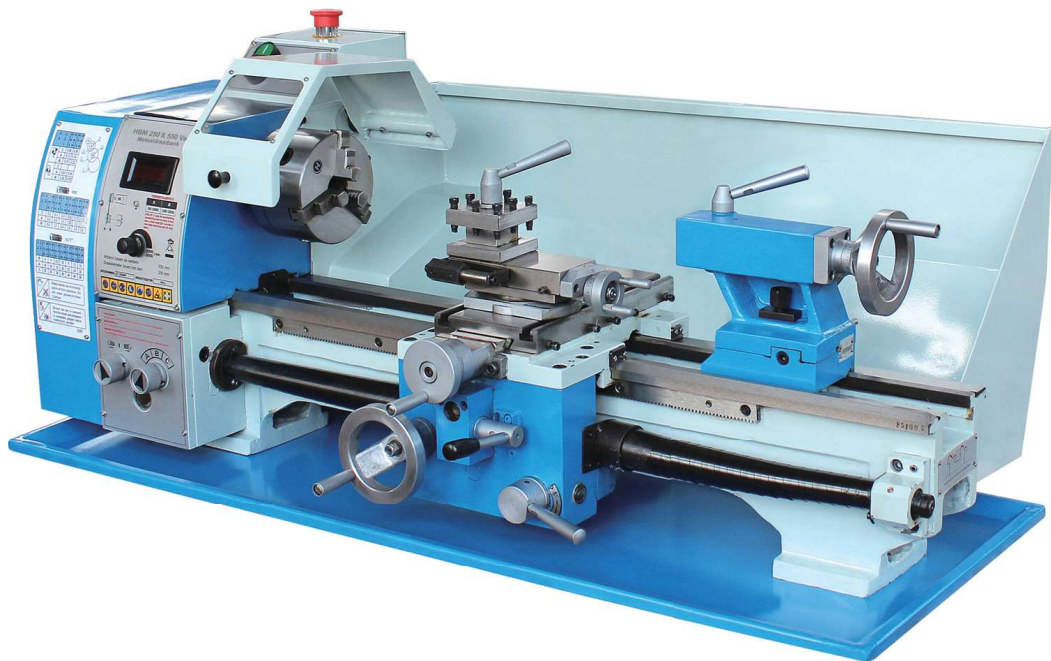




HBM 250 x 550 Vario Metaaldraaibank Compleet met Dwarsvoeding



HBM Machines B.V.

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WARRANTY

This HBM Machines product complies with the highest standards of workmanship, durability and safety. HBM Machines guarantees original buyers a faultless operation of its products for a one year period with respect to material and construction.

This warranty is null and void in case of defects occurring due to the following causes:

- Normal wear
- Lack of attention, ignorance, unsafe working procedures, lack of care during transport or storage.
- Lack of maintenance or maintenance carried out against the rules laid down in this booklet
- Use of the product for any work for which it was not intended; exceeding the rated capacity. Transport without proper care
- Shifting machinery without making use of proper lifting/ carrying gear
- Failure to read and/ or understand the rules and guidelines explained in these instructions.
- Every use for which the product was not designed. These instructions state very clearly all goals for which the product can be used. All other work is prohibited!
- Operation of the machinery by persons who have not or insufficiently been educated or instructed in its operation or who do not or insufficiently understand its operation.
- Operation of the machinery by persons without sufficient experience, in case of Their working without direct supervision by a teacher.
- Operation of the machinery by persons under the influence of medicines which impair one's ability to react, or by persons under the influence of alcohol or drugs.
- Operation of the machinery by persons under the age of 16, or by persons aged between 16 and 18 without direct supervision by a teacher.
- Repairs which are or have been made without prior written consent by HBM Machines.
- Any change or alteration made in the machinery by the customer (owner).
- Accidents or damage, caused by all causes from without, including damage during transport, during storage on the clients' premises, damage caused by objects or persons falling on or knocking against the machinery. Damages caused by acts of God are also excluded from the warranty. Please note that the examples of external causes are not comprehensive.

In no case shall HBM Machines be liable for the death or injuries of persons, for damages to goods or to the machinery itself, which was caused by operation of machinery supplied by HBM Machines.

