Smithy® INDUSTRIES

MI-1440L OPERATOR'S MANUAL

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Smithy Ind.

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Chapter 1

Introduction

Welcome

To the manual for the Smithy MI-1440L lathe. It will teach you about the parts of the machine and how to take care of your investment. This manual is complete and current at the time of printing*. In our continuing effort to bring you the best in machine tools, changes may be made - please visit us at **www.smithy.com** for the latest updates.

This manual—and any other manuals associated with this Smithy machine—should remain with the machine. If ownership changes, please include the Operating Manual with the machine.

Please read the operating manual carefully and closely. Follow the procedures described. If you don't understand how your machine works, you risk injury to yourself or others. Misuse can cause damage to the machine or to your project. To learn more about general machining practices you can turn to a number of sources. The Smithy website has a series of Machinist Training Videos under the Machining Helps section of website heading. Smithy also offers books that meet the needs of Congratulations on the purchase of your Smithy Milling Machine. We welcome you to the Smithy family of quality machine owners. Smithy strives to provide you with the best in machines and service. Please read through this manual carefully to ensure that you achieve maximum performance from your MI-1440L lathe.

We also suggest your local library as a resource. Enrolling in a machining class will give you the best opportunity to learn about machining from professionals in a supportive environment.

Suggestions or Comments

We are interested in any suggestions you might have to improve our products and services. Feel free to contact us with your suggestions by phone or in writing. If you have comments about this operator's manual, or if

you have a project you'd like to share with other Smithy owners, contact Smithy Industries, P.O. Box 1517, Ann Arbor, MI 48106-1517. You can also send an e-mail to: info@smithy.com

Questions?

If you have questions not covered in the manuals, please call our toll-free number:

1-800-476-4849

Our friendly service technicians are available Monday through Friday from 8:00 am. to 5:00 pm. Eastern Standard Time. You can also e-mail your questions 24 hours a day to **info@smithy.com.**

Customer Information

Please record the information below about your Smithy machine. Having this information readily available will save time if you need to contact Smithy for questions, service, accessories, or replacement parts.

Model number:_____
Serial Number: _____
Purchase Date: _____
Delivery Date: _____

We look forward to a long working relationship with you, and thank you again for putting your trust in Smithy.

Chapter 2

Safety

Overview
Smithy machines are proven to be safe and reliable; however, if abused or operated improperly, any machine can cause injury. Please read this manual carefully before you start machining. Proper use will create a safe working environment and prolong the life of your machine.

Symbols Used In This Manual
In this manual, the symbols below draw attention to specific operating issues:

CAUTION

Potential hazard, unsafe situation, or potential equipment damage that may result in injury to yourself or damage to your machine.

DANGER

Hazardous situation which if not avoided could result in series injury or death.

WARNING

Potential hazard, unsafe situation, or equipment damage could result in death or serious injury.

! NOTICE !

Alerts user to helpful and proper operating instructions.

Shop Safety Rules

Your workshop is only as safe as you make it. Take responsibility for the safety of those who use or visit it. This list of rules is by no means complete, so remember that common sense is a must.

DANGER

Smithy strongly discourages the use of casters or wheels on metal-working machine benches. The weight of the machine could result in the bench tipping while being moved. Once the machine is mounted, consider your workbench to be permanent. If you must move the machine, first remove it from the bench.

WARNING – Preparing to Operate Machine

1. Read this manual thoroughly before operating your machine. Don't try to do more than you or your machine can handle. Understand the hazards of operating a machine tool. In particular, remember never to change speeds or setups until the machine is completely stopped and never operate it without first rolling up your sleeves.

2. Wear proper clothing. Avoid loose-fitting clothes, gloves, neckties, or jewelery that could get caught in moving parts. If you have long hair, tie it up or otherwise keep it from getting into the machine. Always wear non-slip footwear.

3. Protect yourself. Use ANSI approved safety glasses, goggles, or a face shield at all times. Use safety glasses designed for machinery operation; regular glasses will not do. Have extras available for visitors. Know when to wear a face mask or earplugs as well.

4. Keep your work area clean and organized. Cluttered work areas and benches invite accidents. Have a place for everything and put everything in its place.

5. Childproof your work area and keep children away from the

machine while it is in use. Childproof your shop with padlocks, master switches, and starter keys or store the machine where children do not have access to it.

6. **Never operate your machine under the influence of drugs and alcohol.**

7. Keep track of tools. Remove adjusting keys and wrenches from the machine before operating. A chuck key or misplaced Allen wrench can be a safety hazard.

8. Avoid accidental starts. Turn the switch to the OFF position before plugging in the machine. Turn the speed dial to zero, if you have a variable speed drive, before starting your machine.

9. Ground your machine. The machine has a three-conductor cord and three-prong, grounding-type plug. Never connect the power supply without proper grounding

10. Keep your mind on your work. By paying attention to what you are doing and avoiding distractions you will spend many safe, enjoyable hours in your workshop.

11. Never leave your machine running unattended!

Attention! - Machine Operation Safety Rules

1. Stop the machine before servicing. Stop the machine before making changes, removing debris, or measuring your work.

2. Don’t over reach. Don’t reach over the machine when it’s operating. Keep your hands out of the way.

3. Turn the switch OFF. Turn the switch to off before plugging in the machine. If your machine is equipped with variable speed control, turn the speed dial to zero before starting your machine.

4. Use proper tooling. Use only recommended accessories and understand how they should be used before trying them out. Don’t try to make a tool into something it isn’t or attempt to use a tool in inappropriate ways. Remember to always use the proper tooling for the material you are cutting. Reference a general machining guide such as Machinist Ready Reference for recommended tooling for your material.

5. Secure your work. Before starting your machine, be certain that your work piece is properly and securely mounted. Flying metal is dangerous!

6. Do not run you machine beyond its limits of travel. Before starting your project, ensure that your work area does not go beyond the limits of travel on your machine. Going beyond the limits of travel will cause serious damage to your machine which will not be covered by your warranty.

7. Run your machine at recommended spindle speeds and feed rates. Always cut at the recommended speed and feed rates for the type of metal that you are cutting for optimum performance. Do not begin your cut until the machine has reached the full and proper speed.

8. Do not change the direction of the spindle rotation or lead screw rotation while your machine is running. Changing the rotation direction of the spindle or lead screw while your machine is running could cause serious damage to your machine.

9. Do not stop the spindle by hand. Always use your on/off switch to stop the spindle from rotating.

10. Do not clear chips by hand. Metal chips are very sharp and can easily cut your hand. Use a brush to clear chips.

11. Protect bed ways. When removing or installing tooling from your lathe spindle, place a piece of wood or other material across the bed to protect the ways from being damaged if the tooling is dropped.

12. Keep your machine maintained. Always replace worn or damaged parts before using your machine to prevent damage to your machine or the operator. Follow the maintenance schedule outline in this manual for peak performance.

Chapter 3

MACHINE SPECIFICATIONS – MI-1440L LATHE

ELECTRICAL SPECIFICATIONS

Power Requirements	110 or 220V, Single Phase, 60 Hz
Phase	Single
Plug	NEMA 5-15P (Included)
Outlet	NEMA 5-15R (Outlet Not Included)
Connection Type	Plug & Cord
Horse Power	2HP
Motor Voltage	110 or 220V
Motor Amperage	18 Amps (110) 9 Amps (220)
Motor Type	A/C Constant Speed Induction

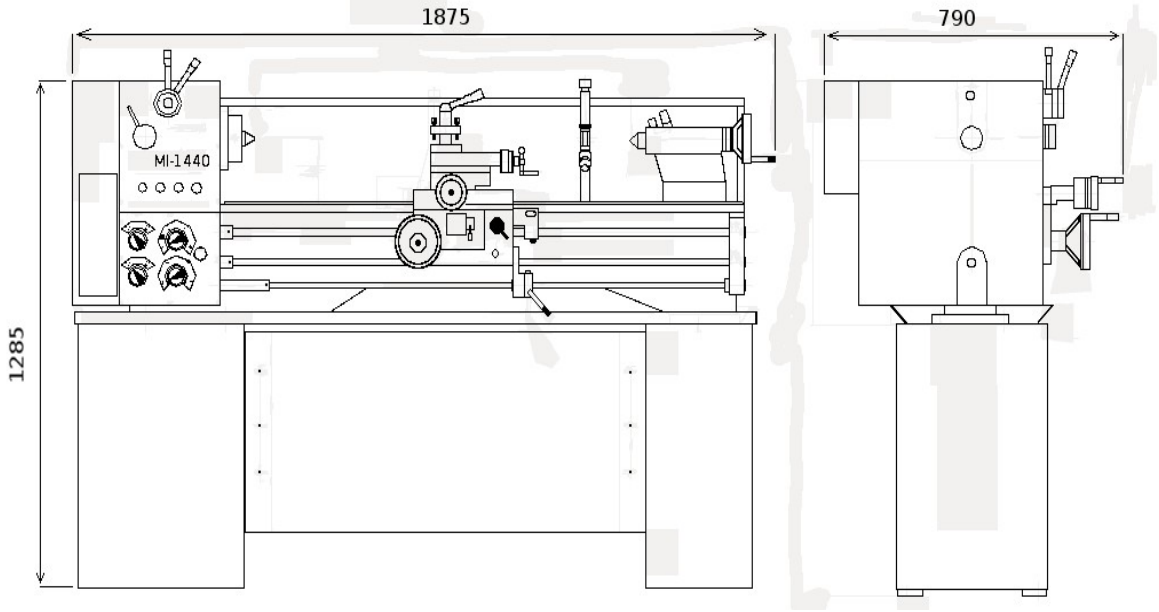
PRODUCT DIMENSIONS

Machine Weight	1340 lbs.
Machine Length	70”
Machine Height	32”
Machine Width	30”
Shipping Weight	1500 lbs.
Shipping Length	76”
Shipping Width	30”
Shipping Height	31”

MACHINE SPECIFICATIONS

Work Area Requirements	30” x 53-1/2”
Powerfeed (Z Axis)	Yes
Powerfeed (X Axis)	Yes
X-Axis Travel	6.5”
Z-Axis Travel (Tailstock Installed)	33” see note below
Threading Dial	Yes
Lathe Chuck Bore	2”
Spindle Taper	MT6
Spindle Speeds	70-120-190-300-460-1250-2000
Distance Between Centers	40”

Dial Calibration on Longfeed	.01”
Dial Calibration on Crossfeed	.002”
Dial Calibration on Tailstock	.001”
Dial Calibration on Toolpost	.001”
Powerfeed Z-Axis in/r	.002”-.055”/ rev
Powerfeed X-Axis in/r	.0002”-.019”/ rev
Oiled Gear Boxes	Yes
Lathe Chuck Diameter	8”
Lathe Chuck Min Diameter Workpiece	1/8”
Lathe Chuck Max Diameter Workpiece	8”
Lathe Chuck Type	3 Jaw & 4 Jaw
Lathe Chuck Mount	D1-5
Spindle Bore	2”
Swing Over Worktable	7.5”
Swing Over Bed	14”
Swing w/Gap Removed	18.75”
Spindle Accuracy TIR	.0003”
Tailstock Barrel Travel	4”
Tailstock Taper	MT3
Tailstock Offset	3/8”
Threads (Inch)	4-56 TPI
Threads (Metric)	.4-7mm
Tool size	1/2” & 5/8”



Chapter 4

Inventory Check List

Overview

It is a good idea to take inventory of the parts of your machine soon after it is unpacked. By doing so, you can quickly determine if any parts are missing. In addition, should you find it necessary to return the machine to Smithy the inventory will ensure that all the parts you received have been returned along with the machine.

A third reason to perform an inventory is to become familiar with the names of all of the parts of your Smithy machine.

Items Included With Your Machine

The items listed below are shipped in the same crate as your MI-1440L Lathe. Please check if the following items are present:

83-945	Owner's Manual
83-942	Binder for manual
G20003	Allen Wrench, 3 mm
C30540	Allen Wrench, 4 mm
C30542	Allen Wrench, 5 mm
C30537	Allen Wrench, 6 mm
C30536	Allen Wrench, 8 mm
72-001	Drill Chuck ½ "
73-033	Arbor, MT3 TO JT33
C30533	Key, Drill Chuck
81-503	Plug
41-003	Dead Center, MT3 (2)
41-103	Live Center, MT3
Z40004	Sleeve, MT5 to MT3
XXXXXX	Sleeve, MT6 to MT5
Z40056	Tool Post Wrench
G20131	Wrench, 13/16 mm
C30335	Wrench, 17/19 mm
80-100	Oil Can
15-020	Air Mask
15-015	Goggles
15-025	Ear Plugs
49-101	Cutting/Tapping Fluid
43-01(1-5)	Carbide Bits

Key, Lathe Chuck
3 Jaw Chuck 8" & Outside Jaws
4 Jaw Chuck 8"
Face Plate 10"
Compound Angle Toolpost
Steady Rest & Follow Rest

Missing Items?

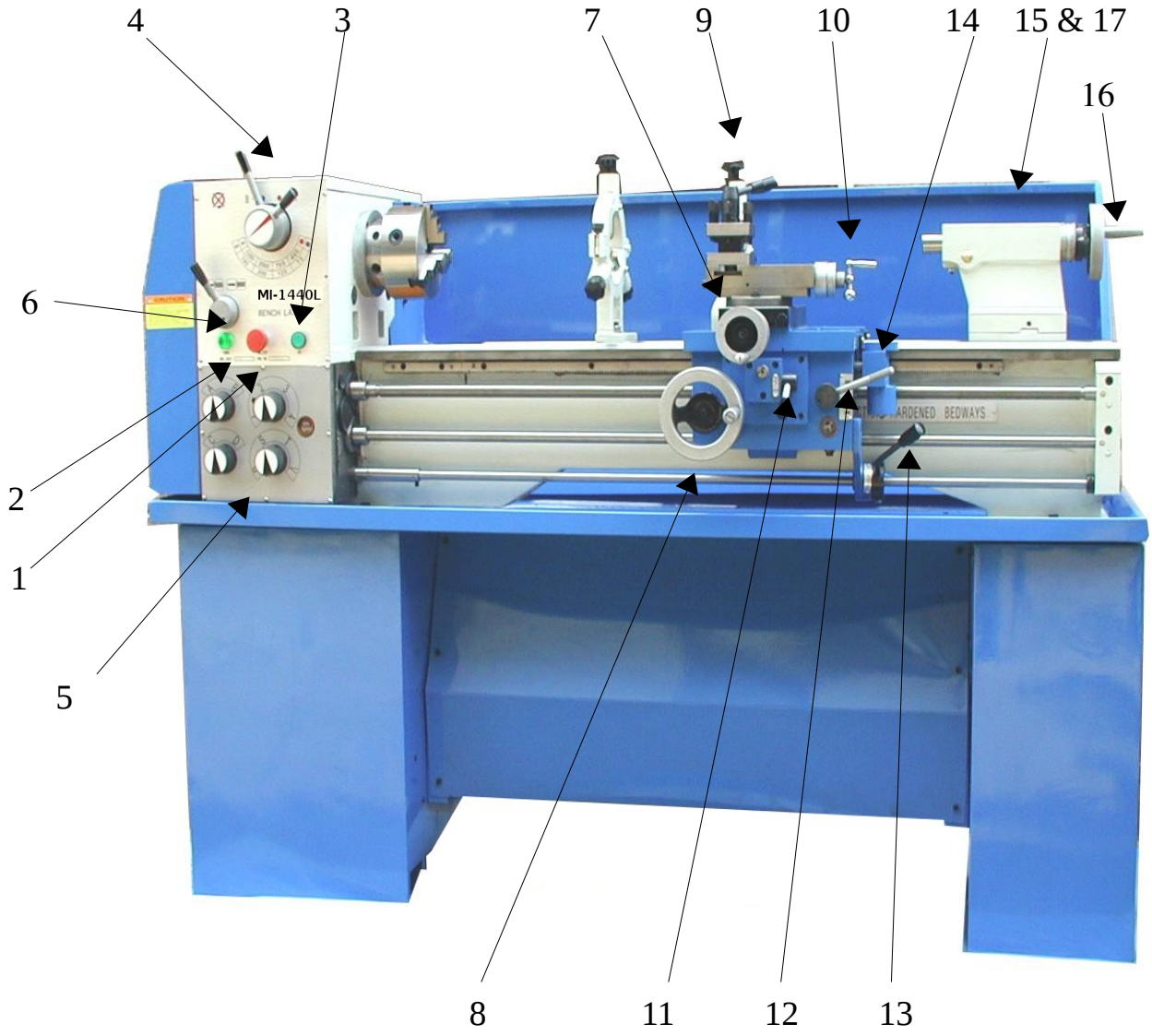
If you find that an item is missing or defective from your Quick Start Tool Pack
Call Us TOLL FREE 1-800-476-4849 or send an e-mail to **info@smithy.com**
within 30 days of receiving your machine so that we may assist you immediately.
Our sales and service technicians are available 9am to 5:30pm ET, Monday through Friday.

