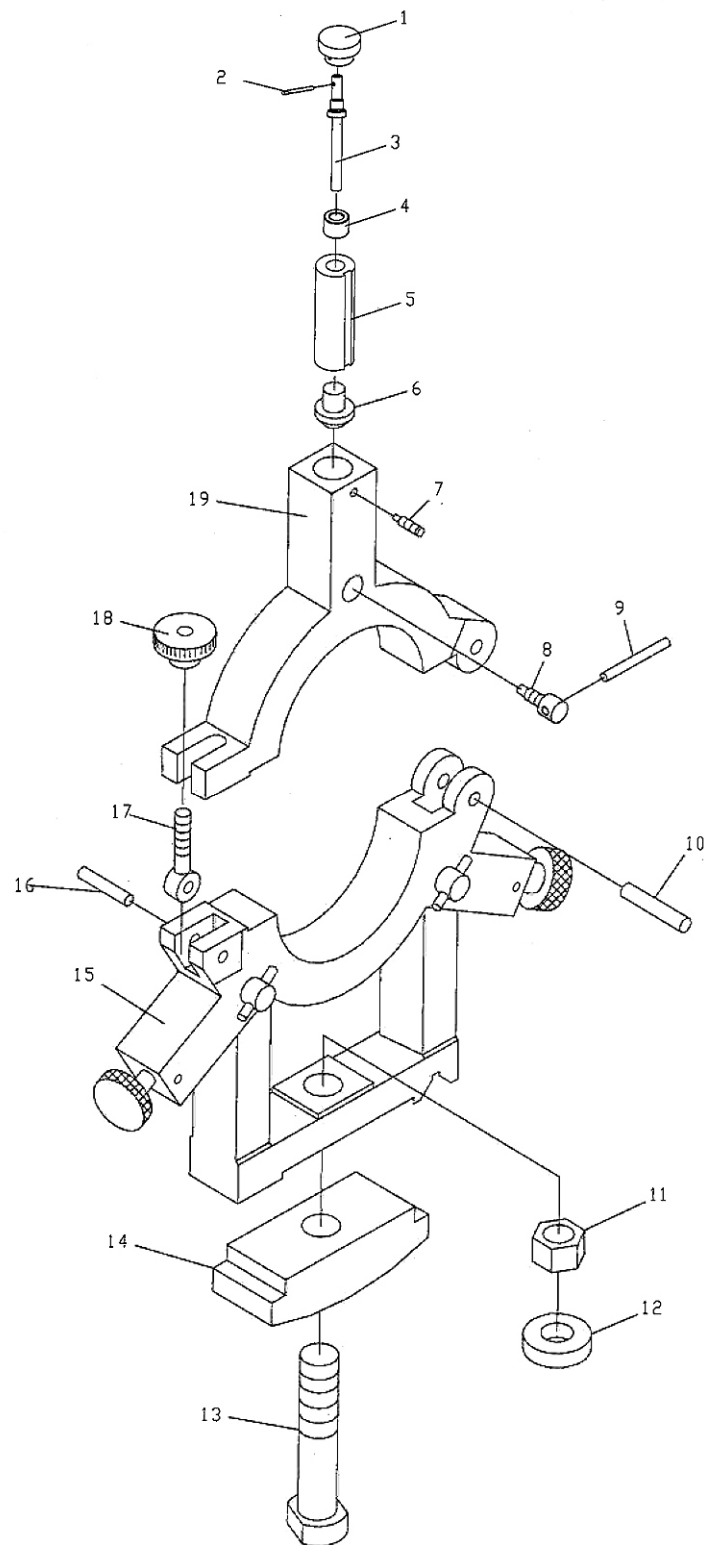
22.0 Tailstock Assembly II – Exploded View



22.1 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.....	Sliding Base.....		1
7.....	C613203302.....	Indicator Plate.....		1
8.....	GB867-3x8.....	Cup Head Rivet.....	3x8 mm.....	4
9.....	GB75-M6x16.....	Slotted Cylindrical End Set Screw.....	M6x16.....	4
10.....	GB2089-1.8x14x18.....	Spring.....	1.8x14x18 mm.....	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.....	M6x10.....	4
19.....	C6140W03503.....	Wipe Plate.....		1
20.....	C6140W03104.....	Clamping Block.....		1
21.....	C6266C03702.....	Screw.....		1
22.....	C6140W03111.....	Clamping Block.....		1
23.....	C6266C03701.....	Screw.....		1
24.....	GB119-5x10.....	Straight Pin.....	5x10 mm.....	1
25.....	GB849-20.....	Spherical Washer.....	20 mm.....	1
26.....	GB850-20.....	Taper Washer.....	20 mm.....	1
27.....	GB6173-M20x1.5.....	Hex Nut.....	M20x1.5.....	2