MAKING USE OF WARRANTY

- To use your right to warranty you should send the machinery or its part to us, postage paid. Please include a proof of purchase and explain your complaint to us.
- In case our customer service finds a fault, we shall repair or replace said machinery or its part. In case this proves impossible or impractical, or cannot be done within a reasonable term, we will refund your purchase price. The cost of returning the machinery or its part to you shall be borne by HBM Machines.
- In case of our customer service ascertaining that there is no fault in the machinery or its part, or when it is established that the fault or damage arose because of events or causes not included in the warranty (see list above) the client is bound to pay the fees for transport and safe keeping.

PLEASE ACT RESPONSIBLY

It's impossible to enumerate all possible uses for which a given product is NOT suited. All these dangerous, ill-advised or hazardous uses have been captured under the phrase *Use of the product for any work for which it was not intended*. If you should be in doubt whether a specific use of the product would be allowed or not, you are advised to:

- Ask for advice from an expert user. This can't do any harm. Anyone who starts operating a machine without having the necessary experience or education may be taking a serious risk and will be held responsible for all consequences!
- Ask HBM Machines for advice.
- Study the EC legislation with respect to machinery and safety
- Read Books about the subject of proper use and design of machinery.

→ Please maintain your machine well. By doing so you can extend its lifetime considerably. Regular maintenance will prevent premature wear and promotes precision. Moreover, a well maintained machine will be safer than an ill-maintained one.

Please Note – Where machine or machinery is mentioned, the text also applies to tools!

SAFETY MEASURES

- 1. Only well trained personnel is allowed to operate this machine. In case you are unfamiliar with this type of machine, please get educated before you start operating it!**
- 2. All safety shields must remain intact and in place. Removal of safety shields is strictly prohibited. You are responsible for keeping all safety measures in proper working condition!**
- 3. KEEP HANDS AWAY FROM MOVING AND REVOLVING PARTS! REMOVE keys and tools from the machine before turning it on.**
- 4. You must prevent the machine from being inadvertently switched on.**
- 5. Never force a machine or its tools. Don't abuse chisels, drills, milling bits etc.**
- 6. Keep tools sharp. Sharp tools are safer and have better performance.**
- 7. Maintain your tools well. Follow the advice on maintenance and lubrication.**
- 8. SWITCH OFF the current before you start any maintenance or repair job. Draw out the wall plug.**
- 9. REGULARLY CHECK for damaged parts. Broken parts can be dangerous. Check if operation is not impeded. Replace worn and damaged parts as soon as possible. Do not operate machine before such parts have been replaced.**
- 10. Never leave a working machine unattended. Shut off first. Draw out wall plug!**
- 11. Keep the workshop clean. Rubbish promotes accidents!**
- 12. Never use machinery under hazardous conditions./ Make sure of proper lighting and ventilation. Do not expose machinery to moisture, rain and snow. Don't operate a machine when you are tired, ill or are using medicines which affect your reaction abilities. Never operate a machine when under the influence of alcohol or drugs!**
- 13. Keep children and visitors at a safe distance.**
- 14. Workshops are danger areas for children. Please lock up after you leave. Prevent children and laymen from entering the workshop without your consent. Use multiple switches to prevent machines being switched on by the ignorant.**
- 15. BEWARE! Please wear anti slip footwear. If your hair is long, put it under your clothes. Wear eye protection, ear protection or a face mask. Normal spectacles will not protect your eyes! Don't wear jewellery or neckties as they can get caught in revolving parts!**
- 17. Never reach across or through machines, in particular when in operation. Ensure a safe body posture.**
- 18. Never try to adjust a working machine!**
- 19. Please read and heed the safety stickers on the machine. Keep them legible and replace them when necessary. Removing such warning stickers is a crime and could lead to legal actions!**
- 20. These instructions for use are not a substitute for proper education.**
- 21. In case you do not comply with any of the rules, guidelines and warnings given here and on the machine, you are taking the risk of accidents, injury and damages which may even result in death. You will be held responsible!**
- 22. Dust arising from drilling, milling, sanding etc. could contain chemical substances that can cause severe diseases (for example, lead, siliceous dust).**
- 23. The risk you are exposed to depends on your operation mode, frequency of activities, etc. You are advised to install an extraction/ filtration system. If applicable use a breathing mask especially designed to filter out small particles or gases.**
- 24. Cutting oil has become a suspect substance. Please avoid contact. When applying cutting oil, wear safety gloves. Don't wear gloves during operation.**



ON DELIVERY

Please check if the product arrives (1) without damage and (2) complete – see the parts list or packing list. If you notice the case/ crate has sustained real damage contact the haulage company and (if possible) *do not accept your delivery*. In case your product arrives in damaged condition (whatever the cause) but the packing case is intact, contact HBM Machines. In case of doubt, ring HBM Machines. In case of obvious damage, always take photographs – a proof of your statement about damage may be required.

