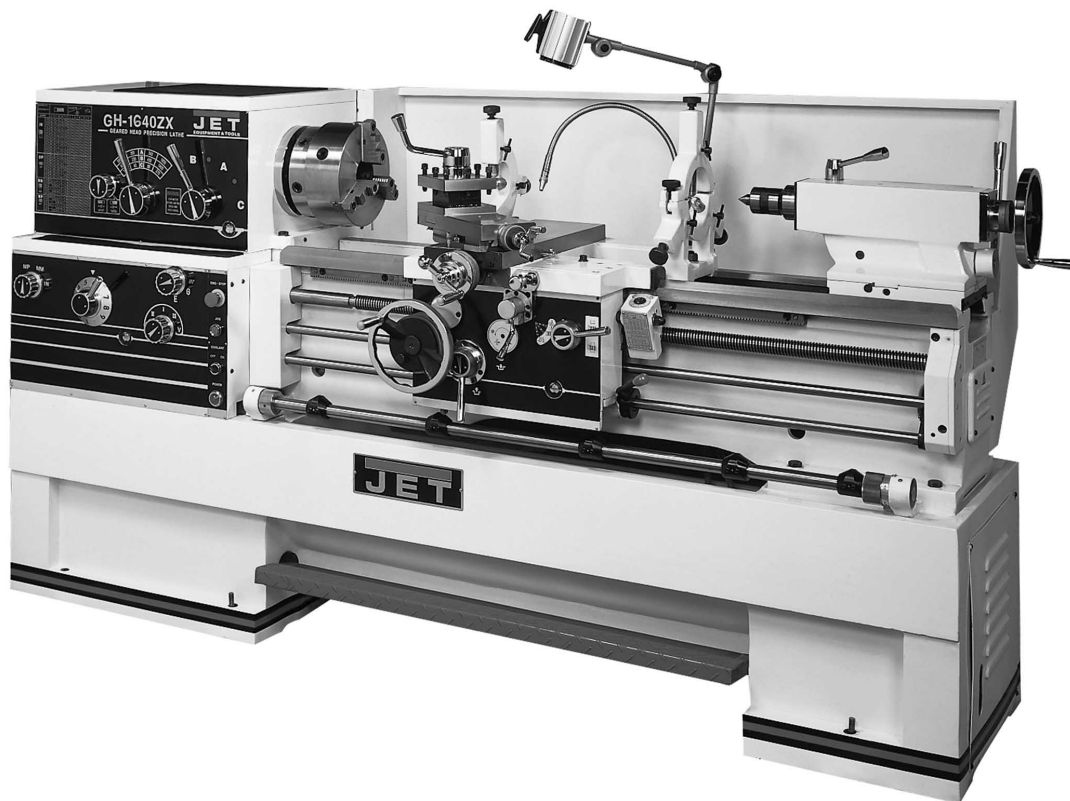




Operating Instructions ZX Series Lathes

Models GH-1440ZX/1460ZX
GH-1640ZX/1660ZX
GH-1840ZX/1860ZX/1880ZX
GH-2280ZX



WMH TOOL GROUP

2420 Vantage Drive
Elgin, Illinois 60123
Ph.: 800-274-6848
www.wmhtoolgroup.com

Part No. M-321910
Revision G 11/05
Copyright © WMH Tool Group

This manual has been prepared for the owner and operators of a JET ZX Series Lathe. Its purpose, aside from machine operation, is to promote safety using accepted operating and maintenance procedures. To obtain maximum life and efficiency from your lathe and to aid in using it safely, please read this manual thoroughly and follow the instructions carefully.

Warranty and Service

WMH Tool Group 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 provide quick service or information.

In most cases, a WMH Tool Group Service Center can assist in authorizing repair work, obtaining parts, or perform routine or major maintenance repair on your JET product.

For the name of an Authorized Service Center in your area, please call 1-800-274-6848, or visit our web site at www.wmhtoolgroup.com

More Information

Remember, WMH Tool Group is consistently adding new products to the line. For complete, up-to-date product information, check with your local WMH Tool Group distributor, or visit our web site at www.wmhtoolgroup.com

WMH Tool Group Warranty

WMH Tool Group makes every effort to assure that its products meet high quality and durability standards and warrants to the original retail consumer/purchaser of our products that each product be free from defects in materials and workmanship as follows: 1 YEAR LIMITED WARRANTY ON ALL PRODUCTS UNLESS SPECIFIED OTHERWISE. This Warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, repair or alterations outside our facilities, or to a lack of maintenance.

WMH TOOL GROUP LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD SPECIFIED ABOVE, BEGINNING FROM THE DATE THE PRODUCT WAS PURCHASED AT RETAIL. 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. IN NO EVENT SHALL WMH TOOL GROUP BE LIABLE FOR DEATH, INJURIES TO PERSONS OR PROPERTY, OR FOR INCIDENTAL, CONTINGENT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF OUR PRODUCTS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

To take advantage of this warranty, the product or part must be returned for examination, postage prepaid, to an Authorized Service Center designated by our office. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will either repair or replace the product at our discretion, or refund the purchase price if we cannot readily and quickly provide a repair or replacement. We will return the repaired product or replacement at WMH Tool Group's expense, but if it is determined there is no defect, or that the defect resulted from causes not within the scope of WMH Tool Group's warranty, then the user must bear the cost of storing and returning the product. This warranty gives you specific legal rights; you may also have other rights, which vary from state to state.

WMH Tool Group sells through distributors only. Members of the WMH Tool Group reserve the right to effect at any time, without prior notice, alterations to parts, fittings and accessory equipment, which they may deem necessary for any reason whatsoever.

Table of Contents

Warranty and Service	2
Table of Contents	3
Warning.....	4
Specifications	6
Specifications	7
Specifications	8
Specifications	9
Unpacking	10
Contents of the Shipping Container	10
Uncrating and Cleanup	11
Chuck Preparation (Three Jaw)	11
Lubrication	12
Coolant Preparation	13
Electrical Connections	13
Conversion to 460 Volt Operation.....	14
General Description	14
Lathe Bed	14
Headstock.....	14
Carriage.....	15
Four Way Tool Post.....	15
Apron	15
Tailstock.....	15
Leadscrew and Feed Rod.....	15
Feed Gearbox	15
Steady Rest	15
Follow Rest	16
Controls.....	16
Operation.....	19
Feed and Thread Selection	19
Thread Cutting	19
Gib Adjustments.....	19
Tailstock Off-Set.....	19
Removing Gap Section.....	20
Installing Removable Gap Section.....	20
Belt Replacement and Adjustment.....	20
Aligning Tailstock to Headstock.....	20

Warnings

1. Read and understand the entire owners 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, WMH Tool Group 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 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.
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.



Warnings

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. 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 safer.
24. Use recommended accessories; improper accessories may be hazardous.
25. Maintain tools with care. Keep cutting tools sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
26. Do not attempt to adjust or remove tools during operation.
27. Turn off the machine and disconnect from power before cleaning. Use a brush to remove shavings or debris — do not use your hands.
28. Do not stand on the machine. Serious injury could occur if the machine tips over.
29. Never leave the machine running unattended. Turn the power off and do not leave the machine until it comes to a complete stop.
30. Remove loose items and unnecessary work pieces from the area before starting the machine.