23.0 Steady Rest Assembly (Small and Large) – Exploded View



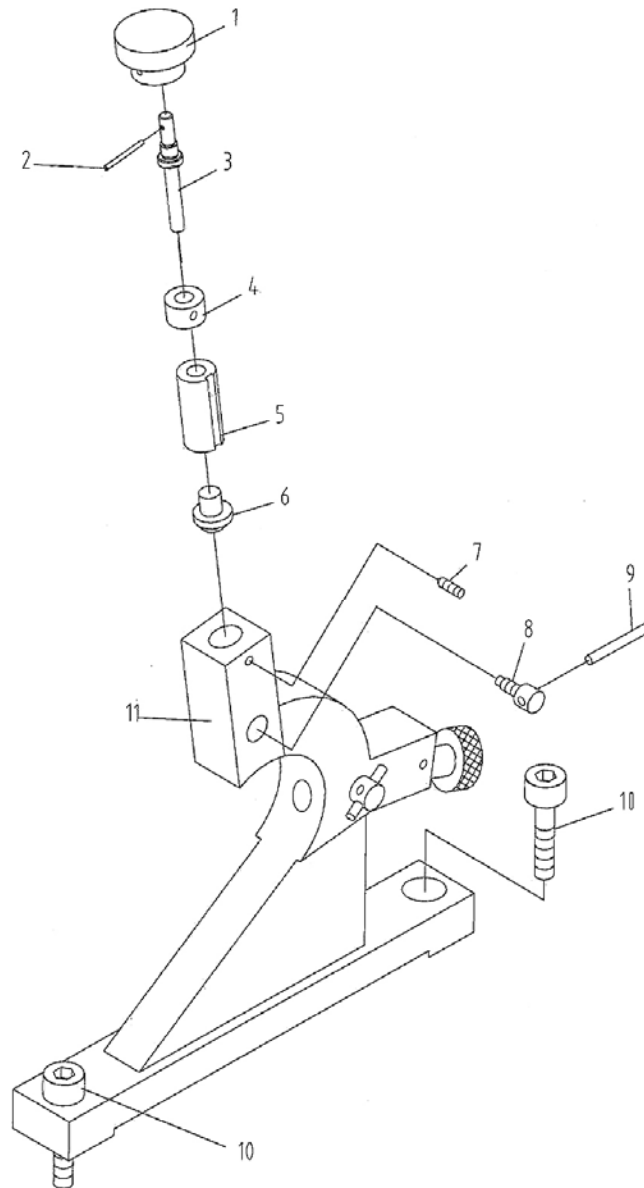
23.1 Steady Rest Assembly (Small) – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	GB4141.29-12	A-Type Knurled Handle	12 mm	3
2.....	GB117-4x25.....	Pin	4x25 mm	3
3.....	C6140W10702.....	Screw.....	.....	3
4.....	C6140W10703.....	Nut.....	.....	3
5.....	C6140W10705.....	Sliding Sleeve .....	.....	3
6.....	C6140W10301.....	Block.....	.....	3
7.....	GB75-M10x16.....	Slotted Set Screw.....	M10x16	3
8.....	C6140W10704.....	Set Screw .....	.....	3
9.....	GB119-A6x45	Pin	A6x45.....	3
10.....	GB119-A16x55	Pin	A16x55.....	1
11.....	ZX-SR10.....	Extra Thick Hex Nut	M20	1
12.....	ZX-SR11.....	Washer	20 mm	1
13.....	C6140W10706.....	Square Head Bolt.....	.....	1
14.....	C6140W10104.....	Clamping Plate.....	.....	1
15.....	C6266C10A101	Steady Rest Lower Body .....	.....	1
16.....	GB119-A8x55	Pin	A8x55.....	1
17.....	C6140W10701.....	Screw.....	.....	1
18.....	GB4141.29-M12.....	B-Type Knurled Handle	M12	1
19.....	C6140W10102.....	Steady Rest Upper Body .....	.....	1

23.2 Steady Rest Assembly (Large) – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	GB4141.29-12	A-Type Knurled Handle	12 mm	3
2.....	GB117-4x25.....	Pin	4x25 mm	3
3.....	C6266C10702.....	Screw.....	.....	3
4.....	C6266C10701.....	Nut.....	.....	3
5.....	C6266C10703.....	Sliding Sleeve .....	.....	3
6.....	C6266C10301.....	Block.....	.....	3
7.....	GB75-M10x16.....	Slotted Set Screw.....	M10x16	3
8.....	C6140W10704.....	Set Screw .....	.....	3
9.....	GB119-A6x45	Pin	A6x45.....	3
10.....	GB119-A16x55	Pin	A16x55.....	1
11.....	ZX-SR10.....	Extra Thick Hex Nut	M20	1
12.....	ZX-SR11.....	Washer	20 mm	1
13.....	C6140W10706.....	Square Head Bolt.....	.....	1
14.....	C6140W10104.....	Clamping Plate.....	.....	1
15.....	C6266C10101	Steady Rest Lower Body .....	.....	1
16.....	GB119-A8x55	Pin	A8x55.....	1
17.....	C6140W10701.....	Screw.....	.....	1
18.....	GB4141.29-M12.....	B-Type Knurled Handle	M12	1
19.....	C6266C10102.....	Steady Rest Upper Body .....	.....	1