IN CASE OF COMPLAINTS RE DAMAGE, ACT WITH DUE DILIGENCE!

In case a claim is made after too long a time interval, this will not be entertained (unless you can provide a reasonable explanation for the delay).

UNPACKING AND ASSEMBLY (also read HOISTING and LIFTING, below))

1. Read the *Instructions for Use* in full before assembling, commissioning and using this product. If you have any question *after having read these instructions*, please ask HBM Machines for advice. Then follow the instructions.
2. Please note that *Instructions for Use* contain sufficient information about the product, enabling normal operation according to its intended use.
3. Please note that products are meant to be used by experienced users only. In case you fail to meet this requirement, please get educated or acquire more experience before using our product.
4. Please note – the user/ owner of this product is fully responsible for any damage or accident caused by a lack of knowledge or experience in the use of such a product!
5. This product should be installed in a place free from shocks, vibrations etc. Keep the installation site clean, well ventilated (use a dust extractor if necessary) and well lit.
6. Follow the rules for assembly. Keep the instructions for use near the site

where the product is used, which makes consulting them easier.

7. After a product has been installed in its intended site, please check if measures taken/ adjustments made, intended for transport, lifting and hoisting only, must be undone or rectified before using the product.

HOISTING AND LIFTING

1. Heavy products are here defined as products weighing over 25 kilograms, the accepted limit for a weight that can be comfortably lifted and shifted by hand. If you (attempt to) lift or shift loads heavier than 25 kilograms without proper lifting or hoisting machinery, you do so at your own risk and you will be responsible for all consequences. This also applies to products under 25 kilograms when shifted by any means (by hand or using lifting or hoisting machinery).
2. Heavy products are always delivered in a packing crate or with a pallet or base that can be moved using e.g. a fork lift, chain hoist, etc.. of sufficient capacity. This is for good reasons. After arrival the new owner is expected to use proper appliances and machines of sufficient capacity to move the product. This is not just to prevent damage to the product, but also for reasons of personal safety.
3. In case of damage, injury or death resulting from moving and/or lifting heavy products as defined under 1 without use of proper lifting or hoisting appliances, or use of such devices without sufficient capacity, as defined under 2, the client will be entirely responsible.
4. In case of hoisting heavy products using aids (fork lift, chain hoist, etc.) the rules as given below **MUST BE COMPLIED WITH**. If not, the client/ owner/ user will be entirely responsible.

SAFETY RULES FOR LIFTING AND MOVING HEAVY LOADS

1. **NEVER** stand under or near a load that is suspended or being lifted. Keep spectators at a safe distance. In particular keep children away!

2. When lifting a load, follow the manufacturer's guidelines concerning the points where hooks, straps, bars, chains etc. are to be attached, and also concerning the protection of the product from damage (e.g. to the paint) resulting from the use of hoisting and lifting devices. If you don't comply, you will be responsible for all consequences.
3. Follow the manufacturer's advice about fixing and securing movable parts or any other measures to be taken during transport and lifting. If you don't comply, you will be responsible for all consequences.
4. Handle lifted or suspended loads with due caution. Keep them well balanced. Do not move loads suddenly. Prevent swinging a load. Use approved straps, chains, hooks, etc. Check hoisting materials for wear on a regular basis and replace them when necessary. Do not knock against other objects. Let down on the floor gently. Let a heavy load down only on a floor able to carry its weight.
5. Loads must be lifted/ shifted/ moved only by people having sufficient education and experience. If you don't comply, you will be responsible for all consequences.
6. It is strictly forbidden for persons to be lifted/ moved/ carried along with a load.