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

CAUTION

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

WARNING

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

- - SAVE THESE INSTRUCTIONS - -

The following specifications were current at the time this manual was published, but because of our policy of continuous improvement, WMH Tool Group reserves the right to change specifications at any time and without prior notice, without incurring obligations.

Specifications

Model Number	GH-1440ZX	GH-1460ZX
Stock Number.....	321910	321920

Capacities:

Swing over Bed (in.).....	14	14
Swing over Cross Slide (in.).....	7-5/8	7-5/8
Swing Through Gap (in.).....	23-5/8	23-5/8
Length of Gap (in.).....	12-1/4	12-1/4
Distance between Centers (in.).....	40	60

Headstock:

Spindle Bore (in.).....	3-1/8	3-1/8
Spindle Mount.....	D1-8	D1-8
Spindle Taper with Sleeve	MT-7(MT-5)	MT-7(MT-5)
Number of Spindle Speeds	12	12
Range of Spindle Speeds (RPM)	42 to 1800	42 to 1800

Gearbox:

Number of Longitudinal and Cross Feeds	122	122
Range of Longitudinal Feeds (in./rev.).....	0.0015 to 0.0913	0.0015 to 0.0913
Range of Cross Feeds (in./rev.)	0.0006 to 0.0365	0.0006 to 0.0365
Number of Inch Threads	61	61
Range of Inch Threads (in.).....	1-5/8 to 72	1-5/8 to 72
Number of Metric Threads	24	24
Range of Metric Threads (mm).....	0.05 to 20	0.05 to 20

Compound and Carriage:

Maximum Tool Size (in.)	1 x 1	1 x 1
Maximum Compound Slide Travel (in.).....	5-1/8	5-1/8
Maximum Cross Slide Travel (in.)	9	9
Carriage Travel (in.).....	35	55

Tailstock:

Tailstock Spindle Travel (in.).....	5	5
Tailstock Taper	MT-4	MT-4

Steady Rest Capacity (in.)	1/2 to 3-1/2	1/2 to 3-1/2
Follow Rest Capacity (in.)	3/8 to 7	3/8 to 7
Width of Bed (in.).....	13-3/8	13-3/8
Overall Dimensions (in.)(LxWxH)	97-1/2 x 40 x 46-7/8	116-1/2 x 40 x 46-7/8
Motor.....	7-1/2HP, 3Ph, 230/460V*	7-1/2HP, 3Ph, 230/460V*
Approximate Net Weight (lbs.)	5187	5380

*pre-wired 230V

Specifications

Model Number.....	GH-1640ZX	GH-1660ZX
Stock Number.....	321930	321940

Capacities:

Swing over Bed (in.).....	16	16
Swing over Cross Slide (in.).....	10	10
Swing Through Gap (in.).....	25-7/8	25-7/8
Length of Gap (in.).....	12-1/4	12-1/4
Distance between Centers (in.).....	40	60

Headstock:

Spindle Bore (in.).....	3-1/8	3-1/8
Spindle Mount.....	D1-8	D1-8
Spindle Taper with Sleeve	MT-7(MT-5)	MT-7(MT-5)
Number of Spindle Speeds	12	12
Range of Spindle Speeds (RPM)	25 to 1800	25 to 1800

Gearbox:

Number of Longitudinal and Cross Feeds	122	122
Range of Longitudinal Feeds (in./rev.).....	0.0015 to 0.0913	0.0015 to 0.0913
Range of Cross Feeds (in./rev.)	0.0006 to 0.0365	0.0006 to 0.0365
Number of Inch Threads	61	61
Range of Inch Threads (in.).....	1-5/8 to 72	1-5/8 to 72
Number of Metric Threads	24	24
Range of Metric Threads (mm).....	0.05 to 20	0.05 to 20

Compound and Carriage:

Maximum Tool Size (in.)	1 x 1	1 x 1
Maximum Compound Slide Travel (in.).....	5-1/8	5-1/8
Maximum Cross Slide Travel (in.)	9	9
Carriage Travel (in.).....	35	55

Tailstock:

Tailstock Spindle Travel (in.).....	5	5
Tailstock Taper.....	MT-4	MT-4

Steady Rest Capacity (in.)	1/2 to 3-1/2	1/2 to 3-1/2
Follow Rest Capacity (in.)	3/8 to 7	3/8 to 7
Width of Bed (in.).....	13-3/8	13-3/8
Overall Dimensions (in.)(LxWxH)	97-1/2 x 40 x 48	116-1/2 x 40 x 48
Motor.....	7-1/2HP, 3Ph, 230/460V*	7-1/2HP, 3Ph, 230/460V*
Approximate Net Weight (lbs.)	5475	5795

*pre-wired 230V

Specifications

Model Number.....	GH-1840ZX	GH-1860ZX	GH-1880ZX
Stock Number.....	321950	321960	321970

Capacities:

Swing over Bed (in.).....	18	18	18
Swing over Cross Slide (in.).....	11	11	11
Swing Through Gap (in.).....	27-1/2	27-1/2	27-1/2
Length of Gap (in.).....	12-1/4	12-1/4	12-1/4
Distance between Centers (in.).....	40	60	80

Headstock:

Spindle Bore (in.).....	3-1/8	3-1/8	3-1/8
Spindle Mount.....	D1-8	D1-8	D1-8
Spindle Taper with Sleeve	MT-7(MT-5)	MT-7(MT-5)	MT-7(MT-5)
Number of Spindle Speeds	12	12	12
Range of Spindle Speeds (RPM)	25 to 1800	25 to 1800	25 to 1800

Gearbox:

Number of Longitudinal and Cross Feeds	122	122	122
Range of Longitudinal Feeds (in./rev.).....	0.0015 to 0.0913	0.0015 to 0.0913	0.0015 to 0.0913
Range of Cross Feeds (in./rev.)	0.0006 to 0.0365	0.0006 to 0.0365	0.0006 to 0.0365
Number of Inch Threads	61	61	61
Range of Inch Threads (in.).....	1-5/8 to 72	1-5/8 to 72	1-5/8 to 72
Number of Metric Threads	24	24	24
Range of Metric Threads (mm).....	0.05 to 20	0.05 to 20	0.05 to 20

Compound and Carriage:

Maximum Tool Size (in.)	1 x 1	1 x 1	1 x 1
Maximum Compound Slide Travel (in.).....	5-1/8	5-1/8	5-1/8
Maximum Cross Slide Travel (in.)	9	9	9
Carriage Travel (in.).....	35	55	75

Tailstock:

Tailstock Spindle Travel (in.).....	5	5	5
Tailstock Taper.....	MT-5	MT-5	MT-5

Steady Rest Capacity (in.)	1/2 to 3-1/2	1/2 to 3-1/2	1/2 to 3-1/2
Follow Rest Capacity (in.)	3/8 to 7	3/8 to 7	3/8 to 7
Width of Bed (in.).....	13-3/8	13-3/8	13-3/8
Overall Dimensions (in.)(LxWxH)	97-1/2x40x48-7/8	116-1/2x40x48-7/8	136-1/8x40x48-7/8
Motor.....	7-1/2HP, 3Ph	7-1/2HP, 3Ph	7-1/2HP, 3Ph
.....	230/460V*	230/460V*	230/460V*
Approximate Net Weight (lbs.)	5980	6245	6590

*pre-wired 230V

Specifications

Model Number..... **GH-2280ZX**
Stock Number..... 321980

Capacities:

Swing over Bed (in.)..... 22
Swing over Cross Slide (in.) 11
Swing Through Gap (in.) 27-1/2
Length of Gap (in.)..... 12-1/4
Distance between Centers (in.) 80

Headstock:

Spindle Bore (in.)..... 3-1/8
Spindle Mount..... D1-8
Spindle Taper with Sleeve MT-7(MT-5)
Number of Spindle Speeds 12
Range of Spindle Speeds (RPM) 25 to 1800

Gearbox:

Number of Longitudinal and Cross Feeds 122
Range of Longitudinal Feeds (in./rev.)..... 0.0015 to 0.0913
Range of Cross Feeds (in./rev.) 0.0006 to 0.0365
Number of Inch Threads 61
Range of Inch Threads (in.)..... 1-5/8 to 72
Number of Metric Threads 24
Range of Metric Threads (mm)..... 0.05 to 20

Compound and Carriage:

Maximum Tool Size (in.) 1 x 1
Maximum Compound Slide Travel (in.)..... 5-1/8
Maximum Cross Slide Travel (in.) 9
Carriage Travel (in.)..... 75

Tailstock:

Tailstock Spindle Travel (in.)..... 5
Tailstock Taper..... MT-5

Steady Rest Capacity (in.) 1/2 to 3-1/2
Follow Rest Capacity (in.) 3/8 to 7
Width of Bed (in.)..... 13-3/8
Overall Dimensions (in.)(LxWxH) 136-1/8 x 40 x 48-7/8
Motor..... 10HP, 3PH, 230V/460V (pre-wired 230V)
Approximate Net Weight (lbs.) 7400

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 assembled 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 assembly, maintenance and safety instructions.

Contents of the Shipping Container

- 1 Lathe
- 1 Steady Rest (mounted on Lathe)
- 1 Follow Rest (mounted on Lathe)
- 1 10" Three Jaw Chuck (mounted on Lathe)
- 1 12" Four Jaw Chuck
- 1 Face Plate (12" Face Plate for 14" & 16" lathes; 16" Face Plate for 18" & 22" lathes)

- 1 Tool Box containing:
 - 1 Box Wrench Set
 - 1 Hex Wrench Set
 - 1 Spindle Sleeve
 - 1 Center
 - 6 Leveling Bolts
 - 6 Leveling Pads
 - 1 Flat Blade Screwdriver
 - 1 Cross Point Screwdriver
 - 1 Chuck Wrench
 - 1 Tool Post Wrench
 - 1 Light Bulb
 - 1 Adjustable Wrench
 - 1 Oil Gun
 - 1 Cross Feed Handle
 - 2 Shear Pins
 - 1 Live Center (MT4 for 14" & 16" lathes; MT5 for 18" & 22" lathes)
 - 1 Operating Manual
 - 1 Parts List Manual
 - 1 Warranty Card



contents of Tool Box

⚠️WARNING

Read and understand the entire contents of this manual before attempting set-up or operation! Failure to comply may cause serious injury.

Uncrating and Cleanup

1. Finish removing the wooden crate from around the lathe.
2. Unbolt the lathe from the shipping crate bottom.
3. Choose a location for the lathe that is dry, has good lighting, and has enough room to allow servicing the lathe on all four sides.
4. Sling the lathe as shown in Figure 1, using steel rods or pipes of sufficient strength inserted through the holes in the bed casting. **Do not lift lathe by the spindle.** With adequate lifting equipment, slowly raise the lathe off the shipping crate bottom. Make sure lathe is balanced before moving.
5. To avoid twisting the bed, the lathe's location must be absolutely flat and level. Check for a level condition using a machinist's precision level on the bedways both front to back and side to side. The leveling pads included in the tool box and the leveling screws in the lathe base will help you to reach a level condition. **The lathe must be level to be accurate.**
6. Clean all rust protected surfaces using a mild commercial solvent, kerosene or diesel fuel. Do not use paint thinner, gasoline, or lacquer thinner. These will damage painted surfaces. Cover all cleaned surfaces with a light film of 20W machine oil.
7. 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.

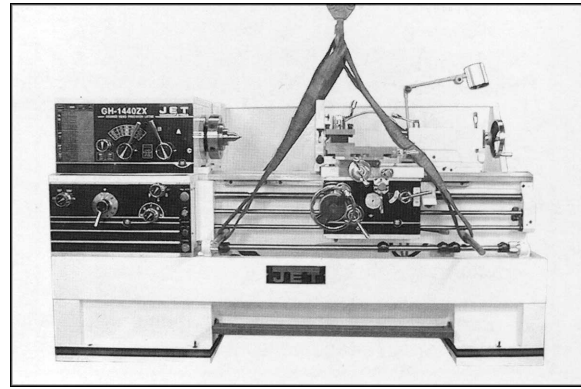


Figure 1

Chuck Preparation (Three Jaw)

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

NOTE: Before removing the chuck from the spindle, place a flat piece of wood (plywood, etc.) across the bedways under the chuck to prevent damage to the bedways should the chuck fall from your hands.

To remove the chuck:

1. Support the chuck while turning six camlocks 1/4 turn counterclockwise with the chuck wrench from the tool box.
2. Carefully remove the chuck from the spindle and place on an adequate work surface.

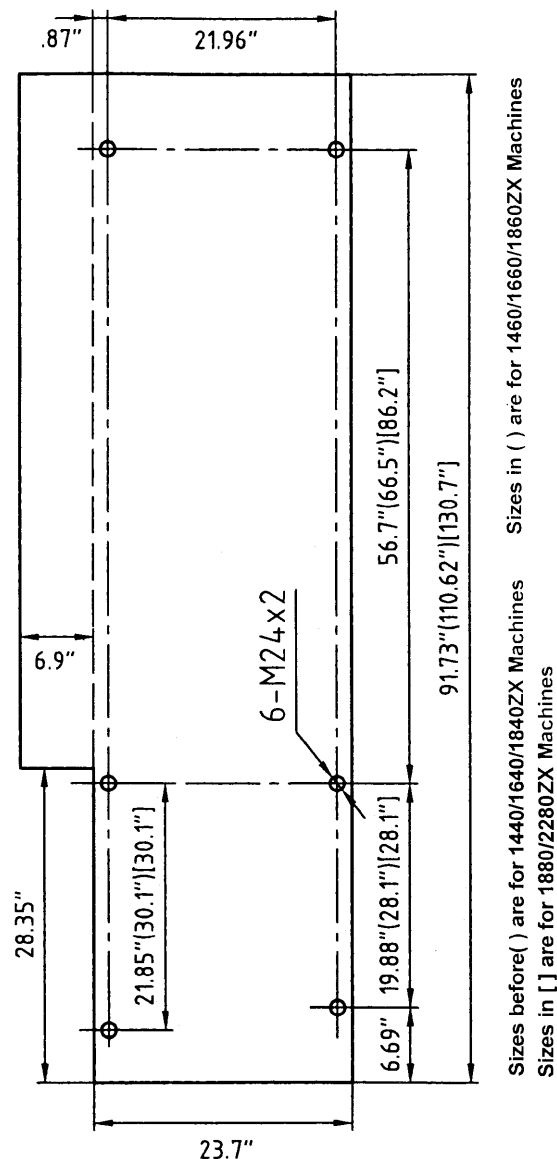


Figure 2

Sizes before () are for 1440/1640/1840ZX Machines Sizes in () are for 1460/1660/1860ZX Machines
 Sizes in [] are for 1880/2280ZX Machines