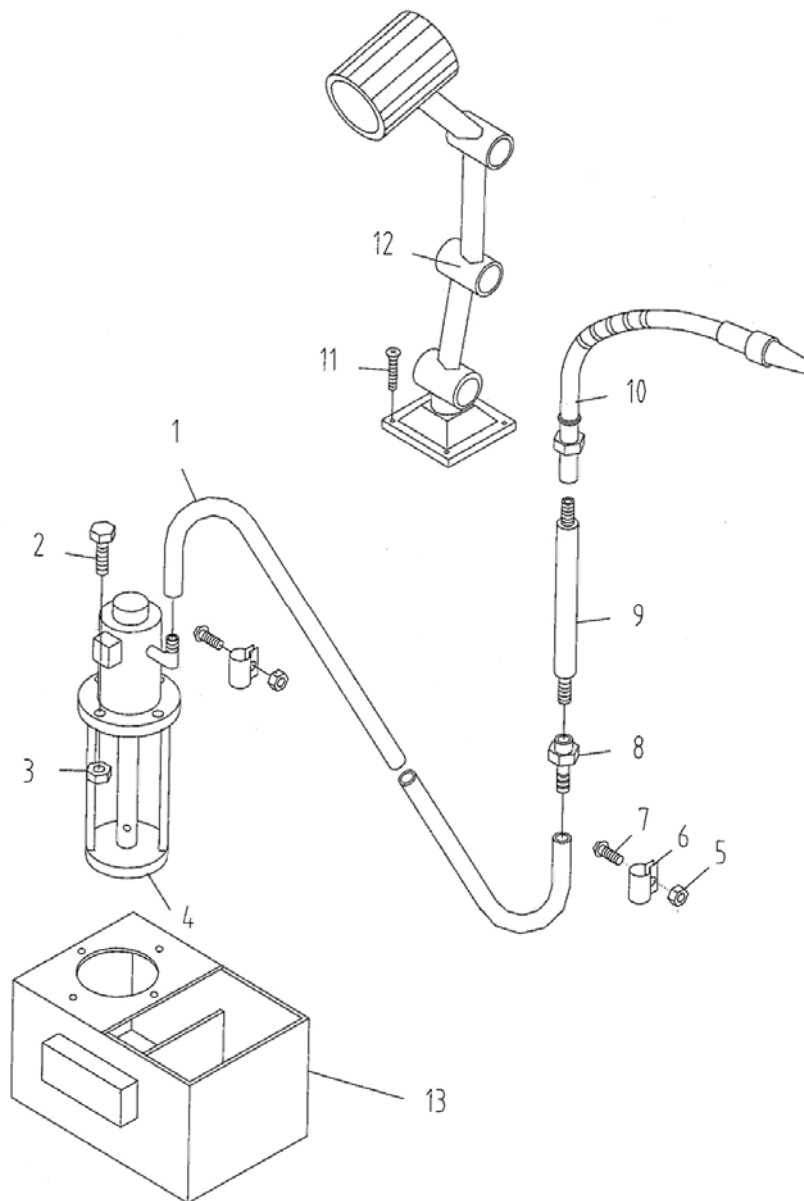
24.0 Follow Rest Assembly – Exploded View