SPECIFICATIONS:

Capacities:	
Swing Over Bed	250mm
Swing Over Cross Slide	150mm
Distance Between Centers	550mm
Width of Bed	135mm
Headstock:	
Hole Through Spindle	26mm
Taper in Spindle Nose	MT4
Number of Spindle Speeds	Variable
Range of Spindle Speeds	50-2000rpm
Feeding and Threading:	
Number of Metric Threads	18
Range of Metric Threads	0.2~3.5mm
Number of Imperial Threads and Range	21/8-56 T.P.I
Range of Corss feed	0.03 - 0.075 mm
Range of Longitudinal Feed	0.06~0.32mm
Compound and Carriage:	
Tool Post Type	4-Way
Maximum Compound Slide Travel	70mm
Maximum Cross Slide Travel	115mm
Maximum Carriage Travel	450mm
Tailstock:	
Tailstock Spindle Travel	80mm
Taper in Tailstock Spindle	MT2
Miscellaneous:	
Main Motor	750W
Dimension:	
Length	1150mm
Width	560mm
Height	560mm
Weight	180KGS

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⚠ WARNING!

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

CONTENTS OF SHIPPING CONTAINER

- 1 HBM 250-F Vario
- 1 Operator's Manual
- 1 Toolbox & Tools

TOOLBOX CONTENTS (Fig. 1)

- 1 Dead Center MT4
- 1 Dead Center MT2
- 3 External Jaw
- 1 Oil Gun
- 1 Spanner for Spindle Adjustment
- 1 Cross Screwdriver
- 1 Flat Screwdriver
- 1 Key for 3-Jaw Chuck
- 1 Tool Post Square Wrench
- 5 Hex Socket Wrench
- 3 Double End Head Wrenches
- 6 Change Gears



Fig. 1

UNCRATING AND CLEAN-UP

1. Finish removing the wooden crate from around the lathe
2. Check all the accessories of the machine tool according to the packing list.
3. Unbolt the lathe from the shipping crate bottom.
4. Choose a location for the lathe that is dry, has good lighting and has enough room to be able to service the lathe on all four sides.
5. With adequate lifting equipment, slowly raise the lathe off the shipping crate bottom. **Do not lift by spindle.** Make sure lathe is balanced before moving to sturdy bench or stand.
6. To avoid twisting the bed, the lathe's location must be absolutely flat and level. Bolt the lathe to the stand (if used). If using a bench, through bolt for best performance.
7. 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.
8. Remove the end gear cover. Clean all components of the end gear assembly and coat all gears with a heavy, non-slinging grease.