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 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 3) on the camlock should be between the two indicator arrows when tight (B, Figure 3). If the index mark is not between the two arrows, remove the chuck and adjust the camlock studs by either turning out one full turn (if cams will not engage) or turning in one full turn (if cams turn beyond indicator marks.)
6. Install chuck and tighten in place.

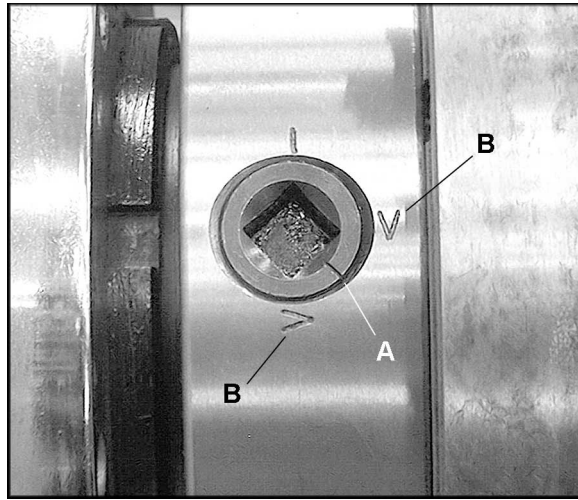


Figure 3

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.

1. **Headstock** – Oil must be up to indicator mark in oil sight glass (A, Figure 4). Top off with Mobil DTE® Oil Heavy Medium. Fill by removing the plug on top of the headstock. To drain, remove drain plug on the left side of the headstock at the lower rear corner. Drain oil completely and clean out all metal shavings. Refill after the first month of operation. Then change the oil in the headstock every two months.
2. **Gearbox** – Oil must be up to indicator mark in oil sight glass (B, Figure 4). Top off with Mobil DTE® Oil Heavy Medium. To add oil to the gearbox, remove two screws on the top cover and remove cover. To drain, remove drain plug (C, Figure 4) on the left side of the gearbox. Drain oil completely and refill after the first three months of operation. Then change oil in the gearbox every six months.
3. **Apron** – Oil must be between indicator marks in the oil sight glass (A, Figure 5). Top off with Mobil DTE® Oil Heavy Medium. Remove oil plug (B, Figure 5) to fill. To drain, remove drain plug on bottom of apron.

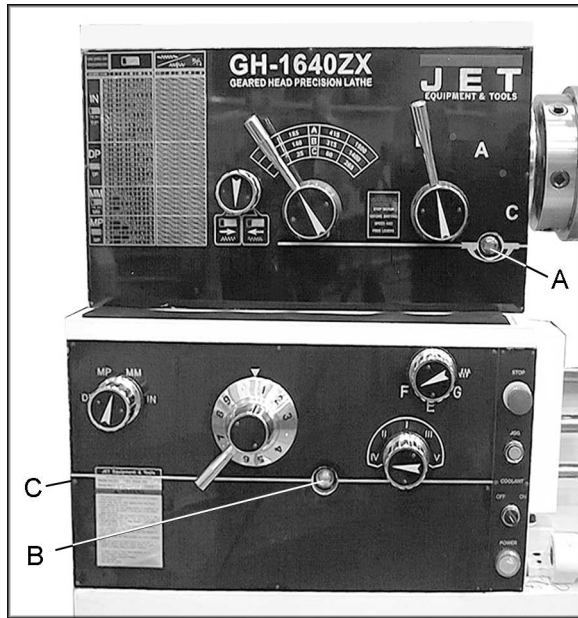


Figure 4

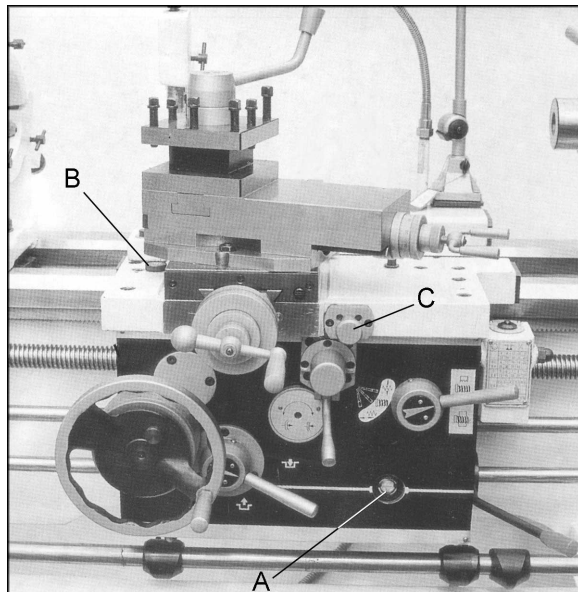


Figure 5

Drain oil completely and refill after the first three months of operation. Then, change oil in the apron annually. Pull knob (C, Figure 5) on the one-shot lube system and hold for several seconds to allow oil to fill the pump. When the knob is released, oil will flow through various oil lines to lubricate the ways and cross slide surface. Perform this twice daily or as needed. When the oil level is below the indicator mark, oil must be added.

4. **Leadscrew and Feed Rod** – Lubricate two ball oilers on the right side bracket (A, Figure 6) with 30W machine oil daily.
5. **Saddle** – Daily lubricate ball oiler (A, Figure 7) on handwheel shaft with Mobil DTE® Oil Heavy Medium.
6. **Compound Rest** – Daily lubricate two ball oilers (B, Figure 7) on top of compound slide with Mobil DTE® Oil Heavy Medium.
7. **Cross Slide** – Daily lubricate one ball oiler (C, Figure 7) with Mobil DTE® Oil Heavy Medium.
8. **Tailstock** – Daily lubricate one ball oiler (A, Figure 8) on top of tailstock with Mobil DTE® Oil Heavy Medium.