24.1 Follow Rest Assembly – Parts List

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

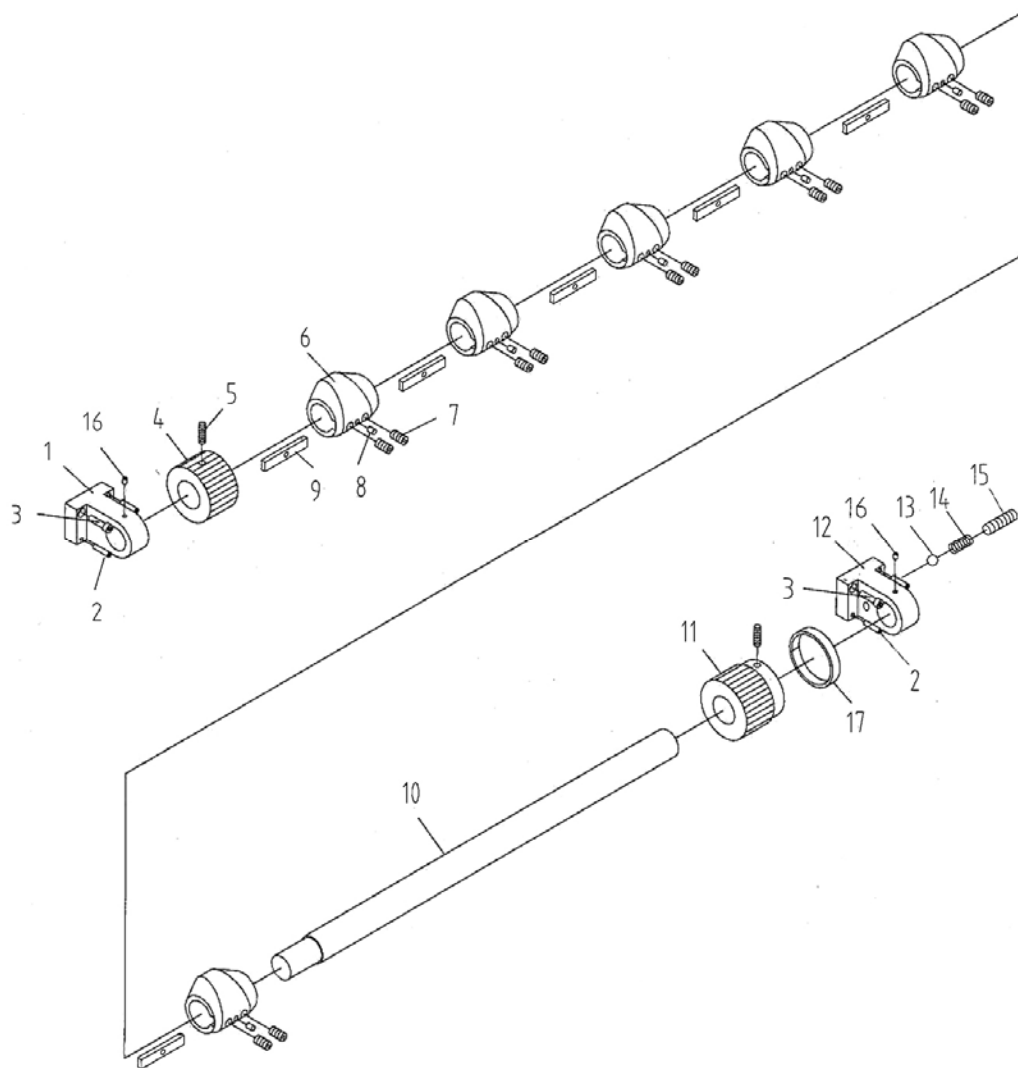
25.0 Coolant and Work Light Assembly – Exploded View



25.1 Coolant and Work Light Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	RT-001C.....	Rubber Tube.....	ID 1/2" x 2280.....	1
2.....	TS-2205201.....	Hex Cap Screw.....	M5x20.....	4
3.....	ZX-CW03.....	Hex Nut.....	M5.....	4
4.....	AB-25-1/8HP.....	Coolant Pump.....	1/8HP 230/460V.....	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 Cap Screw.....	M6x20.....	4
12.....	JC52.....	Work Lamp.....	24V, 50W.....	1
13.....	ZX01510.....	Coolant Tank.....		1

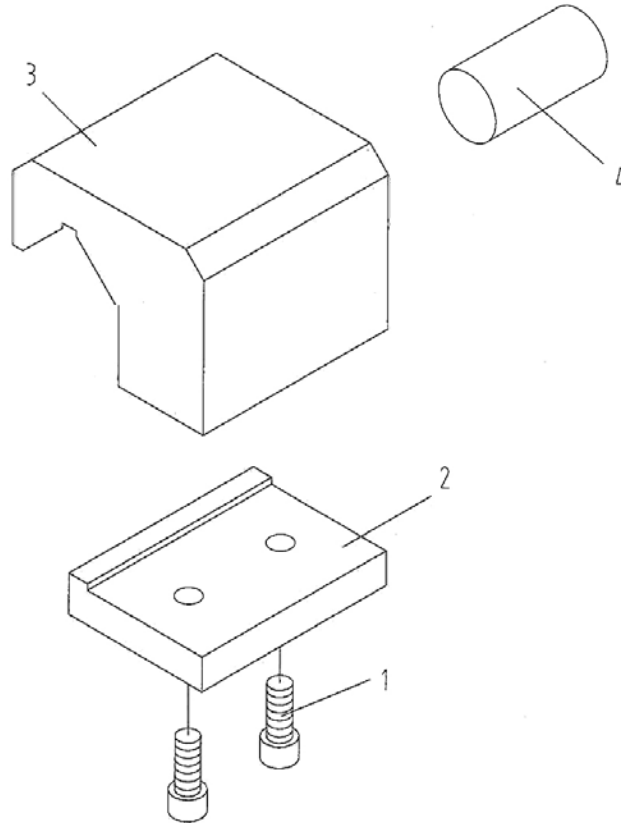
26.0 Travel Stop Assembly – Exploded View



26.1 Travel Stop Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	C6266C26A102	Left Support		1
2.....	GB118-10x40.....	Pin	10x40 mm	4
3.....	TS-1504081.....	Hex Socket Cap Screw.....	M8x40	4
4.....	C6266C26A721	Left Control Ring		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" ZH only).....		1
.....	C6266C26A707D.....	Travel Set Rod (for 120" ZH only).....		1
11.....	C6266C26A720	Right Control Ring.....		1
12.....	C6266C26A101	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.....	C6266C26A301	Label, Travel Stop.....		1