Chapter 5

Machine Overview

Overview

This chapter will help you to familiarize yourself with the Smithy MI-1440 Lathe. The figure below identifies the major controls for your machine.



1. E-Stop and start button
2. Machine on indicator
3. Jog button
4. Spindle speed selectors
5. Feed and thread selectors
6. Feed direction selector
7. Cross feed handwheel

8. Longitudinal feed hand wheel
9. Tool Post handle
10. Toolpost feed handle
11. Powerfeed engagement selectors
12. Threading half nut
13. Spindle forward/reverse selectors
14. Threading dial
15 & 17. Tail stock locks on back side of tail stock
16. Tail stock barrel handwheel

EXPLANATION OF COMPONENTS

1 **E-stop / Power On-Off Switch** Pushing this button in shuts off all power to the machine. To turn the power on, rotate the switch counterclockwise until the red portion of the switch pops out and the power indicator light illuminates.

2 **Power Indicator** This indicator light will illuminate when the E-stop button is out, It shows that the machine is ready to run.

3 **Jog Button** Pressing this button will make the lathe motor run in the forward direction for just as long as the button is held in. When the button is released the motor will stop. This is used for moving the chuck small amounts during some setup operations.

4 **Spindle Speed Selectors** The lathe spindle has two speed selector handles that are used together to select the desired spindle speeds. There is a spindle speed chart on the lathe head showing handle positions for desired speeds. It may be necessary to rotate the lathe spindle by hand in order to get the selector lever fully into position.
Do not move this control when the spindle motor is running!

5 **Feed and Thread Selectors** The four selectors are used to set desired cutting speeds and thread pitches. Detailed instructions are found in chapter 10
Do not move this control when the spindle motor is running!

6 **Feed Direction Selector** The power feed can feed either from the chuck toward the tail stock or from the tailstock toward the chuck. This handle lets you choose the desired direction of feed.
Do not move this control when the spindle motor is running!

7 **Cross Feed Handwheel** Turning this handwheel moves the entire carriage/crossfeed assembly left and right along the length of the machine. This is used for positioning and manual cutting.

8 **Long Feed Handwheel** Turning this handwheel moves the entire crossfeed assembly left and right. This is used for positioning and manual cutting.

9 **Tool Post Handle** This revolves the tool turret in to 4 different positions.

10 **Tool Post Feed Handwheel** This moves only the upper part of the compound angle too post. The direction of movement depends on the angle that the tool post is set at the time.

11 **Powerfeed Engagement Lever** Moving this lever to the left and up will activate the power crossfeed. Moving the lever to the right and down will activate the power longitudinal feed.

12 **Half Nut (Threading) Lever** Pushing this lever down activated the longitudinal feed for threading.

13 **Motor Fwd/Rev Engagement** Pulling this lever upward will run the spindle motor in the forward direction. Moving the lever downward will run the spindle motor in the reverse direction. Placing the lever in the middle position is off and will stop the motor.

14 **Threading Dial** The thread dial is used for coordinating multiple passes when cutting a thread. Detailed instructions are found in chapter 11.

15 **Tailstock Lock Handle** Pushing this lever downward will lock the tailstock to the bed of the machine.

16 **Tailstock Feed Handwheel** Rotating this handwheel will move the barrel in and out of the tailstock casting.

17 **Tailstock Barrel Lock Handle** This handle will lock the tailstock barrel in position in the tailstock casting.

Chapter 6

Setting Up Your Machine

Overview
Moving a machine tool can be dangerous. Improper techniques and methods may injure you and/or damage the machine. To find a professional to move and site your Smithy machine to look in your local Yellow Pages under “Machine Tools, Moving and/or Rigging.” If there is no such listing or your community does not have a rigging specialist, a local machine shop or machinist may be able to provide a referral.

Remember to use caution when moving your new Smithy.

Site selection

Before mounting the machine, select a sight that affords easy access to the machine and is clear of obstructions.

The floor should be as level as possible and sturdy enough to support the machine and stand.

Mount machine to a sturdy table on a solid concrete foundation. Smithy's 80-055 stand has holes drilled to accommodate the hole pattern of the MI-1440 Lathe.

If your plans are to make your own stand, please reference the hole pattern shown above.

Before mounting your machine, make sure that the location is adequately suited for the machine. Allow enough clearance in the back to access the electrical box and enough clearance on the sides of the machine to allow for full X-Axis travel.

Lifting Your Machine & Placing it On the Stand

Once you have found a suitable location for your new lathe, you will need a mechanical lifting device, such as a engine hoist or fork lift, to remove the machine from the pallet and to place it on the stand.

Remove the bolts, securing the machine to the pallet and any loose boxes or parts that may fall off the machine while moving it.

Attach appropriately rated chains or tow straps to the machine.

HEADSTOCK

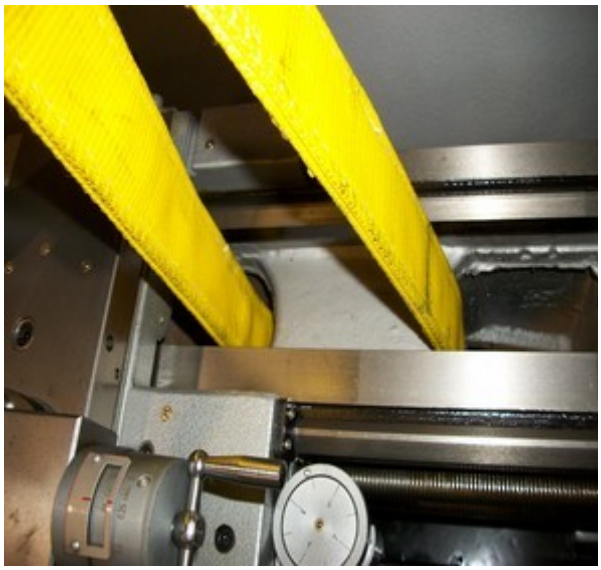
Run down behind the machine bed up close to the head stock. Bring the strap under and up on the front side. Place a short 2 x 4 under the lower selector rod to keep it from getting bent when lifting the machine.

New picture is needed

TAILSTOCK

Run the carriage to the right end of the machine.

Drop the strap or chain down along the right side of the carriage and around the bed webbing below, then up on the other side of the web.



Attach the straps or chains to a hoist of forklift.

Slowly lift the machine slightly off the pallet to see if the machine is properly balanced. If machine is not balanced, lower the machine back to the pallet and reposition the chains or tow ropes, until a good balance is achieved.

Once the machine is balanced, slowly lift the machine off the pallet. Do not rise the machine up until it is ready to place it on the stand.

When at the machine stand, use a couple of pieces of all-thread, steel rod or long bolts to align the holes in the machine base to the holes in the machine stand.

Carefully lower the machine onto the stand.

With machine in place, secure it to the stand.

Power Requirements

The machine runs on 110 or 220 volt AC and comes with a NEMA 5-15 plug. It is recommended to connect to a 20 amp dedicated 110 VAC circuit.

Check your local electrical codes for details on the supply circuit.

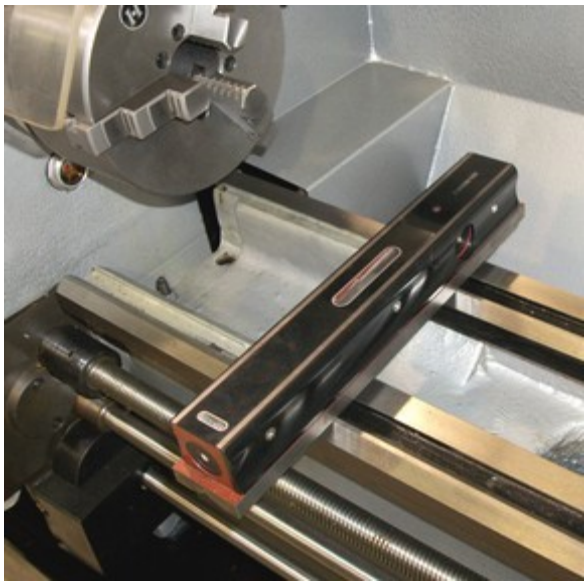
The machine can be changed to 220 volt. Contact smithy for more information.

Leveling the Machine

Leveling of a machine tool is not making the machine level to the horizontal plane. It is assuring the bed of the machine is not twisted.

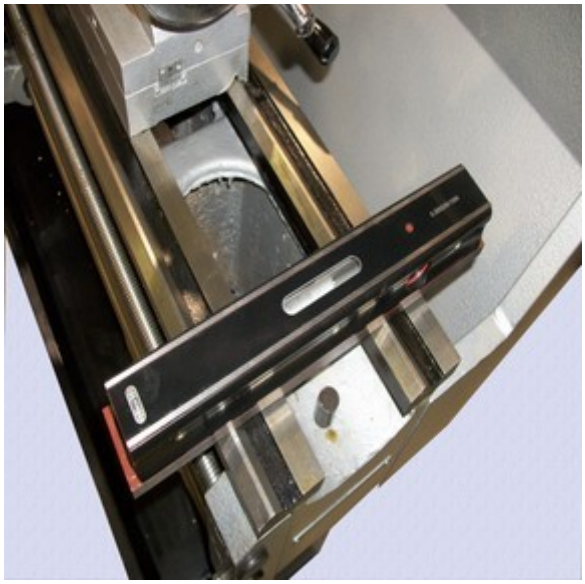
Make sure the machine is setting on a solid surface with both of the stands firmly seated on the floor.

Place a precision level across the bed of the machine close to the lathe chuck. Note the bubble position on the level.



Move the level to the tailstock end of the machine. The bubble position should be the same as at the chuck end of the machine.

If the level is off, place shims between the machine base and the stand to bring the machine into position.



Chapter 7

Preparing the MI-1440 Lathe for Operation

Overview

Before using your new machine, it is important to make sure it is top working condition and is properly lubricated. The section of the manual, will walk you through lubrication and gib adjustments.

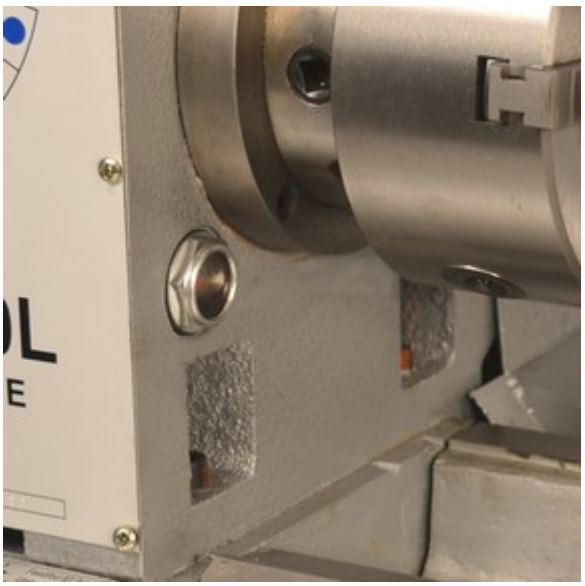
Cleaning and Lubricating The Machine

Smithy machines are shipped with a protective grease coating. To remove it, spray on WD-40, let it sit for a few minutes, and wipe it off with rags. Use a brush and noncorrosive kerosene or white mineral spirits to clean hard to reach places.

Give special attention to the lead screw. Use a brush or cotton string to clean down into the threads.

Once it's cleaned, your Smithy is ready for lubricating. Do this carefully and thoroughly before starting the machine.

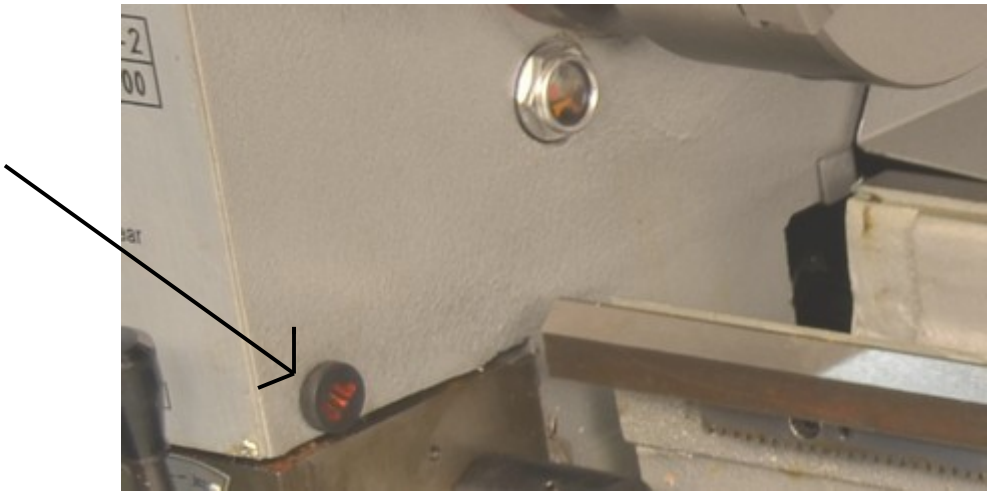
The lathe head has an oil site gauge. The oil level should be half way up the site gauge. A 30 weight non-detergent oil is recommended. Check the oil level before use.



Oil is added through a plug located under the rubber pad that is on top of the lathe head.

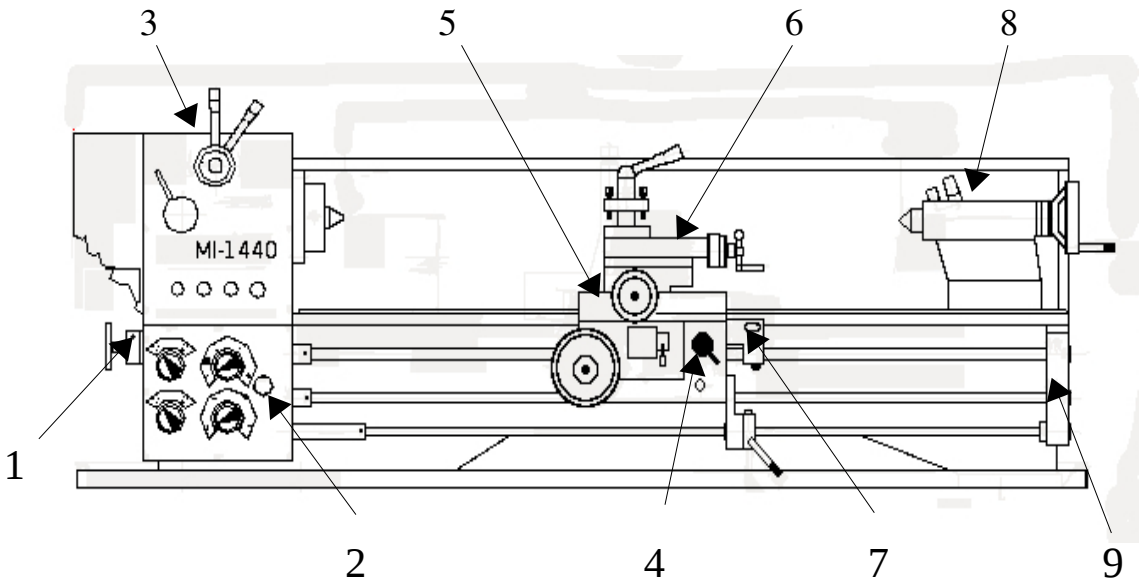
The apron has an oil reservoir. Oil is squirted one of the apron attach screw holes. It will run down into the apron. Oil should be half way up the site gauge on the front of the apron.