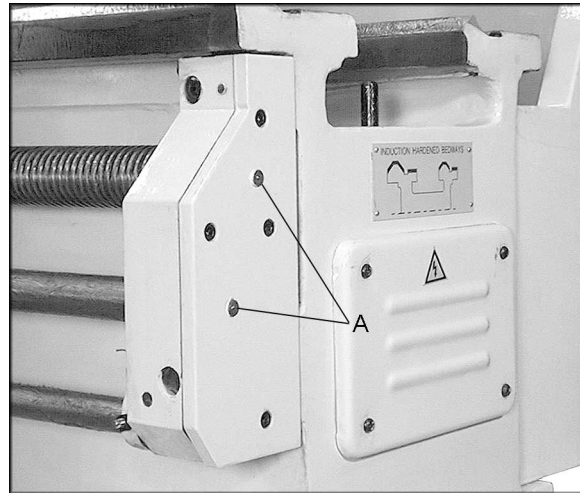


Figure 6

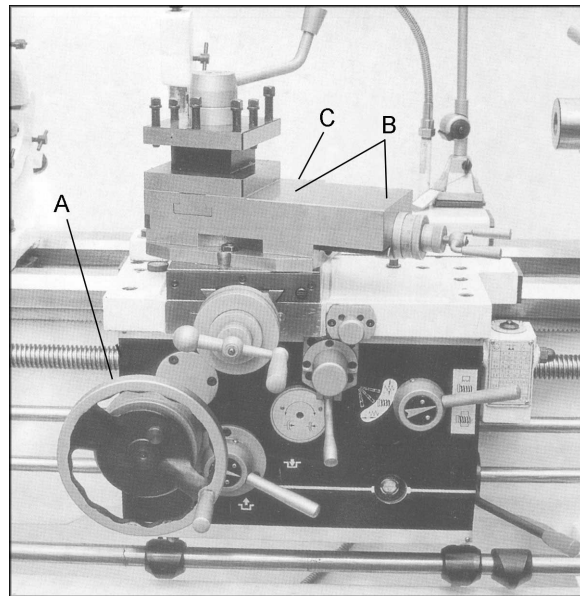


Figure 7

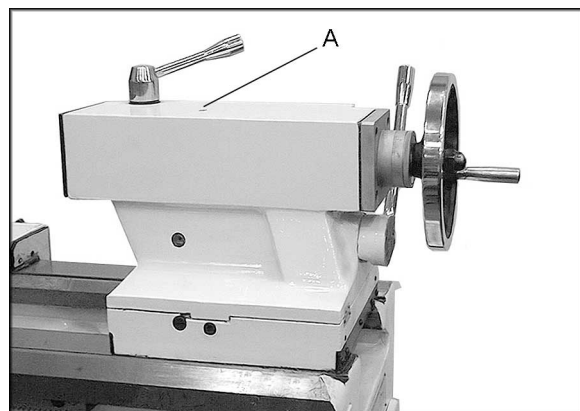


Figure 8

Coolant Preparation

CAUTION Follow coolant manufacturer's recommendations for use, care and disposal.

1. Remove access cover on tailstock end at the rear base of the lathe. Make sure coolant pump has not shifted during transport.
2. Pour four gallons (approximate) of coolant mix into the chip pan.
3. After machine has been connected to power, turn on coolant pump and check to see that coolant is cycling properly.
4. Replace access cover.

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 at 7-1/2 HP (or 10HP for model 2280ZX), 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.

Power is connected properly when rotating the forward-reverse knob (E, Figure 12) to the left position causes the spindle to rotate counterclockwise as viewed from the tailstock. If the chuck rotates in the clockwise direction, disconnect the lathe from the power source, switch any two of the three power leads (not the green ground wire), and re-connect the lathe to the power source.

Conversion to 460 Volt Operation

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

Main Motor: Change the wires according to the diagram on the outside of the motor junction box.

Transformer: Open electrical panel on rear of machine on the headstock side. Switch wire from 230V terminal to 460V terminal as outlined on the transformer.

Coolant Pump: Open access panel on the base at the tailstock end. Change wires in coolant pump junction box according to diagram on the outside of the junction box cover.

Main Power Switch (A, Figure 9): Turns power to machine on and off.

Power Source Cable Receiver (B, Figure 9).

Make sure the lathe is properly grounded.

General Description

Lathe Bed

The lathe bed (A, Figure 10) is made of cast iron with low vibration and high rigidity. Two precision ground v-slideways, reinforced by induction hardening and grinding, are an accurate guide for the carriage and headstock. The main drive motor is mounted in the stand below the the headstock.

Headstock

The headstock (B, Figure 10) is cast from high grade, low vibration cast iron. It is bolted to the bed by four hex socket cap bolts. In the head, the spindle is mounted on precision taper roller bearings.



Figure 9

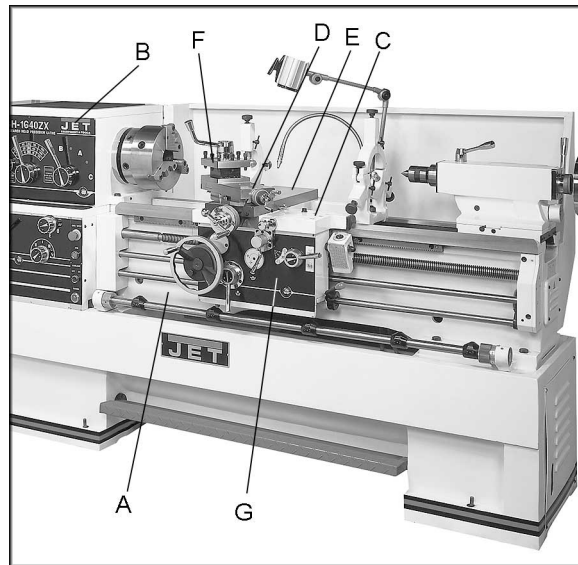


Figure 10

Carriage

The carriage (C, Figure 10) is made from high quality cast iron. The cross-slide (E, Figure 10) is mounted on the carriage and moves on a dovetailed slide which can be adjusted for play by means of the gibs.

The compound slide (D, Figure 10) which is T-slotted, and mounted on the cross slide (E, Figure 10) can be rotated 360°. The compound slide and the cross slide travel in a dovetailed slide and have adjustable gibs.

Four Way Tool Post

The four way tool post (F, Figure 10) is mounted on the compound slide and allows a maximum of four tools to be mounted at the same time. Remember to use a minimum of two clamping screws when installing a cutting tool.

Apron

The apron (G, Figure 10) is mounted to the carriage. Quick travel of the apron is accomplished by means of a bed-mounted rack and pinion, operated by the handwheel on the front of the apron.

Tailstock

The tailstock (H, Figure 11) 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 Morse Taper #4, or Morse Taper #5 (18" and 22" models).

Leadscrew and Feed Rod

The leadscrew (J, Figure 11) and feed rod (K, Figure 11) 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. Both are equipped with shear pins.

Feed Gearbox

The gearbox (L, Figure 11) is made from high quality cast iron and is mounted to the left side of the machine bed.

Steady Rest

The steady rest (M, Figure 11) 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. The sliding fingers require continuous lubrication at the contact points with the workpiece to prevent them from premature wear.