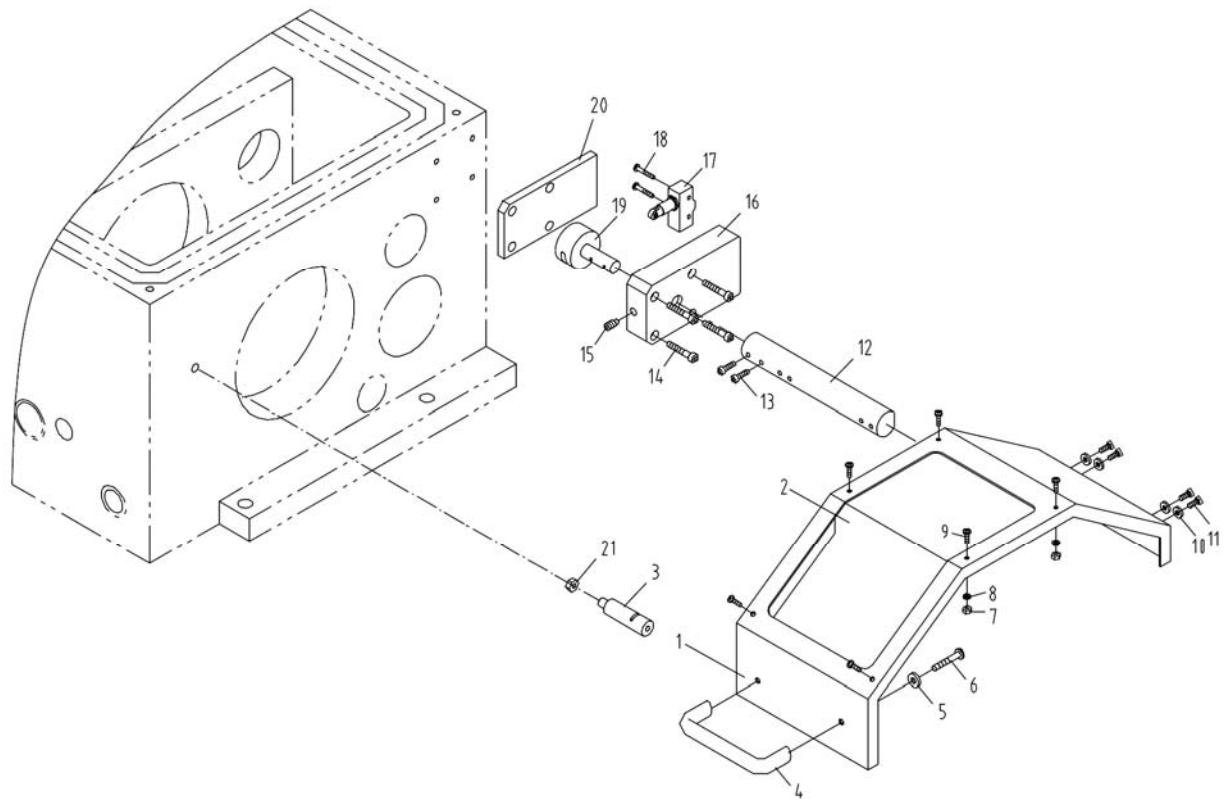
27.0 Small Carriage Stop – Exploded View



27.1 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.....	Stop.....		1
4.....	GB119-12x40.....	Pin.....	12x40 mm.....	1