The quick change gearbox is oiled by removing the plug shown below and squirting oil into the opening. This oil will run over the gears inside the box and drip out the bottom of the quick change gear box. Oil in the drip pan below the box is normal. Oil daily or before each use.



There are oil buttons located in numerous locations on the carriage, table, tool post and tail stock. These should be oiled on a daily basis. A 30 weight non-detergent oil is recommended.

When the machine is not in use, it is recommended that a thin coat of oil be applied to all exposed metal parts to protect the surfaces from corrosion.



Lubrication table

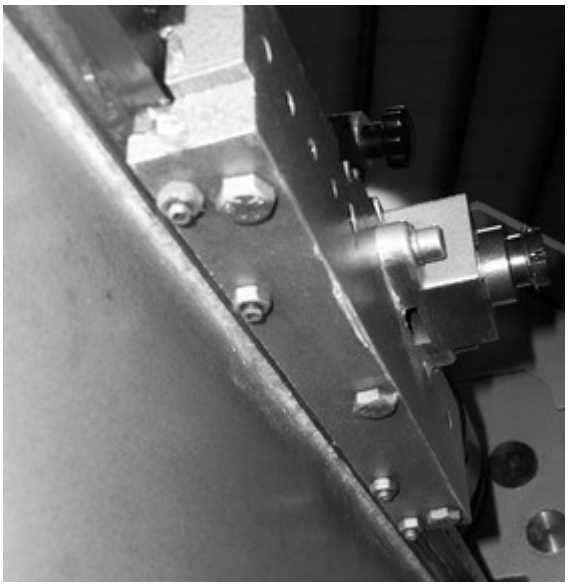
No.	Lubrication parts	Number of oil points	Oil: 30 wt non detergent	Frequency
1	Input shaft of gearbox	1 oil button	30 wt	Once a day
2	Gearbox	1 reservoir	30 wt	First change after 3 months, then,once a year
3	Headstock	1 reservoir	30 wt	
4	Apron	1 reservoir	30 wt	
5	Carriage	5 oil buttons	30 wt	Once a day
6	Tool post	3 oil buttons	30 wt	Once a day
7	Thread dial	1 oil button	30 wt	Once a day
8	Tailstock	3 oil buttons	30 wt	Once a day
9	Support seat	2 oil buttons	30 wt	Once a day

Adjusting the Gibs

The objective of adjusting the gibs is to eliminate as much play in the X and Z axis as possible without having the tightness of the gib interfere with their movement and cause a decrease in the accuracy and performance of the machine due to excessive friction.

Before beginning, make sure the ways are clean and well-oiled.

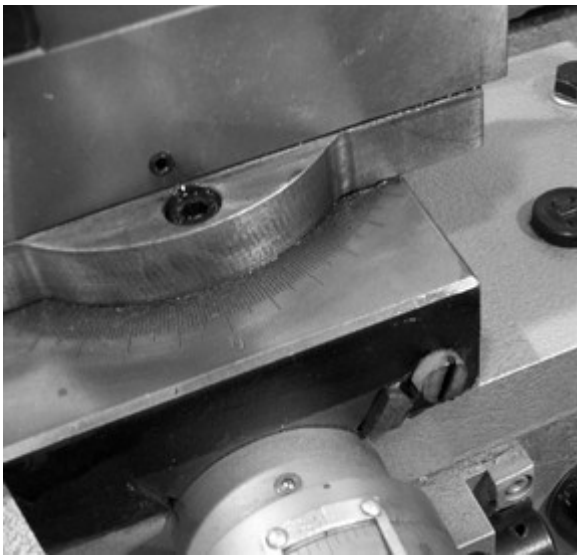
Z Axis Gib Adjustment
There are four adjustment screws for the Z axis. Two on the left rear and two on the right rear underneath corners of the saddle which is shown in the images below.

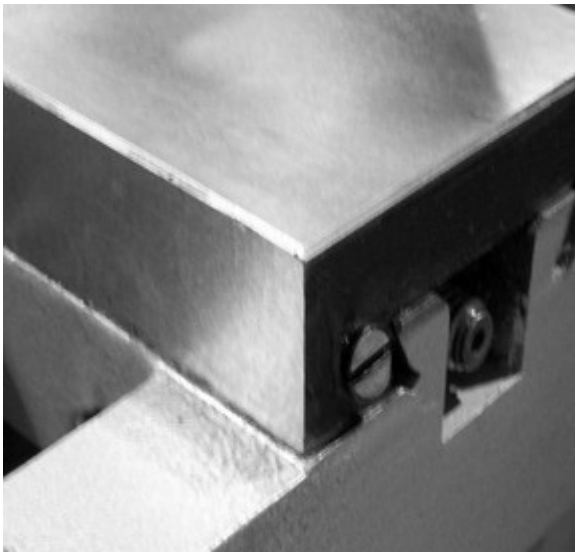


1. Loosen the locking nuts on each adjusting screw.
2. Start at one end and slowly turn the adjusting setscrew inward while moving the carriage left and right until s slight drag is felt in the movement. Back the setscrew up about 1/16 of a turn and tighten the locking nut.
3. Repeat this procedure on all 4 of the adjustment screws.

X Axis Gib Adjustment

There are also two adjustment screws. One in the front and the other one on the back of the cross slide which is shown in the images below.





1. To tighten the gib, loosen the rear screw about 2 turns. Slowly tighten the front screw while moving the cross feed fore and aft.
2. When you fill drag on the hand wheel that's the time to stop and tighten the rear screw.
3. If the gib is too tight, screw out the front screw and screw in the rear screw to loosen the gib.

Removal And Installation Of Lathe Chuck And Faceplate

The spindle nose and chuck mounting is a D1-5 Type. This is one of the industry standard mounts and makes it possible to mount numerous styles and types of chucks to your machine.

The chuck is attached to the spindle nose by 5 cam locks and studs.

Chuck Removal

1. To remove the lathe chuck, place a piece of wood under the chuck to protect the machine bed if the chuck should drop.

2. Rotate each cam on the spindle counterclockwise until the scribe mark on the cam aligns with the mark on the spindle .

3. If the chuck is stuck onto the spindle, a light hit with a mallet or dead blow hammer will knock it loose.

Chuck Installation

1. Place the chuck onto the end of the spindle and turn the cams clockwise. Rotate each cam enough to hold the chuck in place but do not tighten yet. When all 3 of the cams are engaged, go back and tighten each one. The desired tightness is to have the reference mark on the cam somewhere between the 3 o'clock and the 9 o'clock positions.

2. If the cam turns all the way around but does not tighten, Turn the stud in one turn.

Chapter 8

Lathe Operations

Overview

The MI-1440L lathe is put through a initial run-in procedure at the factory before the machine is packaged for shipment.

1. Once you have your lathe setup, Smithy recommends that the spindle motor be run for about 5 minutes at each of the spindle speeds starting with the slowest speed.

2. When the machine has set for some period of thin without being run or if the machine is in a cold environment, it is recommended to run the spindle for about 5 minutes at a medium speed before beginning cutting operations.

Turning Machine On

Rotate the "STOP" button clockwise to assure it is not pushed in. This button is an emergency stop and it will stay in the power off position when pushed in. It must be rotated clockwise to allow it to go into the power on mode and operate the machine. The machine is now powered on!

Changing Spindle Speeds

Spindle speeds are selected using the two Spindle Speed Selectors .

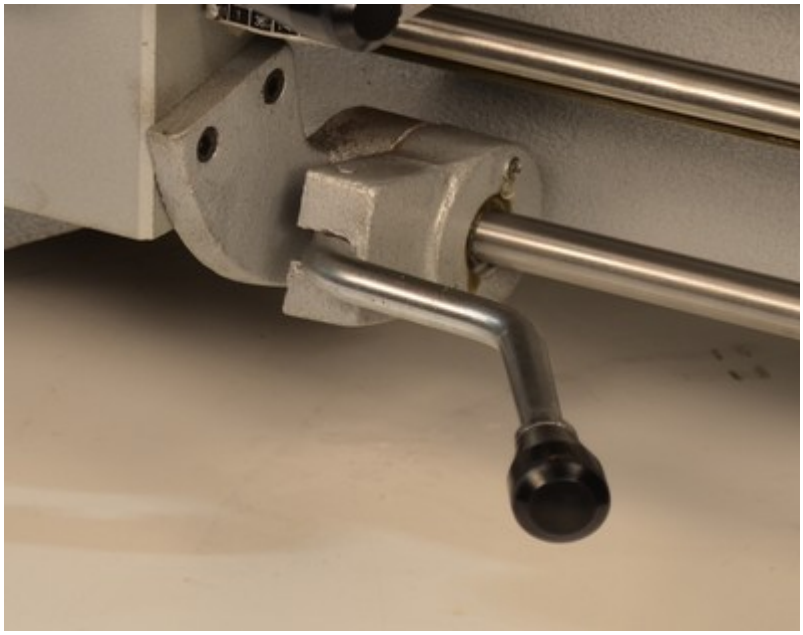
The rear handle selects between speed range A and speed range B

The front selector selects between 4 different speeds from within the selected range.

EXAMPLE:
The rear handle in the A position and the front handle pointing towards 700 will give a spindle speed of 700 RPM.

Spindle Operation

1. Once the desired speed is selected, move the Motor Engagement Lever downward to run in the forward direction for normal turning and threading operations.
2. Move the Motor Engagement Lever back to the center position to stop the lathe spindle.
3. Move the Motor Engagement Lever upward to run the spindle in reverse.

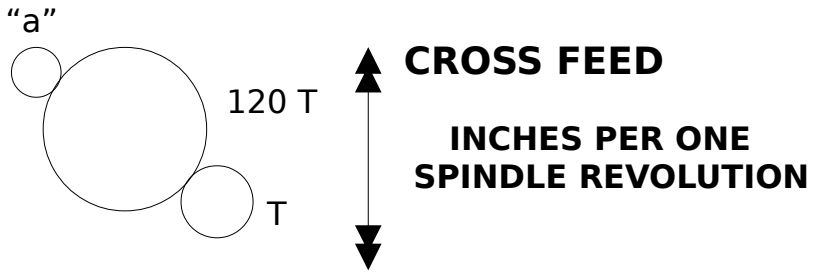


Chapter 9

Powerfeeding

Overview
There are several steps to set up for using the power feed. Determining the proper feed rate for a specific material and size of workpiece will require the use of reference guides such as *Machinery's Handbook* or *Machinist Ready Reference* . This section instructs you in how to set up and operate the powerfeeds.

Feed Chart and Setup
The feed chart is used to select desired feed rates. There Is a chart on the front of the machine and in the picture below.



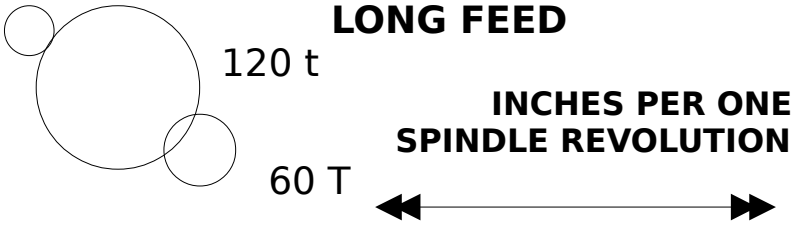
The first line of the chart shows the gears required to be installed in the pulley box on the left end of the machine.

“a”		60T				30T			
DIAL		T	S	R	V	T	S	R	V
A	D	.0187	.0175	.0140	.0112	.0094	.0087	.0070	.0056
B	D	.0094	.0087	.0070	.0056	.0047	.0044	.0035	.0028
A	C	.0047	.0044	.0035	.0028	.0024	.0022	.0017	.0014
B	C	.0024	.0022	.0017	.0014	.0012	.0011	.0009	.0007
DIAL 1-2-3-4 ON THE BLACK DOT									

The remainder of the chart shows the positioning of the 4 dials on the front of the gearbox. You must turn off the spindle and let it come to a complete stop before changing any of the feed knobs.

Example:
The dial A-B on A, the dial C-D on D, and the dial R-S-T-V on T and the 1-2-3-4- dial on the black dot, the feed rate on the cross feed is .0187” per one revolution of the spindle.

“a”



“a”		60T				30T			
LEVER		T	S	R	V	T	S	R	V
A	D	.0548	.0512	.0411	.0328	.0274	.0256	.0205	.0164
B	D	.0274	.0256	.0205	.0164	.0137	.0128	.0102	.0082
A	C	.0137	.0128	.0102	.0082	.0069	.0064	.0051	.0041
B	C	.0069	.0064	.0051	.0041	.0034	.0031	.0025	.0020
DIAL 1-2-3-4 ON THE BLACK DOT									

This chart is used the same as the crossfeed chart.

Operation
Once the desired feed rates are determined and set, the actual operation is very simple.

There is a powerfeed direction selector on the lathe head that allows you to feed either toward the lathe chuck or toward the tailstock.

The lever is located on the lathe head just below and to the left of the spindle speed selectors.

The direction lever **CAN NOT** be moved while the lathe is running.

You must turn off the spindle and let it come to a complete stop before changing directions.

The Powerfeed engagement lever allows you to start the powerfeed for either the longitudinal direction or the cross feed direction. Moving this lever to the left and up will activate the power longitudinal feed. Moving the lever to the right and down will activate the power crossfeed.

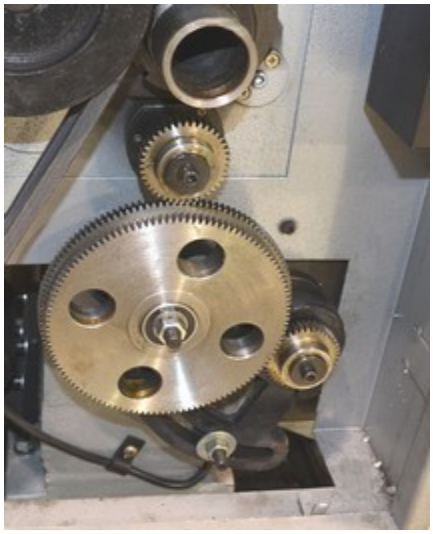
The Powerfeed Engagement lever is made to be be used while the spindle is running.

CHAPTER 10

Threading operation

Overview

This lathe is capable of cutting imperial or metric threads. There are gears on the end of the machine under the belt cover that will need to be changed for cutting some metric threads.

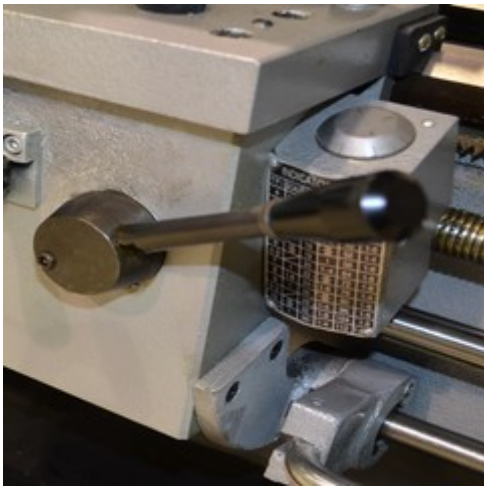


Half Nut Lever

This lever compresses and releases the half nut that engages the leadscrew. The half nut is used only when cutting threads. There is a lockout that prevents the half nut from being engaged when the powerfeed is engaged for cutting.