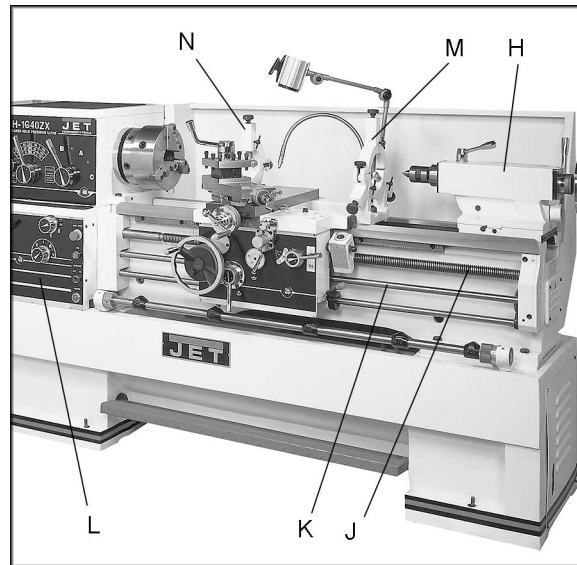


Figure 11

To set the steady rest:

1. Loosen three hex socket cap screws.
2. Loosen knurled screw and open sliding fingers until the steady rest can be moved with its fingers around the workpiece. Secure the steady rest in position.
3. Set the fingers snugly to the workpiece and secure by tightening three hex socket cap screws. Fingers should be snug but not overly tight. Lubricate sliding points with lead-based grease.

Follow Rest

The traveling follow rest (N, Figure 11) is mounted on the saddle and 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 workpieces. It prevents the workpiece from flexing under the pressure of the cutting tool.

The sliding fingers are set similar to the steady rest, free of play, but not binding. Always lubricate adequately with lead-based grease before operating.

Controls

1. **Control Panel:** located on front of headstock.
 - **Coolant On-Off Switch** (A, Figure 12) turns coolant pump on and off.
 - **Power Indicator Light** (D, Figure 12) is lit whenever lathe is receiving power.
 - **Emergency Stop Switch** (C, Figure 12) stops all machine functions (**Caution:** Lathe will still have power). Twist clockwise to re-set.
 - **Jog Switch** (B, Figure 12). Quickly press and release to rotate the spindle.
2. **Headstock Gear Change Levers** (F, Figure 12): Located on front of headstock. Move levers left or right to desired spindle speed.
3. **Leadscrew/Feed Rod Directional Lever** (E, Figure 12): Located on front of headstock at lower left. Changing knob changes direction of feed.

CAUTION Do not move knob while machine is running.

4. **Feed/Lead Selector Lever** (H, Figure 12): Located on front of headstock. Used when setting up for threading or feeding.

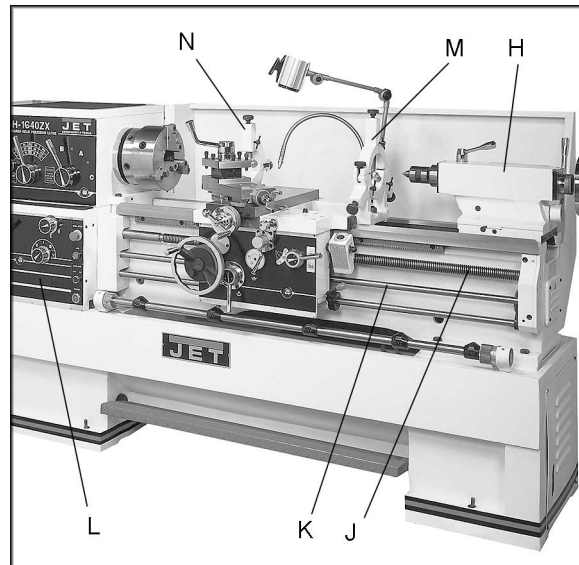


Figure 11 (repeated)

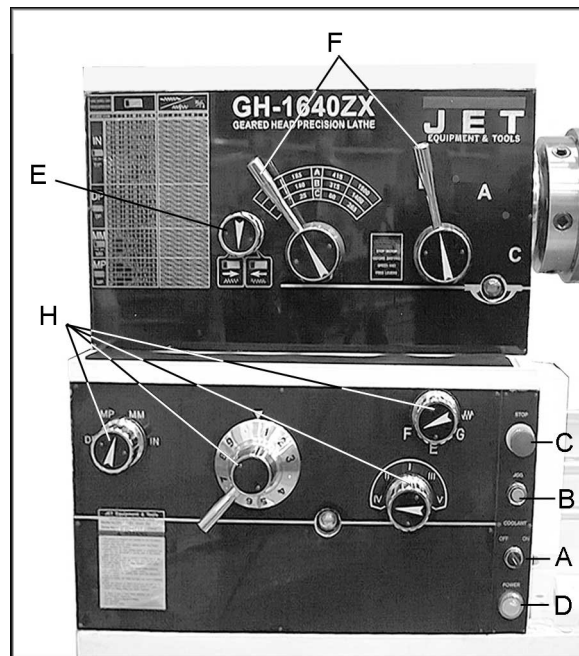


Figure 12

5. **Compound Slide** (L, Figure 13) is located on top of the cross slide and can be rotated 360°. There are calibrations in degrees (M, Figure 13) below the rest to assist in placement of the compound slide to the desired angle.
6. **Compound Lock** (not shown): Lever located on back of compound slide. Turn clockwise to lock and counterclockwise to unlock.
7. **Cross Slide Lock** (A, Figure 13): Lever located on left side of cross slide. Turn clockwise to lock and counterclockwise to unlock.
8. **Carriage Lock** (B, Figure 13): 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.

9. **Longitudinal Traverse Handwheel** (C, Figure 13): Located on the apron assembly. Rotate handwheel clockwise to move the apron assembly toward the tailstock (right). Rotate the wheel counterclockwise to move the apron assembly toward the headstock (left).
10. **Longitudinal/Cross Feed Selector Lever** (E, Figure 13): Can be pushed to upper, middle and lower three positions. Push the lever up, cross feed is effected. Push the lever down, longitudinal feed is effected. When the lever is in the middle position, screws can be cut by engaging the half nut.
11. **Half Nut Lever** (D, Figure 13): Located on the front of the apron assembly. Used for threading.
12. **Feed Engage Lever** (G, Figure 13): Located in the front of the apron assembly. Pull lever up to engage. Push lever down to disengage.
13. **Adjustable Feed Clutch** (F, Figure 13): When the machine is overloaded, it can slip. Then cutting rate must be reduced. **Note:** This setting has been calibrated at the factory and should not need adjustment. If adjustment ever becomes necessary, follow the diagram on the front of the apron.
14. **Cross Traverse Handwheel** (H, Figure 13): Located above the apron assembly. Clockwise rotation moves the cross slide toward the rear of machine.