28.0 Chuck Guard Assembly – Exploded View

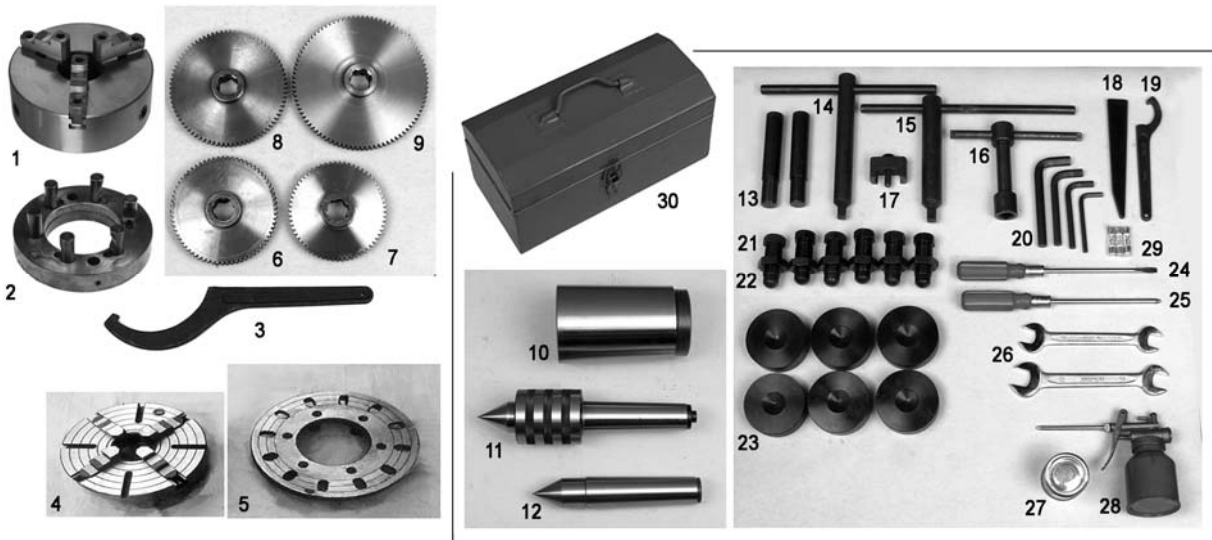


28.1 Chuck Guard Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
1.....	GH1640ZX19701	Protection Guard		1
2.....	ZX-19501E	Protection Guard Visual Glass.....		1
3.....	ZX-19704E	Fixing Rod.....		1
4.....	ZX-S04E	Handle	Z96-6.....	1
5.....	TS-1550041	Plain Washer.....	6 mm	2
6.....	TS-1534042	Cross Recessed Pan Head Screw.....	M6x12	2
7.....	ZX-S07E	Hex Thin Nut	M4	6
8.....	TS-1550021	Plain Washer.....	4 mm	6
9.....	TS-1532042	Cross Recessed Pan Head Screw.....	M4x12	6
10.....	TS-1550031	Plain Washer.....	5 mm	4