Threading dial

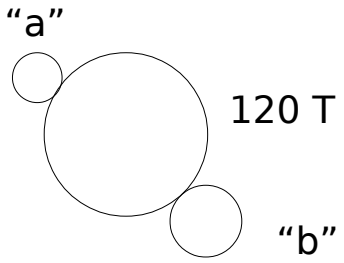
The indicator tells you when to engage the half nut to begin the threading process. The housing of the threading dial must be loosened and the entire assembly rotated so the gear on the end of the thread dial contacts the feed screw. The dial will turn as long as the half nut lever is up and the feed screw is turning.



There is a reference mark on the threading dial housing and numbers on the dial. When the half nut is engaged the dial stops turning. By carefully engaging the half nut as the appropriate line or number passes by the indicator mark, a thread can be established and the lead maintained through the multiple passes that are required to cut a thread to the finished depth.

See the chart below shows the engagement numbers that can be used on inch threads.
NOTE: The thread dial can be used on inch threads only, Metric threads require all mechanical connections remain intact throughout the entire threading procedure.

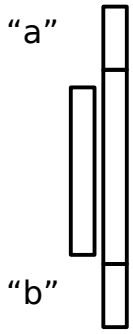
Thread chart Inch
The thread chart is used in the same manner as the feed rate charts. Find the desired thread pitch on the chart and then follow the row to the left to find the position of the left feed/thread selector. Follow the column up to find the position for the right feed/thread selector.



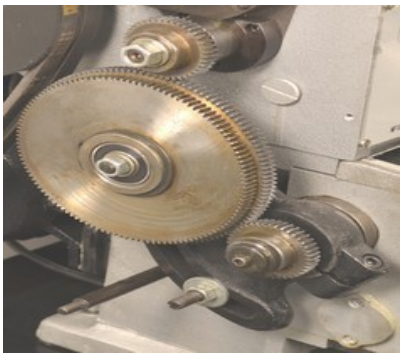
INCH THREADS ARE MEASURED AS THREADS PER INCH

“a” AND “b” BOTH RIDE ON THE 127 T GEAR

“a”		60	60	60	60	60	60	56	60	60
“b”		60	54	57	60	66	69	54	78	63
DIAL		4	1	1	1	1	1	2	1	3
		V	V	V	V	V	V	V	V	V
A	D	4	4 ½		5	5 ½		6	6 ½	7
B	D	8	9	9 ½	10	11	11 ½	12	13	14
A	C	16	18	19	20	22	23	24	26	28
B	C	32	36	38	40	44	46	48	52	56



Both “a” and “b” are riding on the 127 tooth gear for inch threads

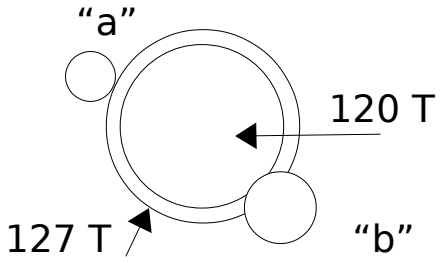


To set up for 24 threads per inch:

1. Place the 56 tooth gear in the “a” position and the 54 tooth gear in the “b” position.
2. Mesh both “b” and “a” to the 127 tooth gear.
3. Place the A-B selector in “A”, the C-D selector in “C”, the T-S-R-V selector in “V” and the 1-2-3-4- selector in “2”
4. Place the Feed direction lever in the desired position, toward the headstock.
5. Start the spindle by moving the motor fwd/rev lever upward.
6. Move the half nut lever down to start the cut. Engage on the proper number for the thread you are cutting.
7. Move the half nut lever up to stop the thread.
8. Manually move the longitudinal feed back to the starting point for the thread.
9. Adjust the thread depth and engage the half nut on the same number as the first pass.
10. Repeat this until the desired thread depth is established.

Metric Threads

The metric thread chart is used in the same manner as the inch chart.

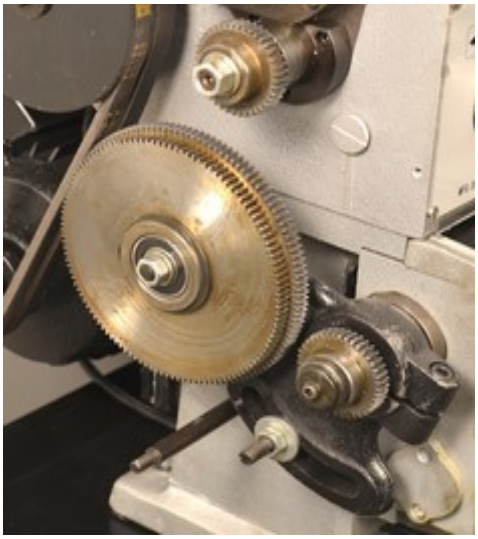


METRIC THREADS ARE MEASURED AS THE DISTANCE BETWEEN TWO THREADS

“a” RIDES ON THE 127 T GEAR ”b” RIDES ON THE 120 T GEAR

“a”		56	60	60	30	60	60	30	60	56
“b”		60	60	60	60	66	60	60	60	63
DIAL		4	1	3	4	1	3	1	3	3
		R	R	S	T	V	R	T	V	V
A	D	7.0	6.0		5.0		4.5	4.0		
B	D	3.5	3.0		2.5		2.25	2.0	1.8	1.6
A	C	1.75	1.5	1.4	1.25	1.2		1.0	0.9	0.8
B	C		0.75	0.7		0.6		0.5	0.45	0.4

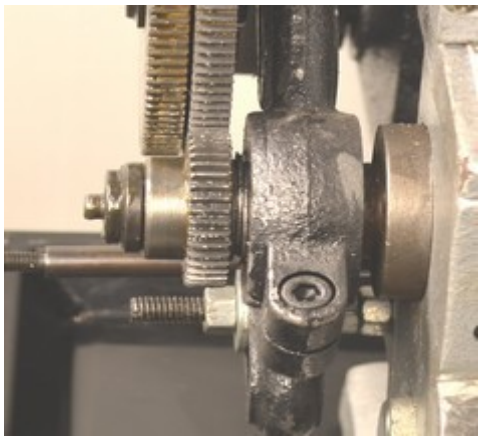
Setup and cutting metric threads



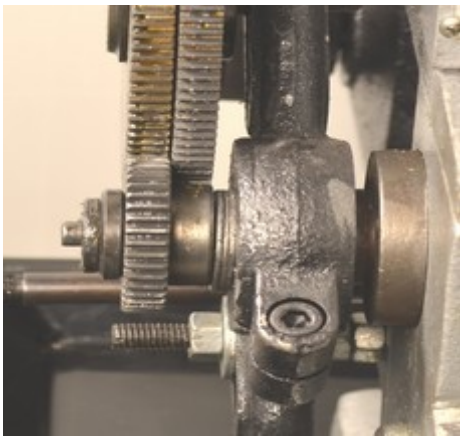
1.Open the pulley cover on the left end of the machine.
2.Loosen the bolt at the pivot point of the gear quadrant and the nut at the quadrant slot.

3.Loosen the nut at the center gear.

4.Remove the lower gear and install the required gear but turn it around so when it is installed, it will mesh with the smaller 120 tooth center gear.

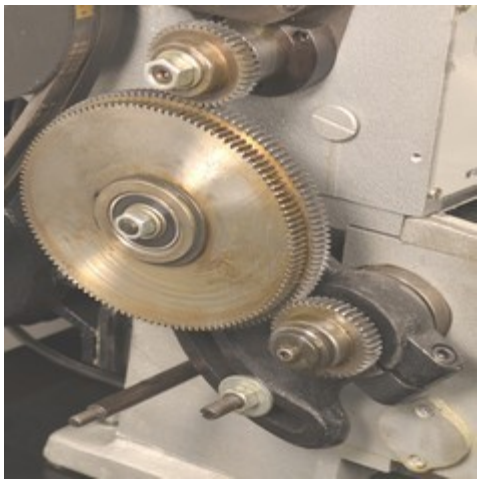


Inch



metric

5.Slide the center gear toward so the 120 tooth gear meshes with the lower and tighten the nut on the center gear.
6.Replace the upper gear with the required tooth gear for the thread you wish to cut.
7.Rotate the gear quadrant so the 127 tooth gear meshes with the upper gear and tighten the nut at the quadrant slot.
8.Replace the belt cover.
9.Set the feed/thread selectors in the positions indicated by the thread chart for the thread you wish to cut.
10.Start the spindle and engage the half nut.



11. **Do not disengage the halfnut until the thread is finished.** All mechanical connections must stay intact for metric threads. If the thread is to be cut in multiple passes,
12. Turn the spindle off with the motor fwd/rev lever.
13. Back the cutter away from the workpiece.
14. Reverse the spindle motor and power back to the start of the tread.
15. Shut the motor off and reset the thread depth.
16. Repeat steps 12 through 15 until the thread is the desired depth.

Chapter 11

Work Holding Devices

The spindle nose and chuck mounting is a D1-5 Type. This is one of the industry standard mounts and makes it possible to mount numerous styles and types of chucks to your machine.

The chuck is attached to the spindle nose by 5 cam locks and studs.

Chuck and Face Plate Removal

4. To remove the lathe chuck, place a piece of wood under the chuck to protect the machine bed if the chuck should drop.

5. Rotate each cam on the spindle counterclockwise until the scribe mark on the cam aligns with the mark on the spindle .

6. If the chuck is stuck onto the spindle, a light hit with a mallet or dead blow hammer will knock it loose.

Installation

1. Place the chuck onto the end of the spindle and turn the cams clockwise. Rotate each cam enough to hold the chuck in place but do not tighten yet. When all 3 of the cams are engaged, go back and tighten each one. The desired tightness is to have the reference mark on the cam somewhere between the 3 o'clock and the 9 o'clock positions.

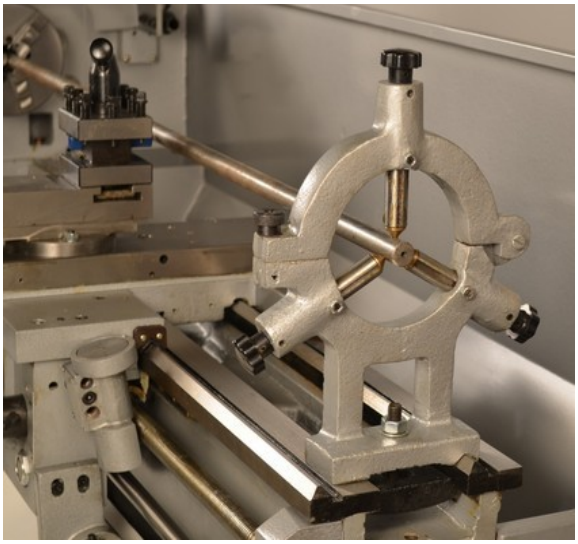
2. If the cam turns all the way around but does not tighten, Turn the stud in one turn.

Steady Rest /Follow Rest Installation.

Steady Rest

The steady rest mounts to the lathe bed and can be used to support longer pieces that extend out past the tail stock. Remove the tail stock and attach the steady rest to the lathe bed as shown.

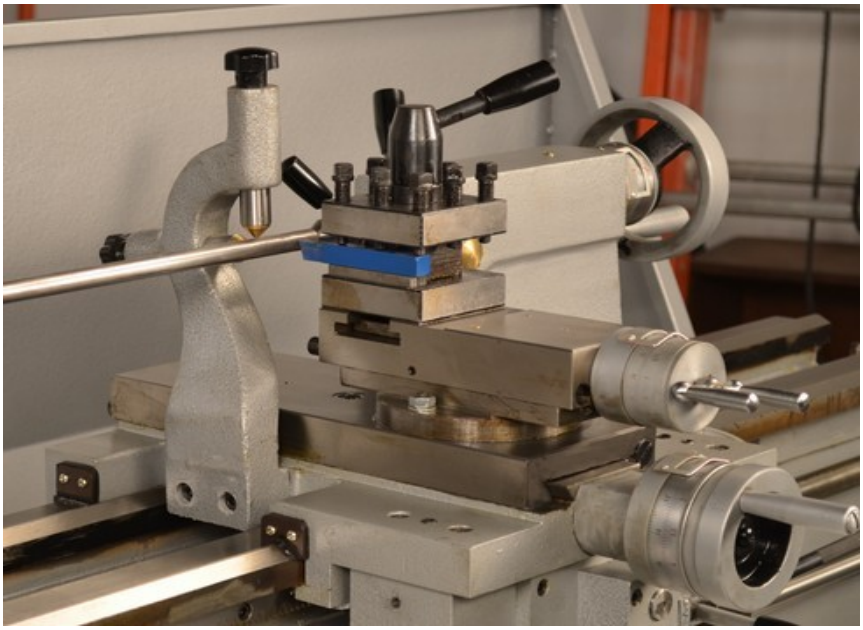
Each individual support on the steady rest must be adjusted into position to support the workpiece. It Is also necessary to lubricate the workpiece and the supports with grease to limit the friction between the parts while turning.



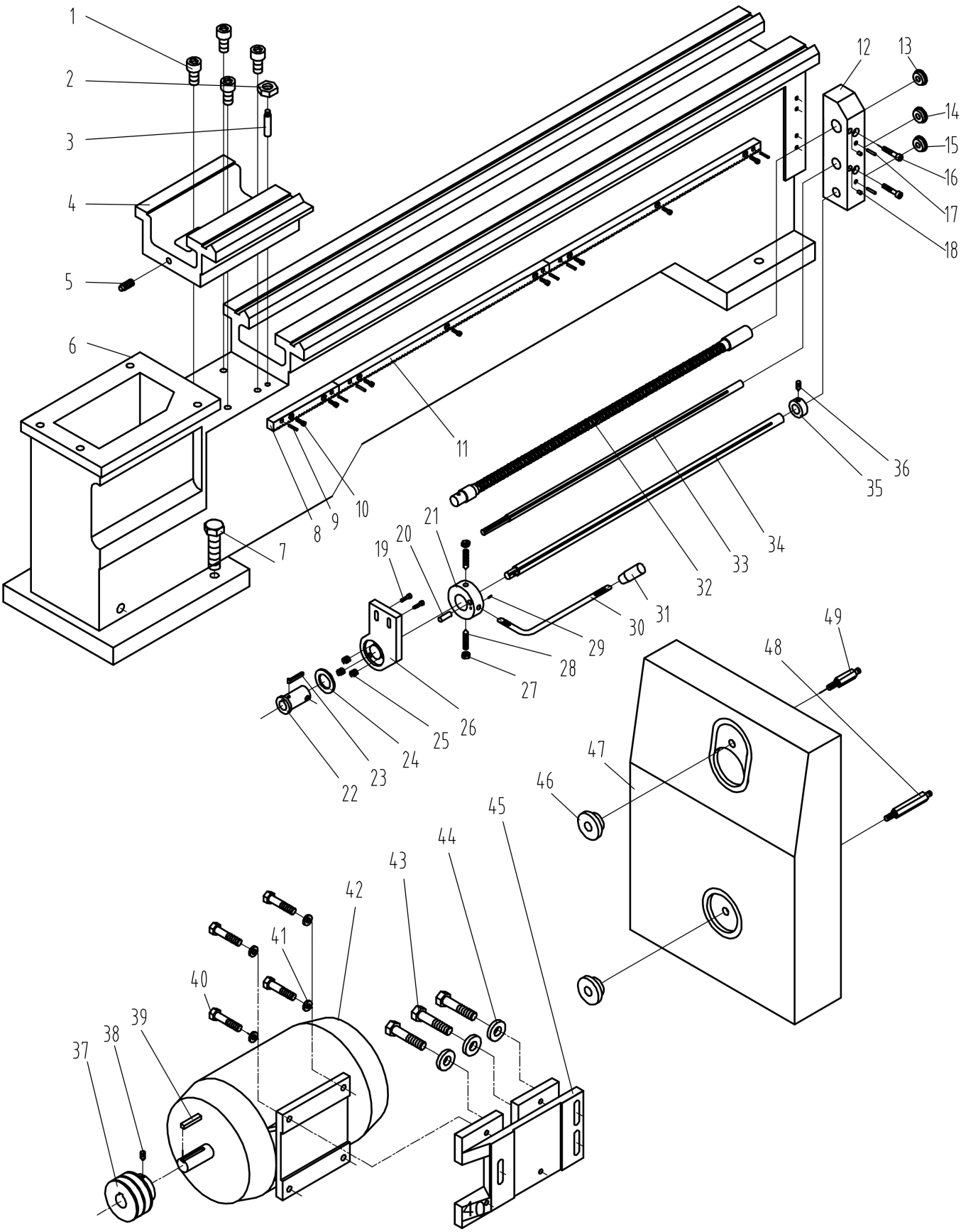
Follow Rest

The follow rest is designed to support behind a small part to keep it from flexing away from the cutter during turning operations. The follow rest mounts on the left side of the carriage as shown below.