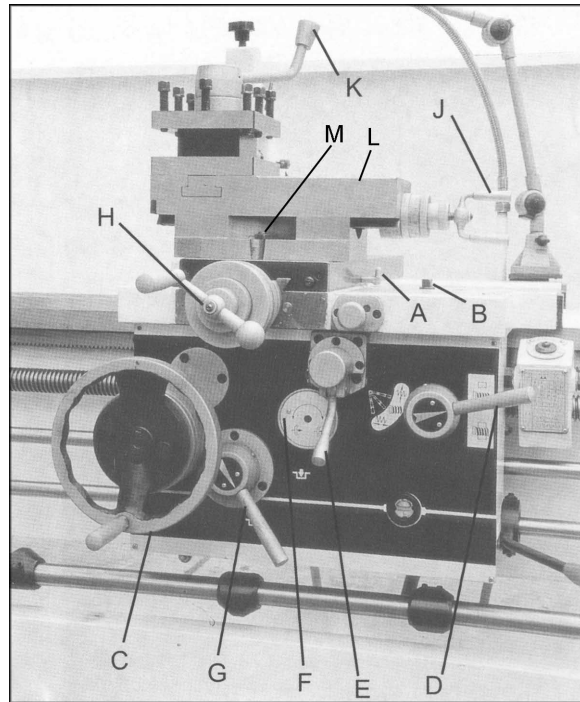


Figure 13

15. **Compound Rest Traverse Handle** (J, Figure 13): Located on the end of the compound slide. Rotate clockwise or counterclockwise to position.
16. **Tool Post Clamping Lever** (K, Figure 13): Located on top of the tool post. Rotate counterclockwise to loosen and clockwise to tighten.
17. **Tailstock Quill Clamping Lever** (A, Figure 14): Located on the tailstock. Rotate clockwise to lock the sleeve. Rotate counterclockwise to unlock.
18. **Tailstock Clamping Lever** (B, Figure 14): Lift up to lock. Push down to unlock. If the tailstock has a heavy load, tighten the hexagon head at right side of the tailstock for auxiliary locking.
19. **Tailstock Quill Traverse Handwheel** (C, Figure 14): Rotate clockwise to advance the quill and counterclockwise to retract it.
20. **Tailstock Off-Set Adjustment** (D, Figure 14): Two hex socket cap screws located on the tailstock base are used to off-set the tailstock for cutting tapers. Loosening one screw while tightening the other will off-set the tailstock. Do not clamp the tailstock lock handle when adjusting.
21. **Foot Brake** (A, Figure 15): The connecting rod mechanism is in the bed stand. The braking device is in the pulley of the headstock. Press the pedal to stop all lathe functions. (**Caution:** Lathe still has power.)
22. **Micro Carriage Stop** (B, Figure 15): can be used during manual feed operation. The dial can be turned for fine tuning the position of the stop. The micro carriage stop can be moved along the bed by loosening the two socket head cap screws underneath the stop.
23. **Bed Cover** (C, Figure 15): can be easily removed to clean out the stand.

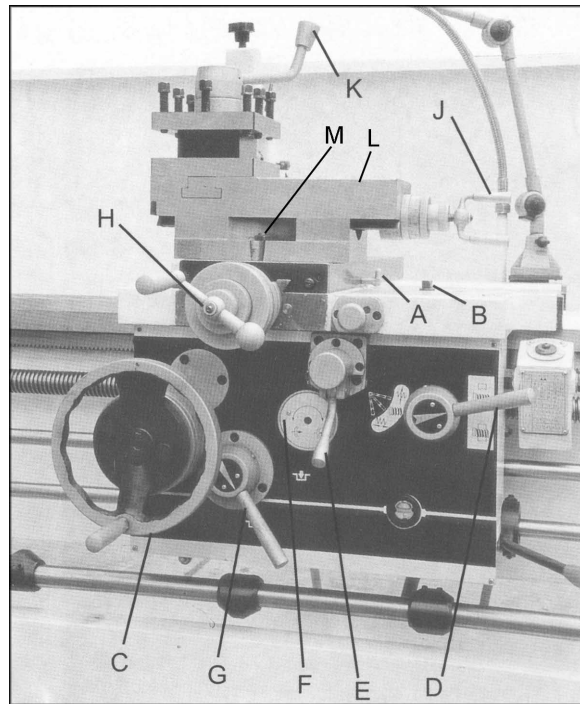


Figure 13 (repeated)

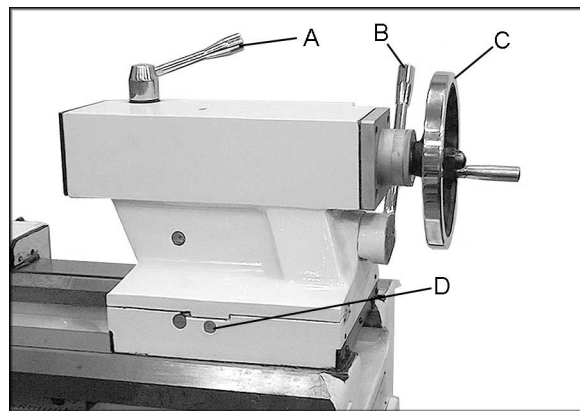


Figure 14

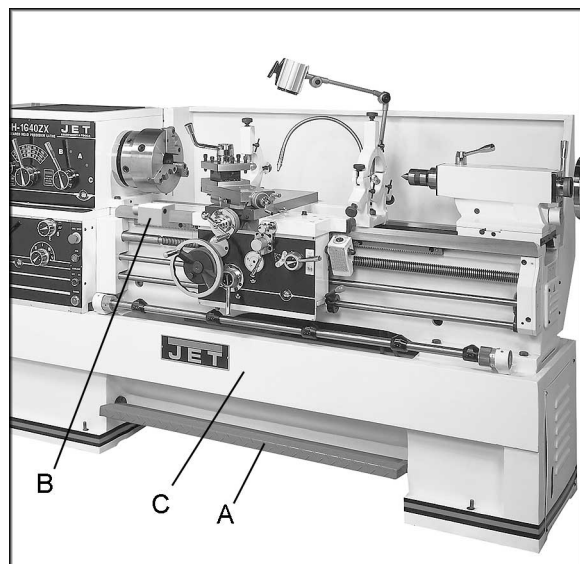


Figure 15

Operation

Feed and Thread Selection

1. Reference the feed and thread chart on the front of the headstock (A, Figure 16).
2. Move levers and knobs (B/C/D/E, Figure 16) to the appropriate position according to the feed and thread chart.

Thread Cutting

1. Set forward/reverse lever (F, Figure 16) to desired direction.
2. Set selector levers (G/H, Figure 16) to desired R.P.M.
3. Select desired thread using levers (B/C/D/E, Figure 16).
4. Set selector lever (A, Figure 17) to correct position (neutral).
5. Engage the half nut lever (B, Figure 17).
6. Make a test cut with scrap material and check results before cutting regular material.

Gib Adjustments

After a period of time, some of the moving components may need to be adjusted due to wear.

Saddle

Turn gib screws on either side of the saddle at the rear to adjust the drag on the saddle.

Cross Slide

Turn gib screws in the front and rear of the gib to adjust the drag of the cross slide.

Compound Slide

Turn gib screws to adjust the drag of the compound slide.