11.....	TS-1502041	Hex Socket Cap Screw.....	M5x16	4
12.....	ZX-19703E	Rest Bar.....		1
13.....	ZX-S13E	Slotted Set Screw.....	M8x10	2
14.....	TS-1503081	Hex Socket Cap Screw.....	M6x35	4
15.....	TS-1524041	Hex Socket Set Screw.....	M8x16	1
16.....	GH1440A19101E	Switch Box		1
17.....	SQ4E	Stroke Switch	LXW5-11Q1.....	1
18.....	ZX-S18E	Slotted Pan Head Screw	M4x25	2
19.....	ZX-19702E	Shaft		1
20.....	ZX-19502E	Gasket		1
21.....	C6266CCGA21-M8	Nut.....	M8	1

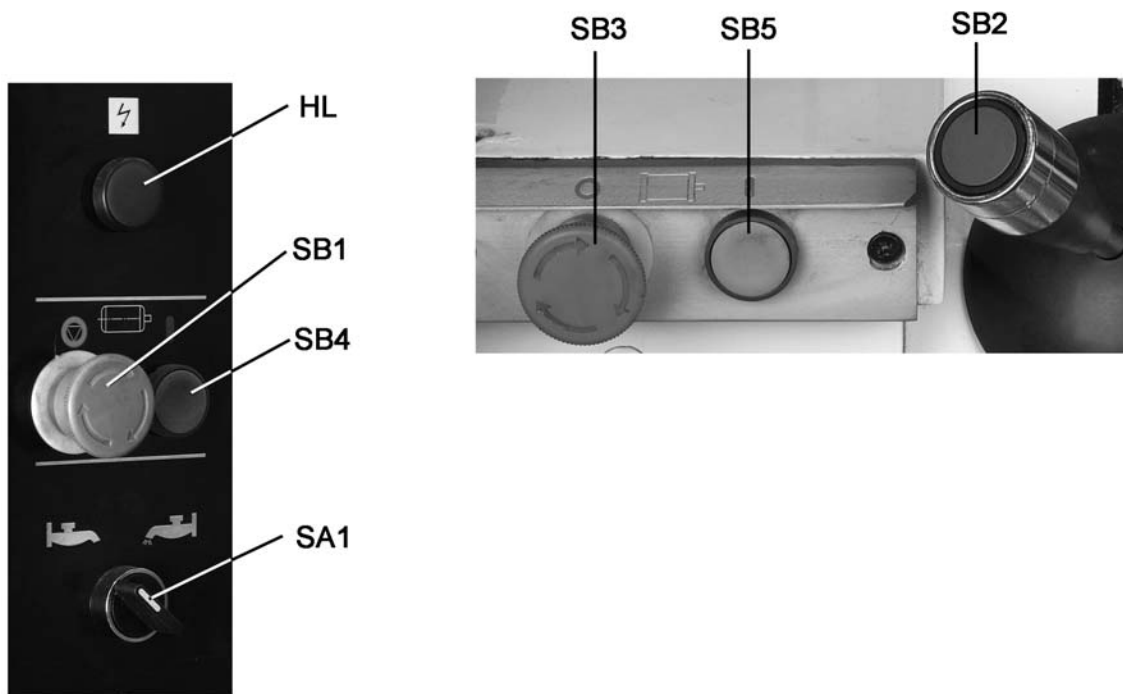
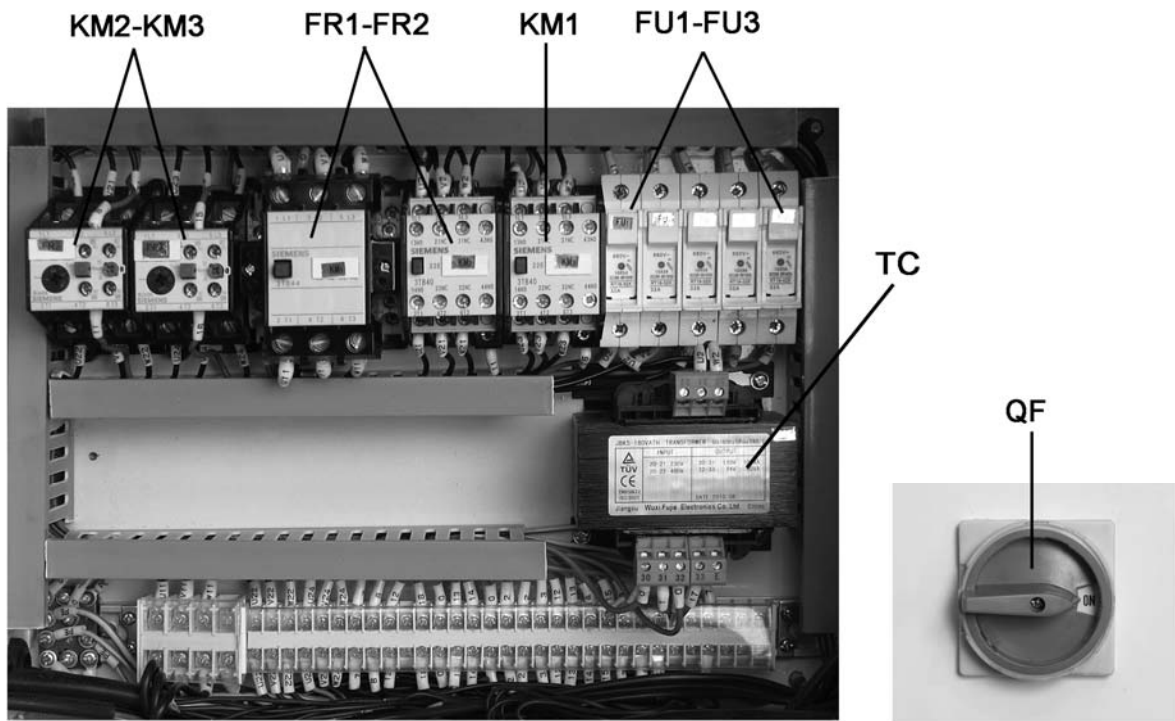
(Note: This device is installed from serial #111105ZH0006)