The supports are adjusted before each pass since the material is getting smaller with each pass. It Is also necessary to lubricate the workpiece and the supports with grease to limit the friction between the parts while turning.



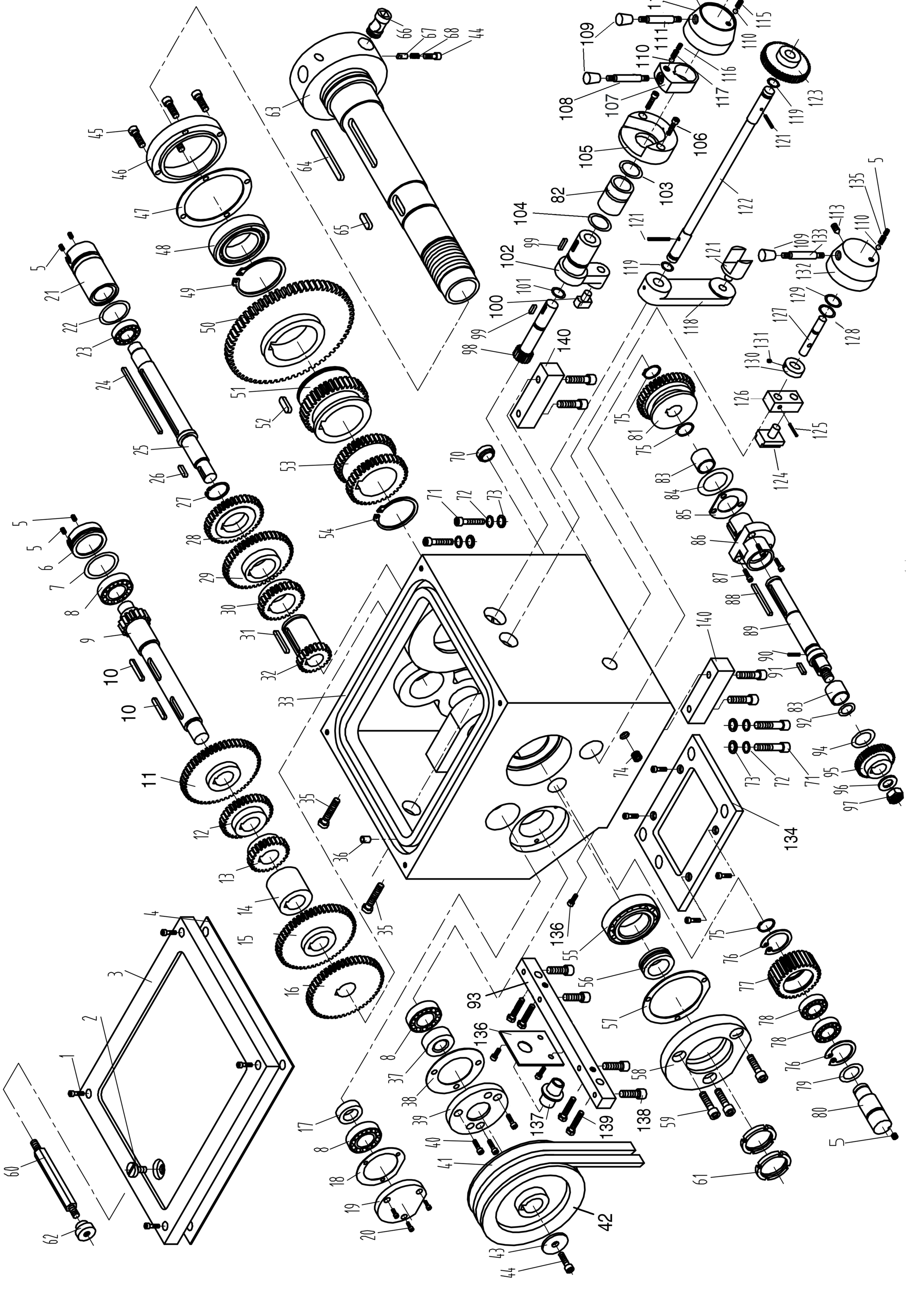
BED & MOTOR ASSEMBLY



Bed & Motor Assembly

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
1	S12104	Screw, socket head cap M10 x 40	4				
2	S18125	Nut M8	2	**24**	LZ01024	Brake ring	1
3	LZ01003	Pin, taper pull type M8x75	2	**25**	LZ01025	Spring, coil 1x6x25	3
4	LZ01004	Gap bed section	1	**26**	LZ01026	Bracket	1
5	LZ01005	Screw, set flat point M10X16	1	**27**	S18125	Nut M8	2
6	LZ01006	Bed	1	**28**	S12328	Screw, set dog point M8x30	2
7	LZ01007	Bolt, hex head M12x50	6	**29**	S22316	Pin, spring M3x16	1
8	LZ01008	Rack, Left end	1	**30**	LZ01030	Handle	1
9	S22170	Pin, taper M5x25	6	**31**	LZ01031	Knob M10x50	1
10	S11991	Screw, socket head cap M6x20	8	**32**	LZ01032	Lead screw	1
11	LZ01011	Rack, 2 piece long section	2	**33**	LZ0133	Feed rod	1
12	LZ01012	Bracket, feed rods right end	1	**34**	LZ0134	Shaft, motor engage	1
13	LZ01013	Plug	3	**35**	LZ0135	Collar	1
14	LZ01014	USE LZ01013	0	**36**	S11942	Screw, set cone point M6x10	1
15	LZ01015	USE LZ01013	0	**37**	LZ01037	Pulley	1
16	LZ01016	Screw, socket head cap M8x55	2	**38**	S11938	Screw, set flat point M6x8	1
17	LZ01017	Pin, taper M6x70	2	**39**	S21815	Key, parallel M8x32	1
18	C30035	Oil cup M8	2	**40**	S12280	Bolt, hex head M8x25	4
19	S11971	Screw, socket head cap M6x16	2	**41**	S18140	Washer, flat M8	4
20	S22070	Pin, straight M8x25	1	**42**	LZ01042C	Motor, 110/220	1
21	LZ01021	Handle collar	1	**43**	S12630	Bolt, hex head M10x35	3
22	LZ01022	Collar	1	**44**	S18170	Washer, flat M10	3
23	LZ01023	Key	1	**45**	LZ01045	Plate, motor mounting	1
24	LZ01024	Brake ring	1	**46**	LZ01046	Nut, cover attach	2
25	LZ01025	Spring, coil 1x6x25	3	**47**	LZ01047	Cover, pulley box	1
26	LZ01026	Bracket	1	**48**	LZ01048	Stud, cover long	1
27	S18125	Nut M8	2	**49**	LZ01049	Stud, cover short	1

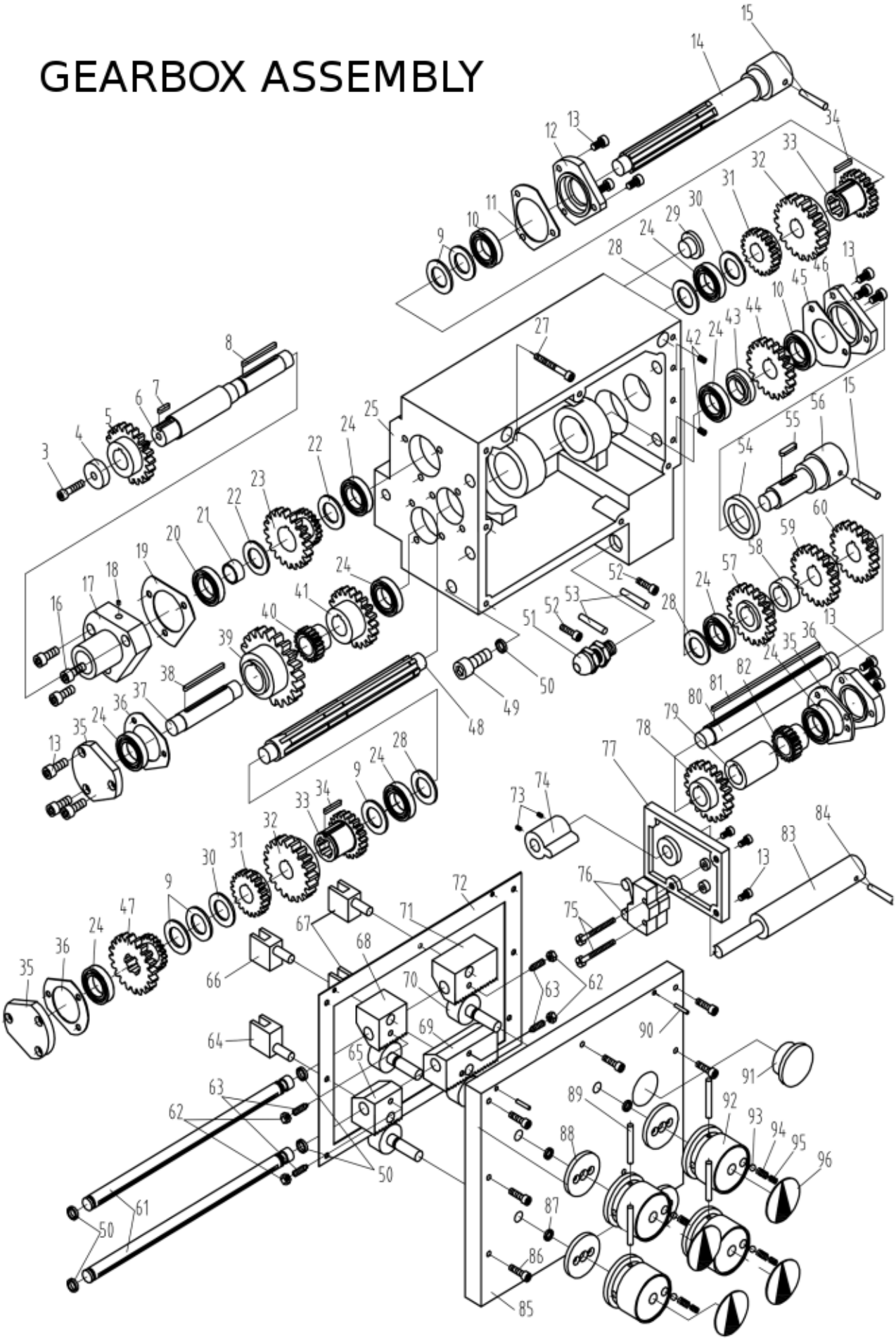
HEADSTOCK ASSEMBLY



Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
1	S11971	Screw, socked head cap M6x16	6	30	LZ02030	Gear 29T	1
2	MLZ02002	Screw, oil fill	1	31	S21380	Key, square M5x50	1
3	LZ02003	Cover plate	1	32		Gear 21T	1
4	MLZ02004	Gasket	1	33	MLZ02033	Casting, headstock	1
5	S11938	Screw, set flat point M6x8	6	34	S18125	Nut, hex	2
6	LZ02006	Plug	1	35	S12850	Bolt, hex head M8x50	2
7	LZ02007	O Ring 41.3x3.1	1	36	LZ02036	Oil pipe	1
8	LZ02008	Bearing, ball 6204/P6 20x47x14	3	37	LZ02037	Oil seal	1
9	LZ02009	Gear shaft	1	38	LZ02038	Gasket	1
10	S21680	Key, square M6x55	2	39	LZ02039	Cover	1
11	LZ02011	Gear	1	40	S11971	Screw, socket head cap M6x16	3
12	LZ02012	Gear 34T	1	41	LZ02041	Belt, V A787 787x12	2
13	LZ02013	Gear 26T	1	42	LZ02042	Pulley	1
14	LZ02014	Collar	1	43	LZ02043	Washer	1
15	LZ02015	Gear 43T	1	44	S12291	Screw, socked head cap M8x20	1
16	LZ02016	Gear 51T	1	45	S12011	Screw, socked head cap M6x25	1
17	LZ02017	Washer	1	46	MLZ02046	Cover, front	1
18	LZ02018	Gasket	1	47	MLZ02047	Gasket	1
19	LZ02019	Cover, rear	1	48	MLZ02048	Bearing, tapered roller 33015/P5 75x115x31	1
20	LZ02020	Screw, socked head cap M4x12	3	49	MLZ02049	Snap ring, external M85	1
21	LZ02021	Plug	1	50	MLZ02050	Gear	1
22	LZ02022	O-Ring M34.7x3.1	1	51	MLZ02051	Gear	1
23	S20180	Bearing, ball 6203/P3 17x40x12	1	52	MLZ02052	Key, square M8x18	1
24	LZ02024	Key, square M6x120	1	53	MLZ02053	Gear	1
25	LZ02025	Shaft	1	54	S23410	Snap ring, external M65	1
26	LZ02026	Key, square M5x20	1	55	MLZ02055	Bearing, tapered roller 32013/P5 65x100x32	1
27	LZ02027	Snap ring, external M35	1	56	MLZ02056	Collar	1
28	LZ02028	Gear 38T	1	57	MLZ02057	Gasket	1

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
58	MLZ02058	Cover, rear	1	91	S21110	Key, square M4x14	1
59	S12011	Screw, socked head cap M6x25	3	92	LZ02092	O-ring 13.8x3.1	1
60	LZ02060	Screw, short	1	93	LZ02093	Washer	1
61	MLZ02061	Nut, spanner M62x2	1	94	LZ02094	Seal, oil 24x32x5	1
62	LZ02062	Nut, locking	1	95	LZ02095	Gear 40T	1
63	MLZ02063	Spindle	1	96	S18200	Washer, flat M12	1
64	MLZ02064	Key, square M8x90	1	97	S18185	Nut, hex M12	1
65	MLZ02065	Key, square M8x40	1	98	MLZ02098	Gear shaft	1
66	MLZ02066	Cam, chuck mount	6	99	S21230	Key, square M5x16	2
67	MLZ02067	Plunger	6	100	MLZ02100	Fork, shifter	1
68	MLZ02068	Spring	6	101	MLZ02101	O-ring 13.8x1.8	1
69	MLZ02069	Screw,	6	102	MLZ02102	Shaft collar	1
70	MLZ02070	Oil site gage	1	103	MLZ02103	O-ring 25.7x2.65	1
71	LZ02071	Screw, socked head cap M10x20	4	104	S23030	Snap ring, external M30	1
72	S18165	Washer, locking M10	4	105	MLZ02105	Hub	1
73	S18170	Washer, flat M10	4	106	S11691	Screw, socket head cap M6x20	2
74	LZ02074	Screw, set flat point M12X12	1	107	MLZ02107	Handle block	1
75	S23120	Snap ring, external M20	3	108	MLZ02108	Handle	1
76	LZ02076	Snap ring, internal M42	2	109	MLZ02109	Sleeve, handle 8x40	3
77	LZ02077	Gear 30T	1	110	Z40073	Ball, steel M6	3
78	LZ02078	Bearing, ball 16004/P6 24x42x8	2	111	MLZ02111	Handle	1
79	LZ02079	O-ring 19.8x2.65	1	112	MLZ02112	Handle body	1
80	LZ02080	Shaft	1	113	S11952	Screw, set cone point M6X8	1
81	MLZ02081	Gear	1	114	S11088	Screw, set flat point M8X8	1
82	MLZ02082	Sleeve	1	115	MLZ02115	Spring, coil 0.9x4x20	1
83	LZ02083	Collar	1	116	S11088	Screw, set flat point M8x8	1
84	LZ02084	O-ring 26.3x3.1	1	117	MLZ02117	Spring, coil 0.9x4x7	1
85	LZ02085	Gasket	1	118	MLZ02118	Shift lever	1
86	LZ02086	Collar flange	1	119	MLZ02119	O-RING m11.8X1.8	2
87	S12516	Screw, socket head cap M5x16	3	120	MLZ02120	Shift fork	1