Tailstock Off-Set

Follow the procedure below to off-set the tailstock to cut shallow tapers:

1. Loosen tailstock in position by lowering locking handle (B, Figure 18) and loosening hexagon head eccentric shaft at back of tailstock.
2. Alternately loosen and tighten front and rear screws (D, Figure 18). **Note:** Front screw is shown.

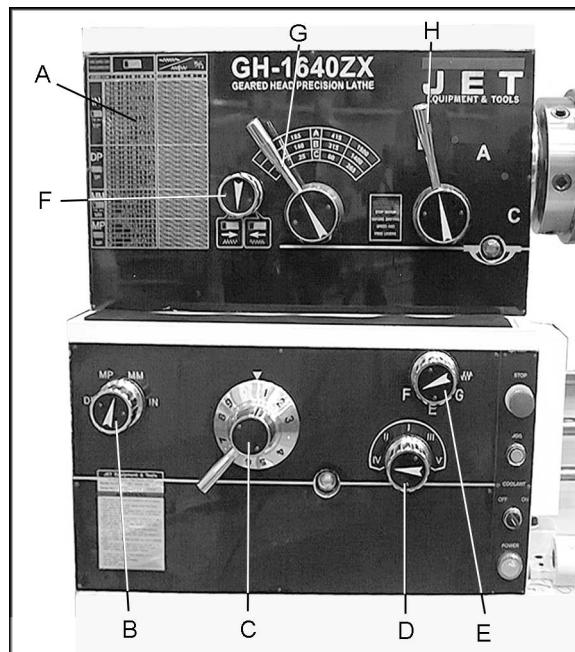


Figure 16

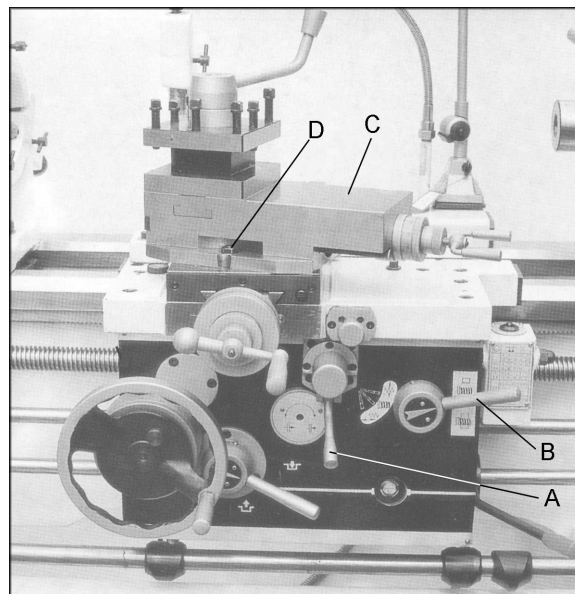


Figure 17

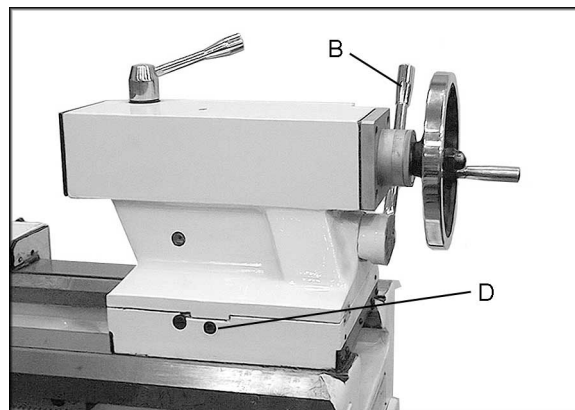


Figure 18

Removing Gap Section

1. To remove the gap section, remove four hex socket cap screws, and two hex cap bolts.
2. Tighten the hex nuts on the tapered alignment pins to loosen the pins. Once loosened, they can be removed.
3. Gap section can now be removed.

Installing Removable Gap Section

1. Clean the bottom and the ends of the gap section thoroughly.
2. Set gap section in place and align the ends.
3. Loosen the nuts on the locating pins and push down through the gap into the lathe bed.
4. Replace four hex socket cap screws and tighten alternately until all are snug.

Belt Replacement and Adjustment

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 19). 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 19) and tightening upper nut (A, Figure 19) until light finger pressure causes approximately 3/4" deflection on each belt.
7. Install covers and connect lathe to the power source.

Aligning Tailstock to Headstock

1. Fit a 12" ground steel bar between centers of the headstock and tailstock (Figure 20).
2. Fit a dial indicator to the top slide and traverse the center line of the bar.
3. If adjustment is needed, align the tailstock using the off-set screws (D, Figure 21) until the tailstock is aligned.

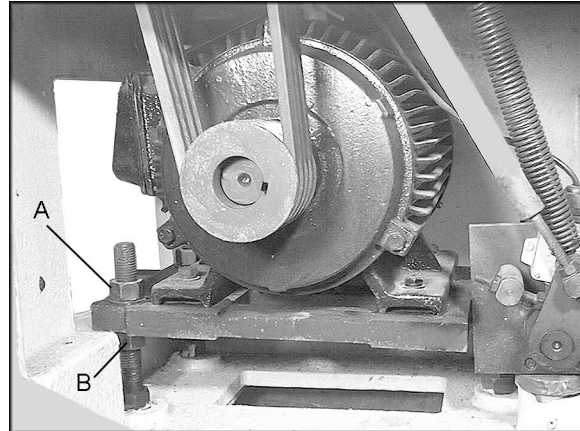


Figure 19

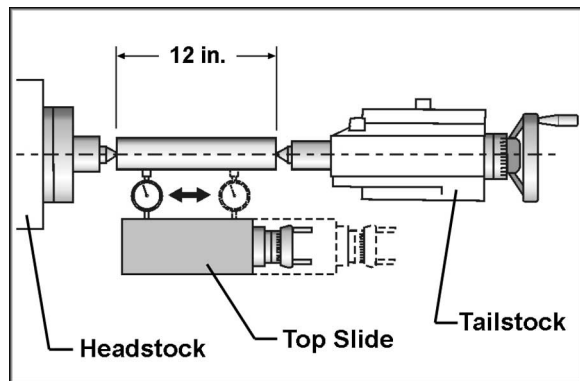


Figure 20

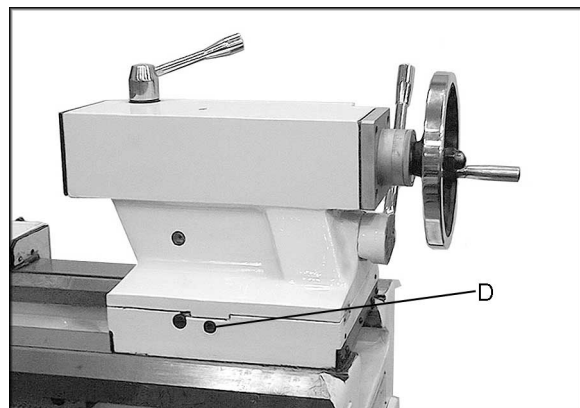


Figure 21