29.0 Toolbox, Accessories, and Attachments

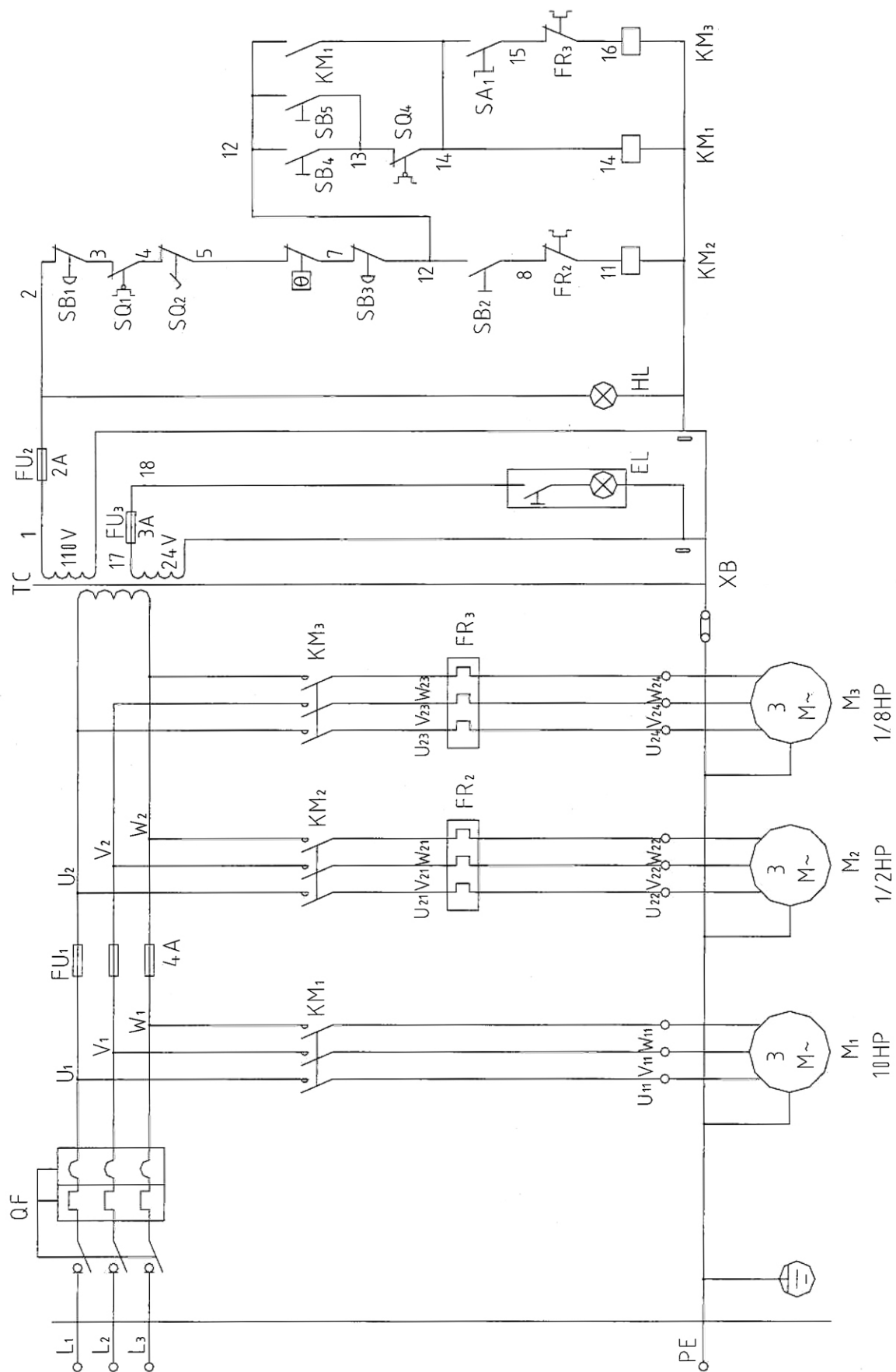


Index No.	Part No.	Description	Size	Qty
1.....	ZH-2501.....	3-Jaw Scroll Chuck.....	13", D1-8.....	1
2.....	ZH-2502.....	Drive Plate.....		1
3.....	RNS-170/210.....	Round Nut Spanner.....	170-210.....	1
4.....	ZH-2504.....	4-Jaw Independent Chuck.....	16", D1-8.....	1
5.....	ZH-2505.....	Face Plate.....	24-25/32".....	1
6.....	C6266C08716.....	Gear (in.).....	2m69T.....	1
7.....	C6266C08717-63.....	Gear (in.).....	2m63T.....	1
8.....	C6266C08717-90.....	Gear (in.).....	2m90T.....	1
9.....	C6266C08717-78.....	Gear (in.).....	2m78T.....	1
10.....	ZX-OP-08.....	Morse 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
16.....	ZX-OP-04.....	Tool Post 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 *.....	6,8,10,12 mm.....	1
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 mm.....	1
27.....	ZX-OP-10.....	Touchup Paint Can (JET White) *.....		1
28.....	ZX-OP-09.....	Oil Gun *.....		1
29.....	(see section 30.2).....	Set of Fuses.....	4A/3A/2A.....	1
30.....	ZH-TBC.....	Tool Box Complete, ZH Lathes (includes items with asterisk *).....		

30.0 Electrical Components



30.1 Electrical Diagram



30.2 Electrical Components – Parts List

Index No.	Part No.	Description	Model	Size	Qty
M1.....	*	Main Motor	Y132M-4TH/B3.....	10HP, 3PH, 230/460V	1
M2.....	*	Coolant Pump	AB-12TH	1/8HP, 3PH, 230/460V	1
M3.....	*	Rapid Feed Motor.....	YSS5634	1/2HP, 3PH, 230/460V	1
QF.....	ZH-QF.....	Automatic Switch.....	JFD11	40A, 3P.....	1
TC.....	ZH-TC.....	Control Transformer	JBK5-160TH.....	110V, 230/460V, 24V	1
FR1.....	ZH-FR1.....	Thermal Relay.....	3UA59	0.25-0.4A	1
FR2.....	ZH-FR2.....	Thermal Relay.....	3UA59	1.6-2.5A	1
KM1	ZX-KM3	A.C. Contactor.....	3TB43	Coil Voltage 110V, 22A ...	1
KM2,KM3	ZX-KM2	A.C. Contactor.....	3TB40	Coil Voltage 110V, 9A	2
.....	.....	Blow Fuse	RT18-32X.....	.....	5
FU1.....	ZH-FU1.....	Fuse.....	RT14	4A.....	3
FU2.....	ZH-FU2.....	Fuse.....	RT14	2A.....	1
FU3.....	ZH-FU3.....	Fuse.....	RT14	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.....	JC52.....	.....	1
.....	.....	Bulb .....	.....	24V, 50W	1
HL	ZH-HL	Indicator Light.....	XB2EV163.....	110V, Green.....	1

* See related parts lists for part numbers.

31.0 Ordering Replacement Parts

To order parts or reach our service department, call 1-800-274-6848, Monday through Friday (see our website for business hours, www.waltermeier.com). Having the Model Number and Serial Number of your machine available when you call will allow us to serve you quickly and accurately.