GEARBOX ASSEMBLY



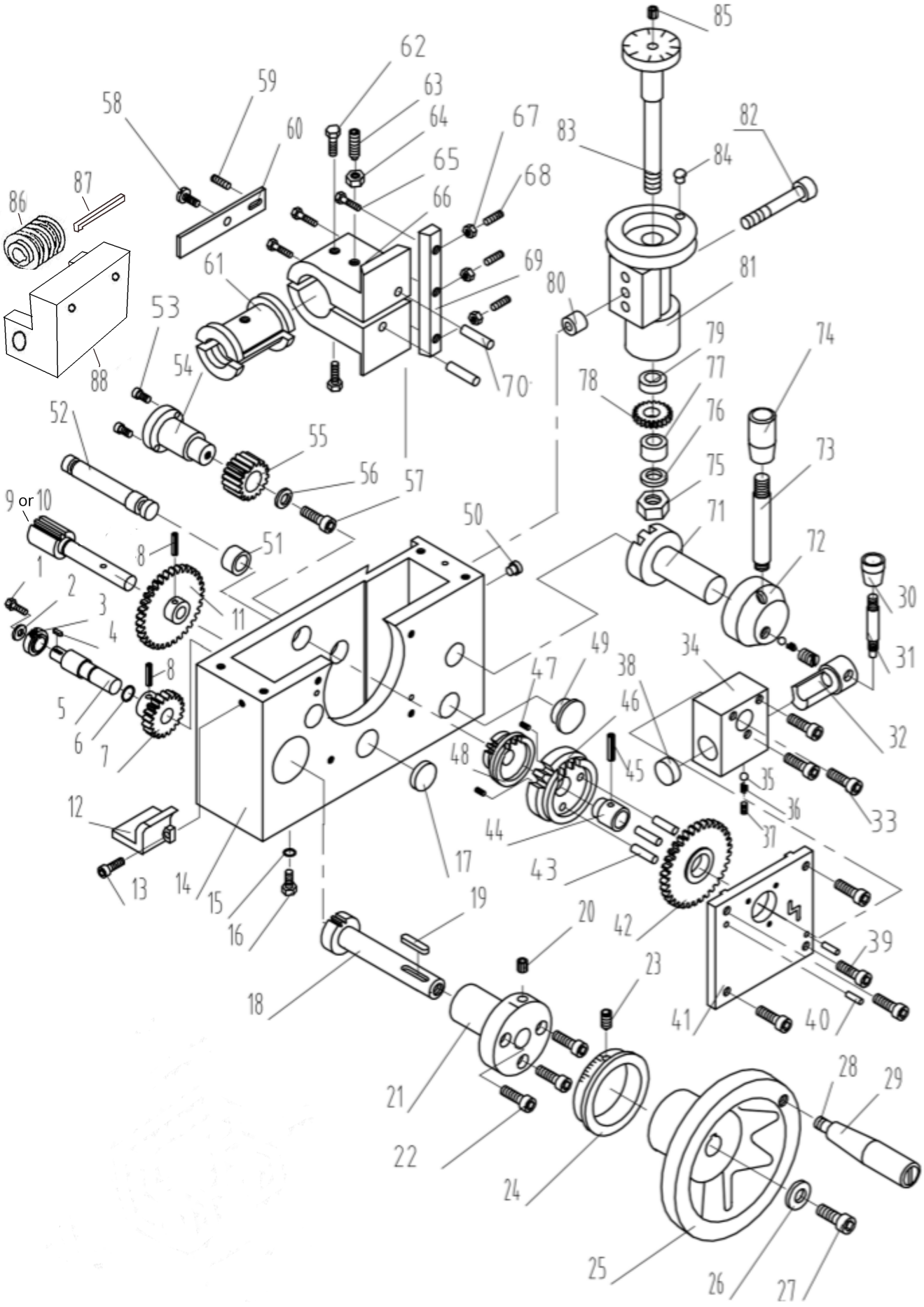
Gearbox Assembly

Item	Part Number	Description	Qty.	Item	Part Number	Description	Item
1	Not Used	*	*	27	LZ04019	Gasket	1
2	Not Used	*	*	28	S20180	Bearing, ball 6203 17x40x12	1
3	S11971	Screw, socket head cap M6x16	1	29	LZ04021	Cover	1
4	LZ04004	Washer	1	30	S23010	Snap ring, external M16	2
5	LZ04005A	Gear, change 30T	1	31	LZ04023	Gear, duplex 24T & 16T	1
6	LZ04005A	Gear, change 54T	1	32	LZ04024	Bearing, ball 6202 15x35x11	9
7	LZ04005A	Gear, change 56T	1	33	LZ04025	Casting	1
8	LZ04005A	Gear, change 57T	1	34	S22230	Pin, spring M5x20	2
9	LZ04005A	Gear, change 60T	1	35	LZ04027	Screw, socket head cap M8x65	2
10	LZ04005A	Gear, change 63T	1	36	LZ04028	Washer	3
11	LZ04005A	Gear, change 66T	1	37	LZ04029	Plug, oil fill	1
12	LZ04005A	Gear, change 69T	1	38	LZ04030	Snap ring, external M26	2
13	LZ04005A	Gear, change 78T	1	39	LZ04031	Gear 24T	2
14	LZ04006	Shaft	1	40	LZ04032	Gear 28T	2
15	S21232	Key, square 5x18	1	41	LZ04033	Gear	2
16	S21350	Key, square 5x45	1	42	LZ04034	Key, square 4x22	2
17	S23120	Snaring, external M20	5	43	LZ04035	Cover	3
18	LZ04010	Bearing, ball 6004RS 20x42x12	2	44	LZ04036	Gasket	3
19	LZ04011	Gasket	1	45	LZ04037	Shaft	1
20	LZ04012	Cover	1	46	LZ04038	Key, square 4x55	1
21	S12215	Screw, socket head cap M5x12	18	47	LZ04039	Gear 24T	1
22	LZ04014	Shaft	1	48	LZ04040	Gear 16T	1
23	LZ04015	Pin, taper m3X32	2	49	LZ04041	Gear 32T	1
24	S11991	Screw, socket head cap	3	50	LZ04042	Screw, set flat point M5x16	2
25	LZ04017	Cover	1	51	LZ04043	Cover	1
26	C30050	Oil cup M6	1	52	LZ04044	Gear 32T	1
53	LZ04045	Gasket	1				

Gearbox Assembly Continued

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
54	LZ04054	Seal, oil 28x40x7	1	74	LZ04074	Engaging arm	1
55	S21260	Key, square 5x20	1	75	LZ04075	Screw, cheese head	2
56	LZ04056	Shaft	1	76	LZ04076	Switch, micro	2
57	LZ04057	Gear 32T	1	77	LZ04077	Plate	1
58	LZ04058	Cover	1	78	LZ04078	Gear 30T	1
59	LZ04059	Gear 30T	1	79	LZ04079	Spacer	1
60	LZ04060	Gear 28T	1	80	LZ04080	Shaft	1
61	LZ04061	Shaft	1	81	LZ04081	Key 4x145	1
62	S18065	Nut, hex M5	4	82	LZ04082	Gear 16T	1
63	LZ04063	Screw, set dog point M5x16	4	83	LZ04083	Shaft	1
64	LZ04064	Fork	1	84	S22325	Pin, taper M3x25	1
65	LZ04065	Block	1	85	LZ04085	Cover, front plate	1
66	LZ04066	Fork	1	86	LZ04086	Screw, socket head cap M5x25	8
67	LZ04067	Fork	2	87	LZ04087	O-ring 6.9x1.8	4
68	LZ04068	Block	1	88	LZ04088	Washer	4
69	LZ04069	Block	1	89	LZ04089	Pin, spring M4x40	4
70	LZ04070	Shaft	4	90	S22442	Pin, spring M4x24	2
71	LZ04071	Block	1	91	LZ04091	Oil site glass M20	1
72	LZ04072	Gasket	1	92	LZ04092	Handle body	4
73	LZ04073	Screw, set flat point	4	93	C30126	Ball, steel M6.5	4
74	LZ04074	Engaging arm	1	94	LZ04094	Spring, coil M1x5x20	4
75	LZ04075	Screw, cheese head	2	95	S11938	Screw, set flat point M8x8	4
76	LZ04076	Switch, micro	2	96	LZ04096	Insert plate, knob	4

APRON ASSEMBLY



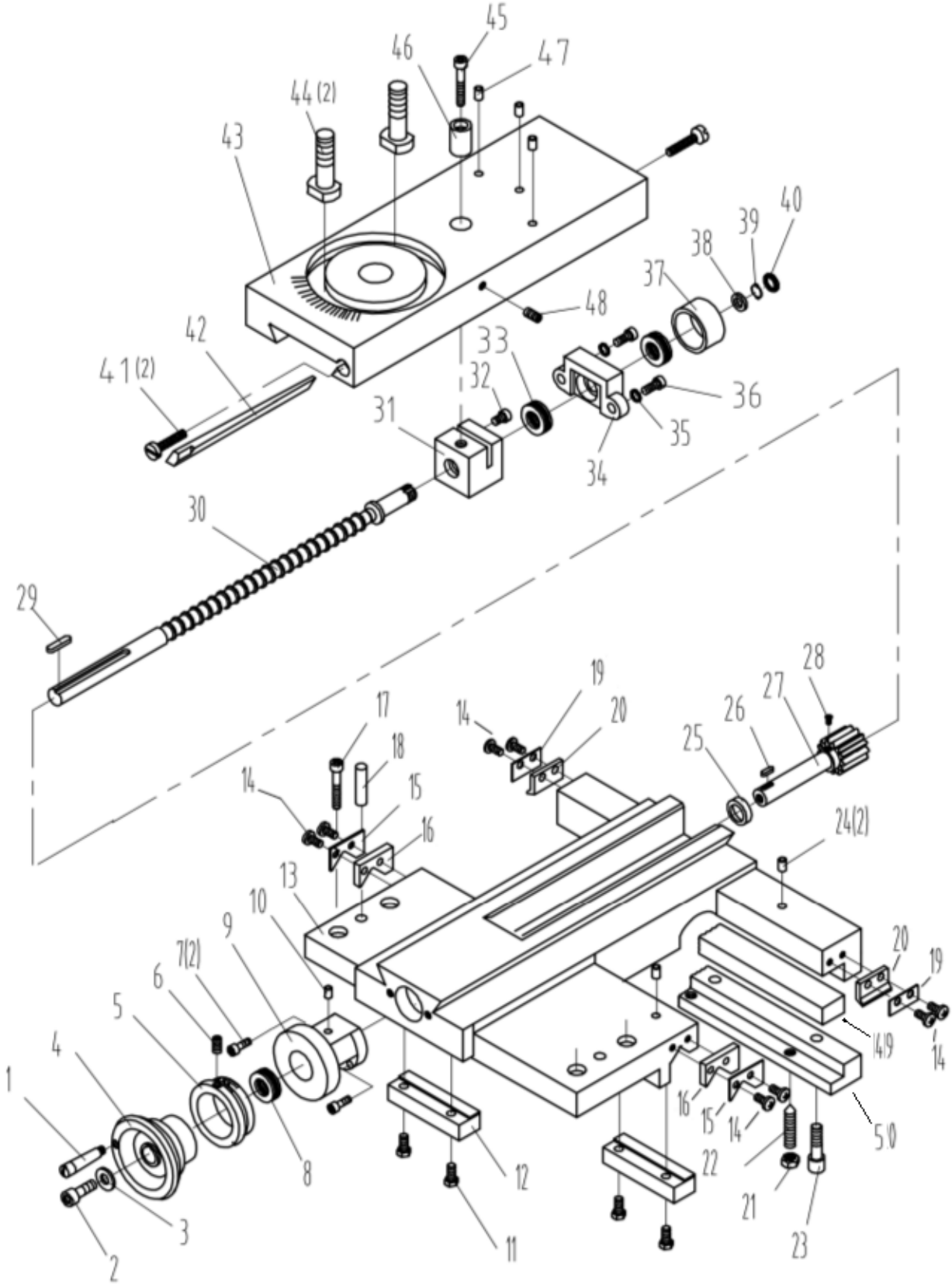
Apron Assembly

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
1	LZ05001	Bolt, hex head M6x10	1	23	S11612	Screw, set cone point M5x6	1
2	LZ05002	Washer	1	24	LZ05024	Dial	1
3	LZ05003	Gear 22T	1	25	LZ05025	Handwheel	1
4	S21512	Key, square M5x12	1	26	LZ05026	Washer	1
5	LZ05005	Shaft	1	27	S11971	Screw, socket head cap M6x16	1
6	LZ05006	O-ring 20x2.4	1	28	LZ05028	Handle shaft	1
7	LZ05007	Gear 40T	1	29	LZ05029	Handle sleeve	1
8	LZ05008	Pin, taper M5x30	2	30	LZ05030	Handle end 8x16	1
9	LZ05009	Gearshaft, short shank 13T	1	31	LZ05031	Handle shaft	1
10	LZ05010	Gearshaft, long shank 13T	1	32	LZ05032	Shift lever	1
11	LZ05011	Gear 60T	1	33	S12011	Screw, socket head cap M6x25	3
12	LZ05012	Bracket	1	34	LZ05034	Box	1
13	S11971	Screw, socket head cap M6x16	1	35	C30199	Ball, steel M5	2
14	LZ05014	Body, casting	1	36	LZ05036	Spring, coil 0.8x4x20	2
15	LZ05015	O-ring 12x2.4	1	37	S11918	Screw, set flat point M6x6	2
16	LZ05016	Bolt, hex head M12x25	1	38	LZ05038	Cover plug	1
17	LZ05017	Cover plug	1	39	S11951	Screw, socket head cap M6x12	4
18	LZ05018	Gearshaft 14T	1	40	S22230	Pin, spring M5x20	2
19	LZ05019	Key, square M5x18	1	41	LZ05041	Cover plate	1
20	C30035	Oil cup M8	1	42	LZ05042	Gear 63T	1
21	LZ05021	Flange	1	43	S22070	Pin, straight 8x25	3
22	S12011	Screw, socket head cap M6x25	3				

Apron Assembly Continued

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
44	LZ05044	Bushing	1	67	S18065	Nut, hex M5	3
45	LZ05045	Pin, straight 3x25	1	68	LZ05068	Screw, set flat point M5x16	3
46	LZ05046	Gear 40T	1	69	LZ05069	Gib	1
47	S13512	Screw, set flat point M5x12	2	70	LZ05070	Pin, straight 6x12	2
48	LZ05048	Gear 30T	1	71	LZ05071	Shaft	1
49	LZ05049	Oil site glass M12	1	72	LZ05072	Handle seat	1
50	LZ05050	Plug, oil fill	1	73	LZ05073	Handle shaft	1
51	LZ05051	Bushing		74	LZ05074	Knob M8x40	1
52	LZ05052	Shaft		75	S18125	Nut, hex M8	1
53	S12215	Screw, socket head cap M5x12	2	76	S18135	Washer, locking M8	1
54	LZ05054	Shaft	1	77	LZ05077	Bushing	1
55	LZ05055	Gear 18T	1	78	LZ05078	Gear	1
56	LZ05056	Washer	1	79	LZ05079	Bushing	1
57	S11941	Screw, socket head cap M6x10		80	LZ05080	Bushing	1
58	LZ05058	Screw, cheese head M5x5	1	81	LZ05081	Body, thread dial	1
59	LZ05059	Screw, set flat point M6x10	1	82	LZ05082	Screw, socket head cap M8x50	1
60	LZ05060	Bar, lockout	1	83	LZ05083	Shaft, thread dial	1
61	LZ05061	Half nut	1	84	LZ05084	Rivet M3x8	1
62	LZ05062	Bolt, hex head M6x12	2	85	C30050	Oil cup M6	1
63	LZ05063	Screw, set dog point M6x35	2	86	LZ05086	Worm gear	1
64	S18331	Nut, hex M6	2	87	LZ05087	Key	1
65	S11971	Screw, socket head cap M5x16	3	88	LZ05088	Support, worm gear	1
66	LZ05066	Nut seat set 1upper & 1lower	1				

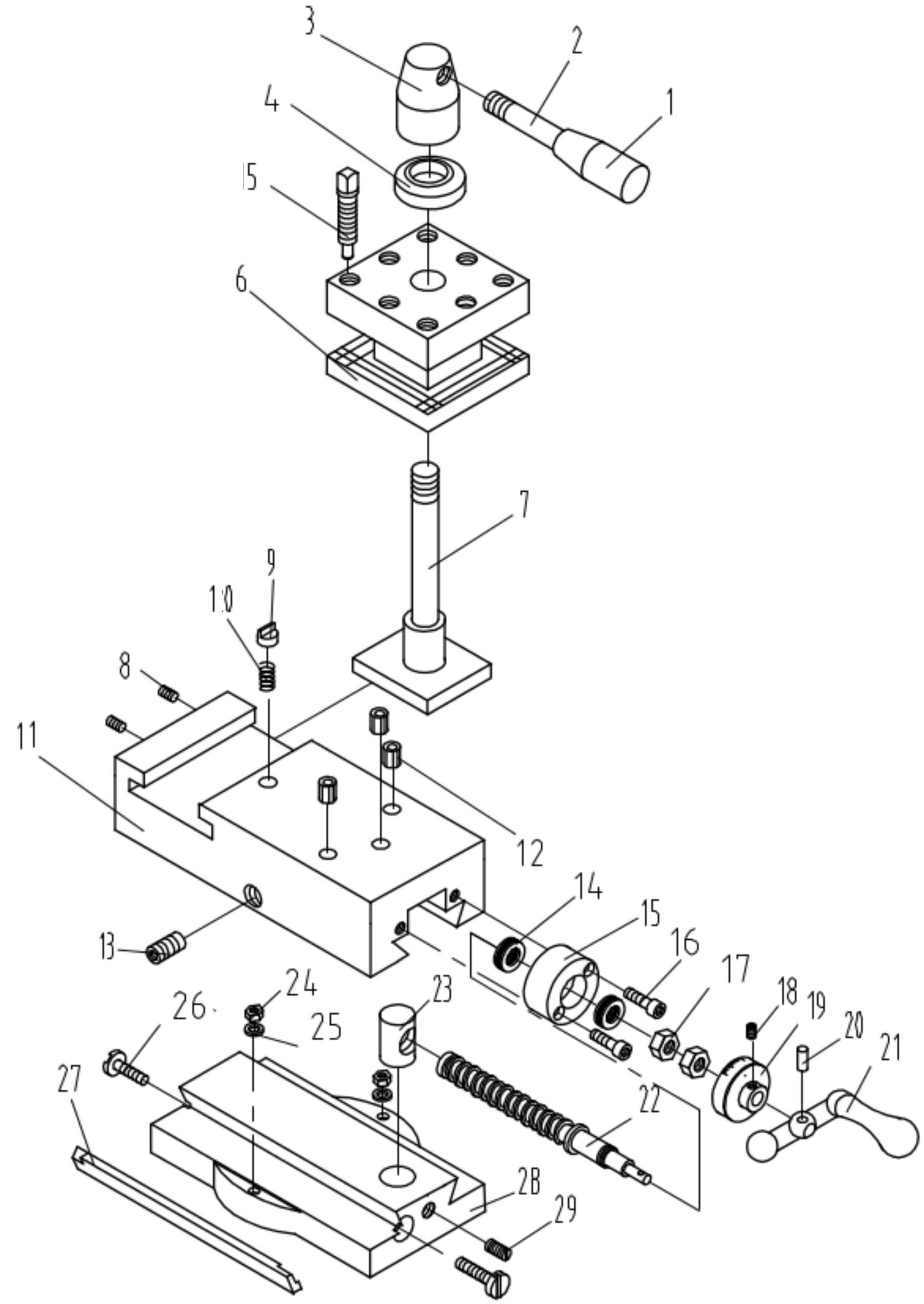
SADDLE AND CROSS-SLIDE ASSEMBLY



Saddle and Cross Slide Assembly

Item	Part Number	Description	Qty.	Item	Part Number	Description	Qty.
1	LZ06001	Handle M8x 63	1	25	LZ06025	Sleeve	1
2	LZ06002	Screw	1	26	S21170	Key, square M4x20	1
3	LZ06003	Washer	1	27	LZ06027	Gear shaft	1
4	LZ06004	Handle wheel	1	28	S02283	Screw, flat head M3x6	1
5	LZ06005	Dial ring	1	29	LZ06029	Key, square m5x30	1
6	S12218	Screw, set flat point M6x8	1	30	LZ06030	Screw, feed	1
7	s12011	Screw, socket head cap M6x25	2	31	LZ06031	Nut, feed	1
8	LZ06008	Bearing, thrust 20x35x10 51104	1	32	S11971	Screw, socket head cap M6x16	1
9	LZ06009	Hub	1	33	LZ06033	Bearing, thrust 51101 12x26x9	1
10	C30050	Oil cup M6	1	34	LZ06034	Housing, bearing	1
11	S12290	Bolt, hex head M8x20	4	35	S16135	Washer, lock M8	2
12	LZ06012	Block	2	36	S12311	Screw, socket head cap M8x25	2
13	LZ06013	Saddle	1	37	LZ06037	Dust cover	1
14	S11355	Screw, pan head M4x12	8	38	LZ06038	Sleeve	1
15	LZ06015	Plate, wiper	2	39	LZ06039	Washer, lock tab M12	1
16	LZ06016	Wiper	2	40	G01020	Nut, spanner M12	1
17	LZ06017	Screw, socket head cap M8x30	4	41	LZ06041	Screw, gib adjusting	2
18	LZ06018	Pin, taper internal threads 8x40	2	42	LZ06042	Gib	1
19	LZ06019	Plate, wiper	2	43	LZ06043	Cross slide	1
20	LZ06020	Wiper	2	44	LZ06044	T-bolt	2
21	S18331	Nut, hex M6	4	45	S12271	Screw, socket head cap M8x16	1
22	S11972	Screw, set cone point M6x16	4	46	LZ06046	Sleeve	1
23	LZ06023	Bolt, M8x25	3	47	C30035	Oil cup m8	3
24	C30035	Oil cup m8	2	48	S12242	Screw, set cone point M8x10	1
49	LZ06049	Block	1	49	LZ06049	Block	1
50	LZ06050	Gib	2	50	LZ06050	Gib	2

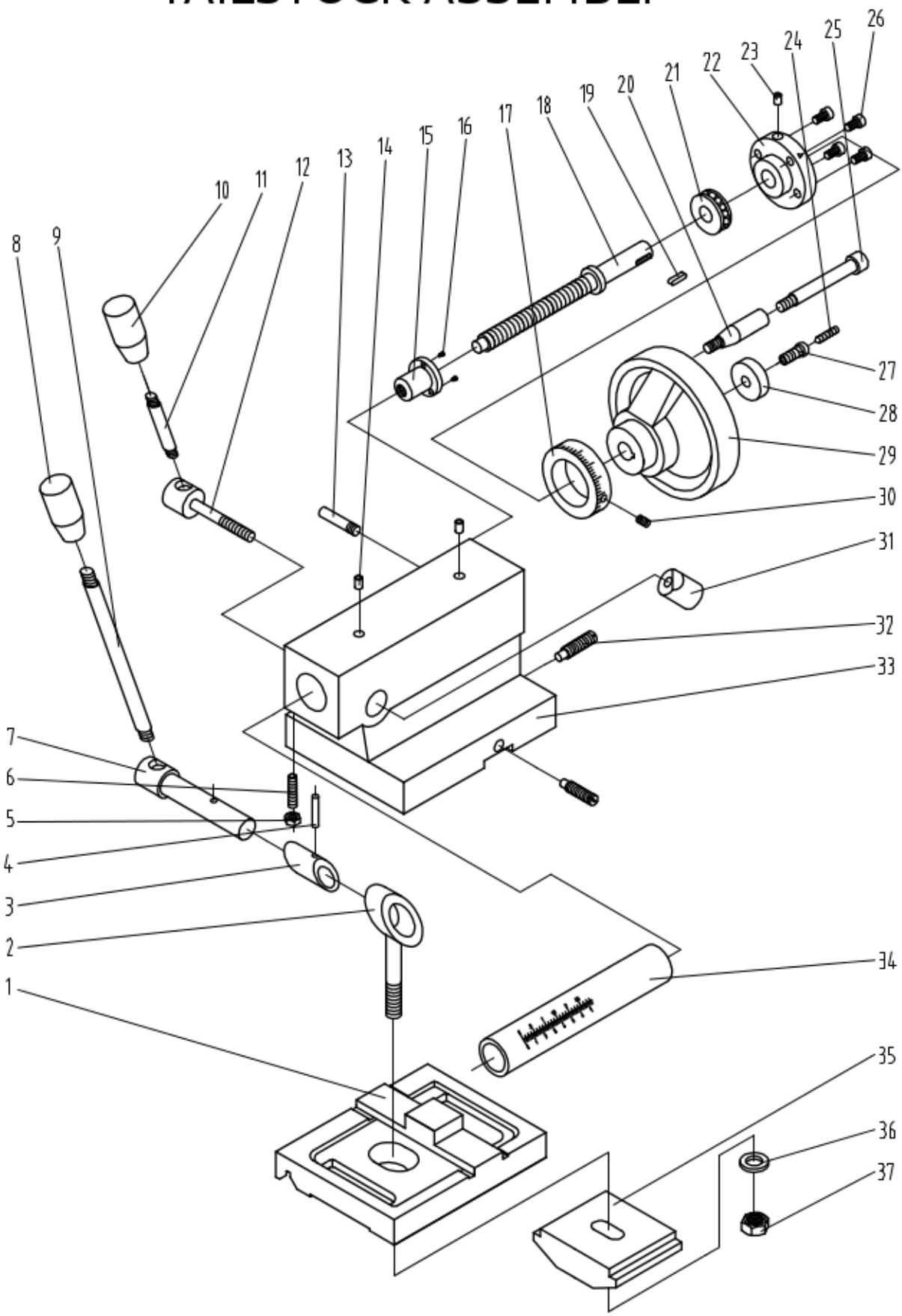
TOOL POST ASSEMBLY



Toolpost Assembly

Item	Part Number	Description	Qty.
1	LZ07001	Knob 10x50	1
2	LZ07002	Handle rod 10x80	1
3	LZ07003	Handle seat	1
4	LZ07004	Washer	1
5	LZ07005	Screw, turret M8x40	8
6	LZ07006	Turret	1
7	LZ07007	Stud, turret	1
8	S11942	Screw, set cone point M6x10	2
9	LZ07009	Stop	1
10	LZ07010	Spring, coil .4x4x18	1
11	LZ07011	Top slide	1
12	C30050	Oil cup M6	3
13	S11942	Screw, set cone point M6x10	1
14	LZ07014	Bearing, thrust 51101 12x26x9	2
15	LZ07015	Collar	1
16	S11991	Screw, socket head cap M6x20	2
17	G01020	Nut, hex fine thread M12x1.25	2
18	S11932	Screw, set cone point 6x6	1
19	LZ07019	Dial ring	1
20	S22110	Pin, taper M3x16	1
21	LZ07021	Handle rod 10x80	1
22	LZ07022	Lead screw	1
23	LZ07023	Nut, lead screw	1
24	S18125	Nut, plain M8	2
25	S18140	Washer M8	2
26	LZ07026	Screw, gib adjusting	2
27	LZ07027	Gib	1
28	LZ07028	Bottom swivel	1
29	S11088	Screw, set flat point M8x8	1

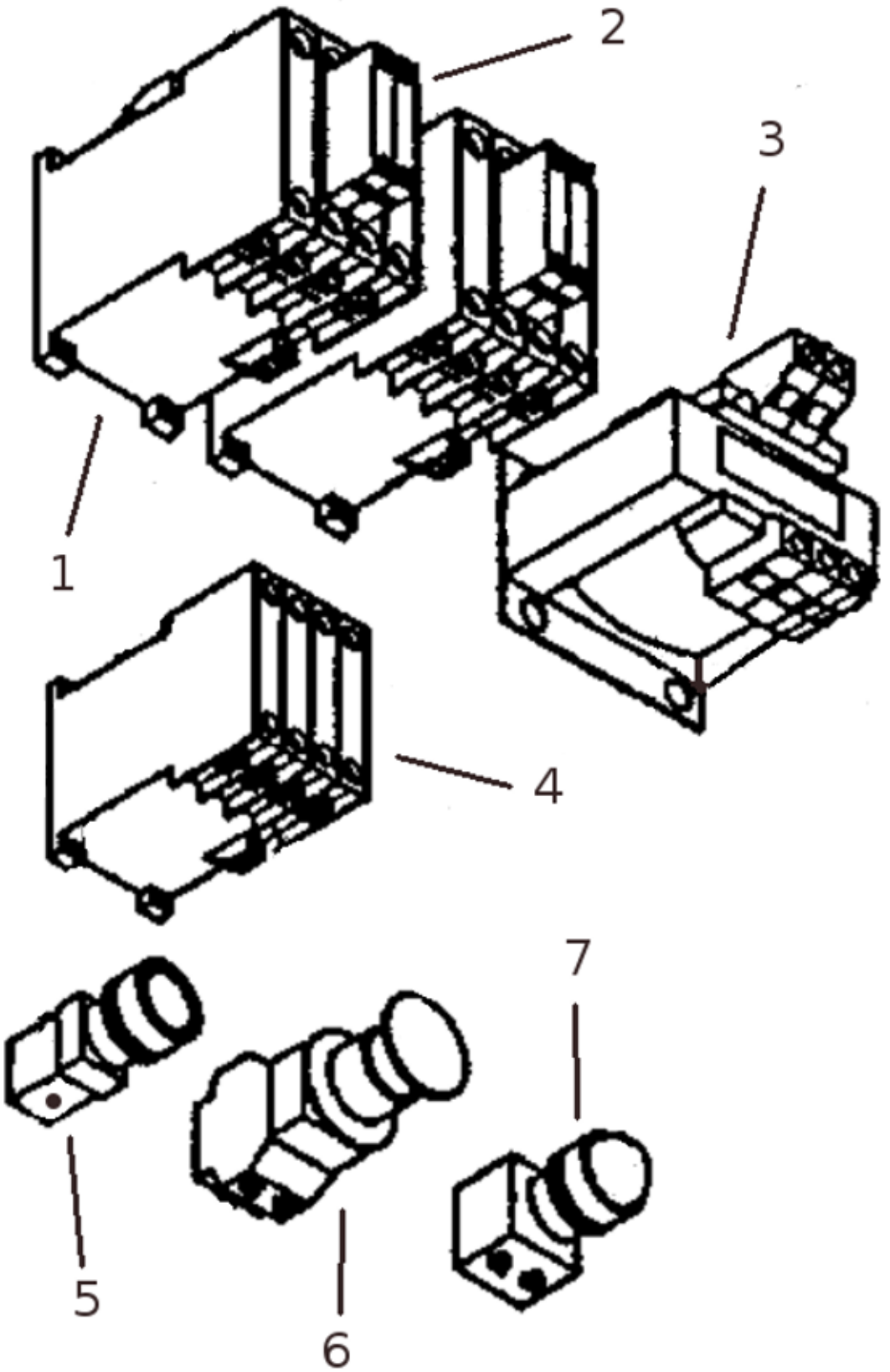
TAILSTOCK ASSEMBLY



Tailstock Assembly

Item	Part Number	Description	Qty.
1	LZ07001	Base	1
2	LZ07002	Screw, base locking	1
3	LZ07003	Collar, eccentric	1
4	S22240	Pin, spring M5x25	1
5	S18125	Nut,plain M8	1
6	S12332	Screw, set dog point M8x35	1
7	LZ07007	Shaft	1
8	LZ07009	Knob M15x50	1
9	LZ07009	Handle shaft	1
10	LZ07010	Knob M8x40	1
11	LZ07011	Handle shaft	1
12	LZ07012	Handle seat	1
13	LZ07013	Stop screw	2
14	C30035	Oil cup M8	2
15	LZ07015	Nut, feed	1
16	LZ07016	Screw, socket head cap M4x12	3
17	LZ07017	Dial ring	1
18	LZ07018	Screw, feed	1
19	LZ07019	Key, square 4x16	1
20	LZ07020	Handle shaft	1
21	LZ07021	Bearing, thrust 51102 15x29x8	1
22	LZ07022	Flange	1
23	C30035	Oil cup M8	1
24	S11692	Screw, set cone point M5x20	1
25	LZ07025	Screw, handle	1
26	S11971	Screw, socket head cap M6x16	1
27	LZ07027	Screw, base locking	1
28	LZ07028	Washer	1
29	LZ07029	Hand wheel	1
30	S11948	Screw, set dog point M6x10	1
31	LZ070	Block, locking	1
32	LZ07032	Screw, set dog point M10x45	3
33	LZ07033	Casting, tail stock body	1
34	LZ07034	Quill	1
35	LZ07035	Clamping plate	1
36	S18200	Washer, plain M12	1
37	S18185	Nut, hex M12	1

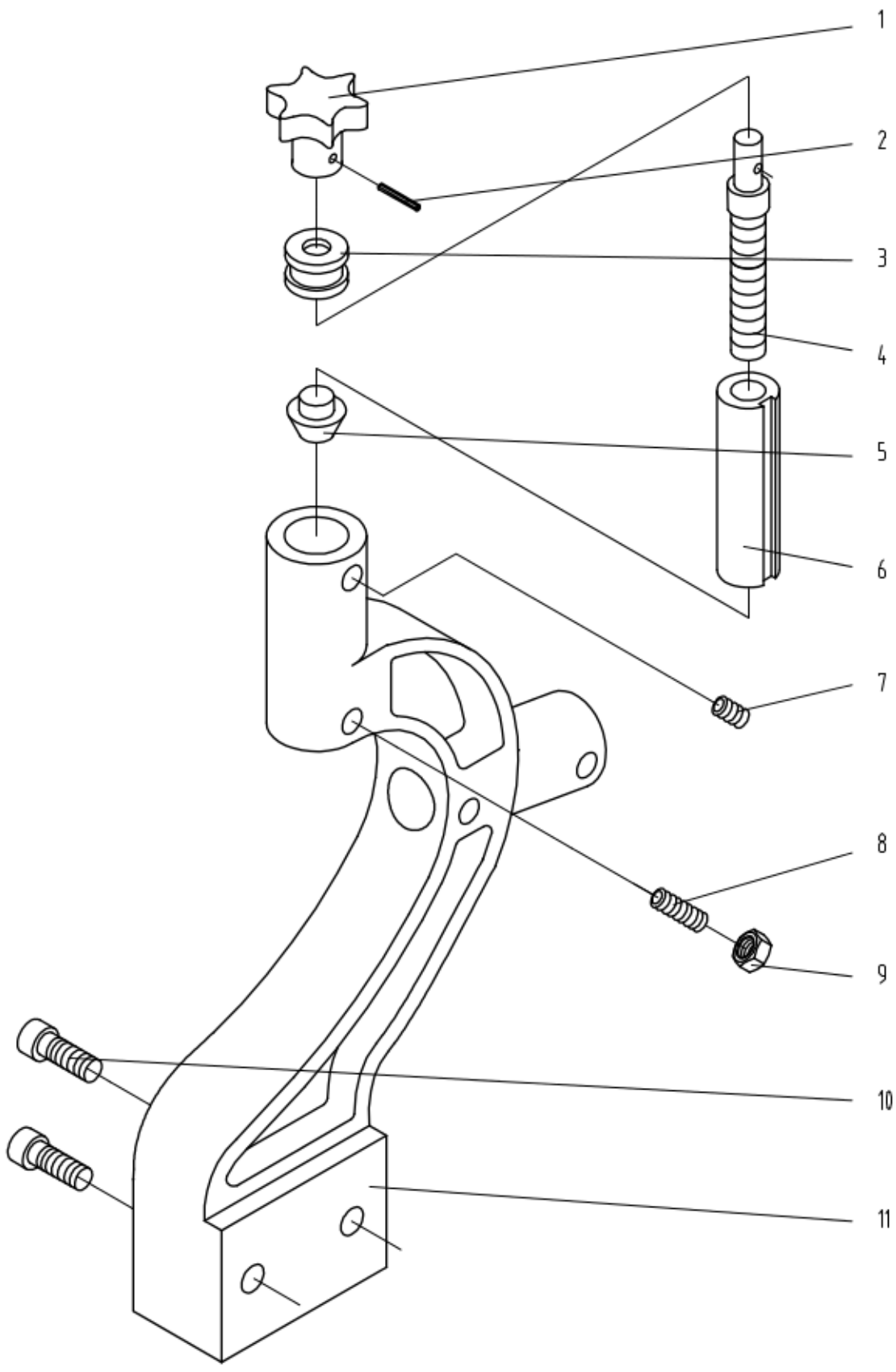
ELECTRICAL SYSTEM



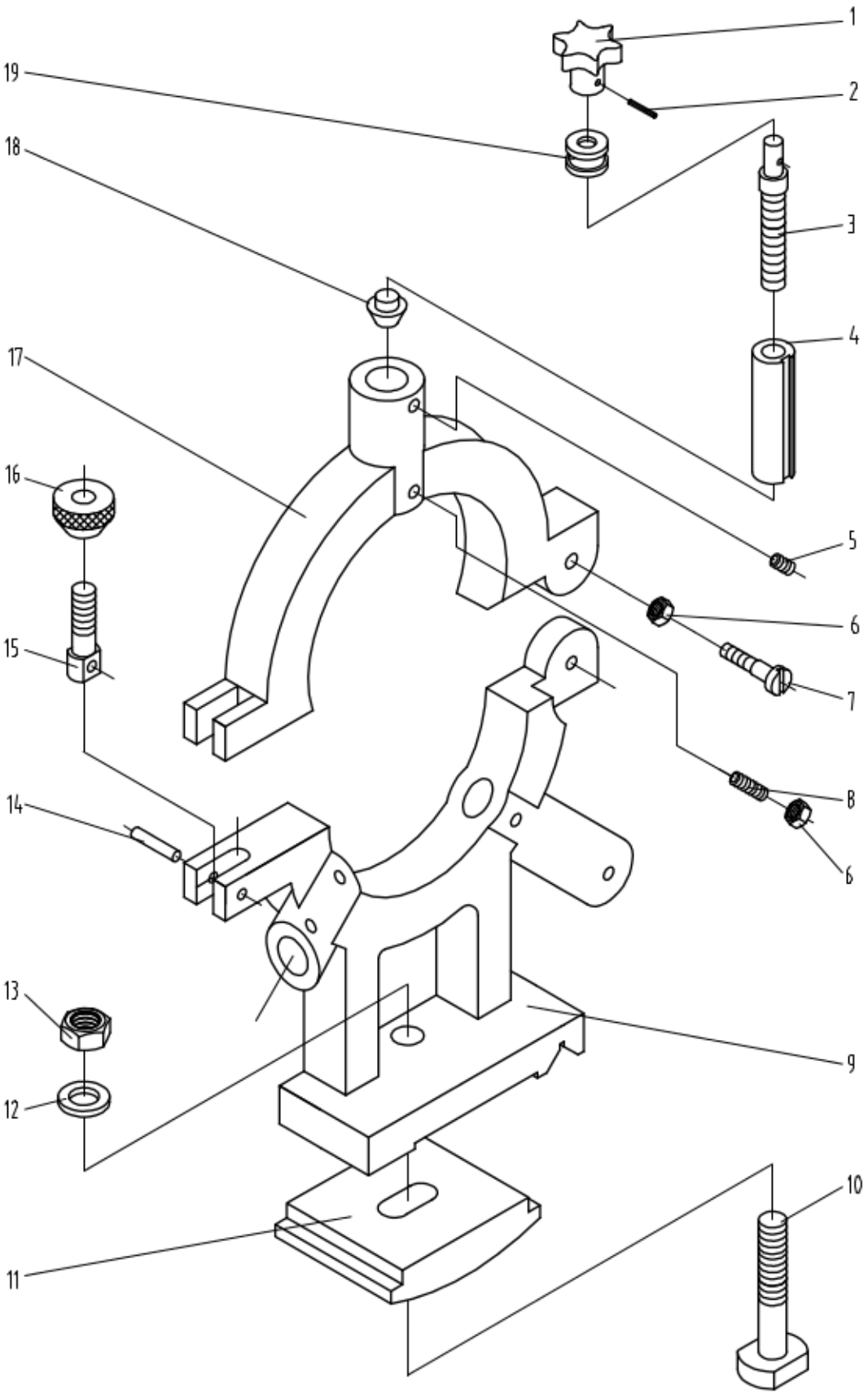
Electrical System Components

Item	Part Number	Description	Qty.
1	LZ09009	Contactor	2
2	LX06016	Aux Contactor	2
3	LZ09016	Transformer	1
4	LZ09019	Contactor	1
5	LX06045	Jog button	1
6	LX06042	E-Stop button	1
7	LX06040	Indicator light	1
8	Z40204	Fuse only	1
9	LZG10012	Direction switch, rotary type	1
9A	Z40201	Direction switch, micro switch type	2
10	LZ01042C	Motor, 110/220 not shown	1

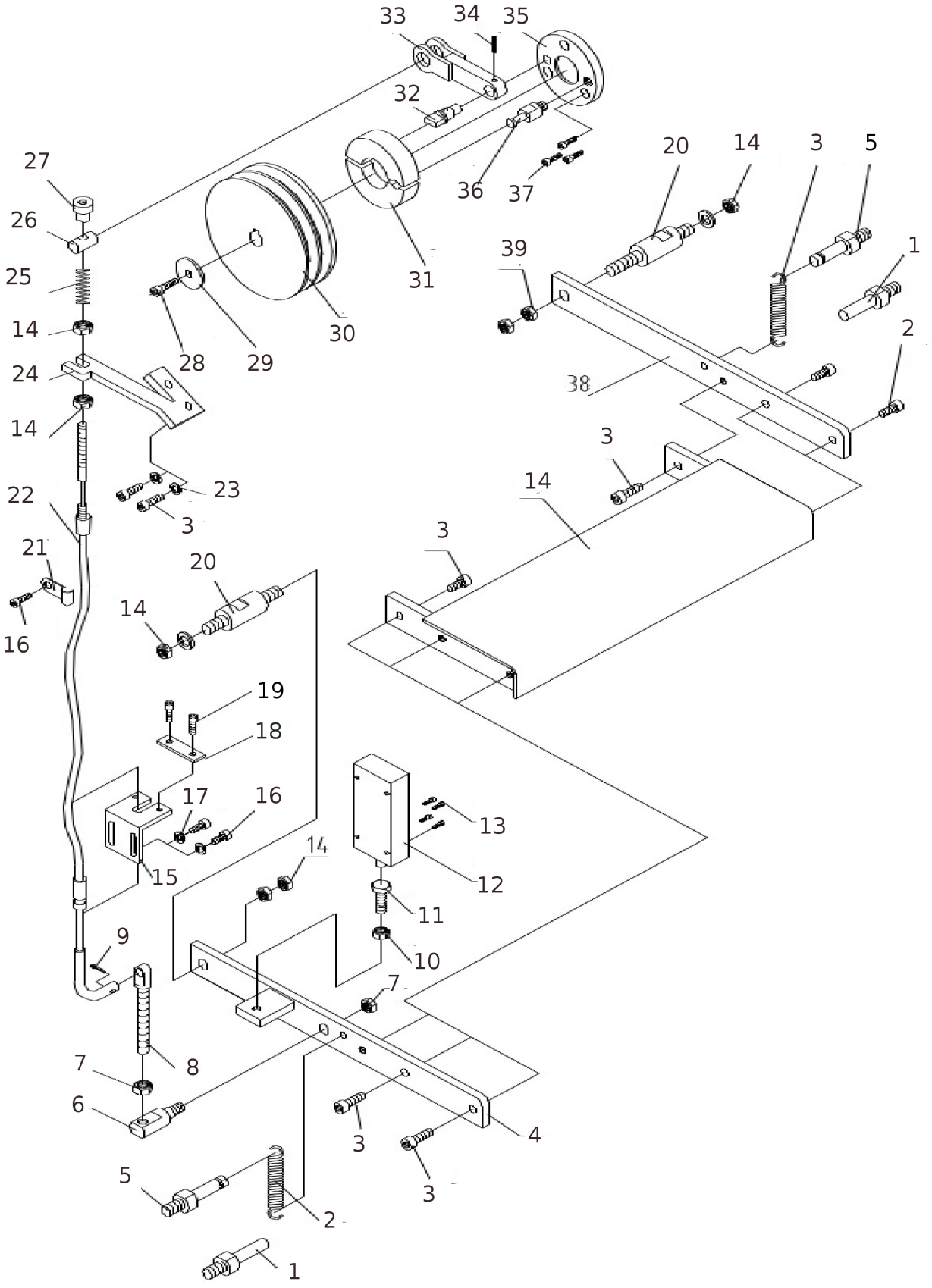
FOLLOW REST ASSEMBLY

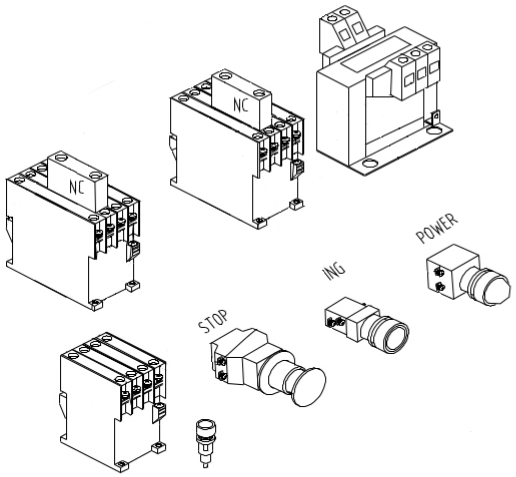


STEADY REST ASSEMBLY



OPTIONAL BRAKE ASSEMBLY




NC
NC
POWER
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STOP