FOUNDATION DRAWING

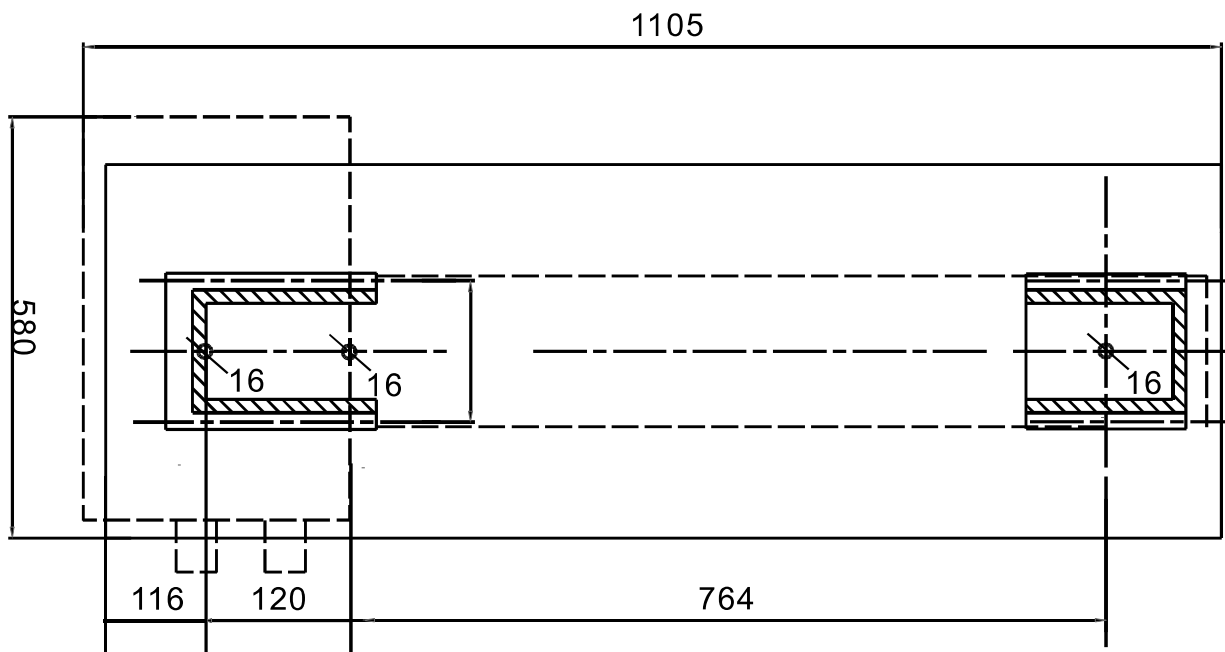


Fig. 2

GENERAL DESCRIPTION

Lathe Bed (Fig. 3)

The lathe bed is made of high-grade iron. By combining high cheeks with strong cross ribs, a bed of low vibration and rigidity is produced. It integrates the headstock and drive unit, for attaching the carriage and leadscrew. The two precision-ground V – sideways, re-enforced by heat hardening and grinding, are the accurate guide for the carriage and tailstock. The main motor is mounted to the rear of the left side of the bed.

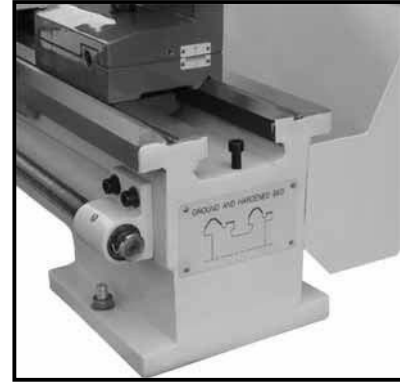


Fig. 3

Headstock (Fig. 4)

The headstock is cast from high grade, low vibration cast iron. It is bolted to the bed with four screws. The headstock houses the main spindle with two precision taper roller bearings and the drive unit.

The main spindle transmits the torque during the turning process. It also holds the workpieces and clamping devices. (e.g. 3-jaw chuck).



Fig. 4

Gear Box (Fig. 5)

The gear box is made from high quality cast iron and is mounted on the left side of the machine bed. It is used to select the feeds for straight turning as well as for thread cutting. In order to achieve certain thread pitches, it is necessary to replace the change gears.

The torque of the work spindle is transmitted to the feed gear and thus to the leadscrew.

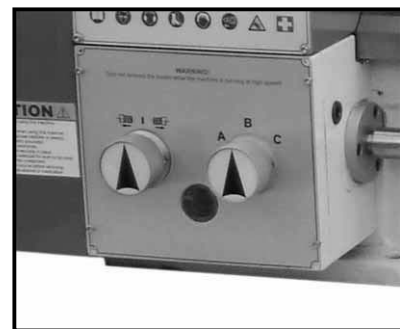


Fig. 5

Carriage (Fig. 6)

The carriage is made from high quality cast iron. The slide parts are smoothly ground. They fit the V on the bed without play. The lower sliding parts can be easily and simply adjusted. The cross slide is mounted on the carriage and moves on a dove tailed slide. Play in the cross slide may be adjusted with the gibs.

Move the cross slide with its conveniently positioned handwheel. There is a graduated collar on the handwheel.

The top slide, mounted on the cross slide, can be rotated 360°. The top slide and the cross slide travel in dove tailed slides and have gibs, adjustable nuts, and graduated collars.

A four way tool post is fitted on the top slide and allows four tools to be clamped. Loosen the center clamp handle to rotate any of the four tools into position.

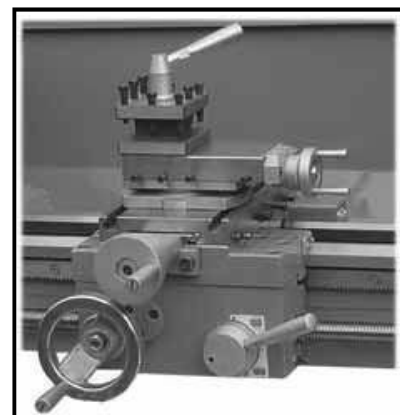


Fig. 6

Apron (Fig. 7)

The apron is mounted on the bed. It houses the half nut with an engaging lever for activating the automatic feed. The half nut gibs can be adjusted from the outside.

A rack, mounted on the bed, and a pinion operated by handwheel on the carriage allow for quick travel of the apron.

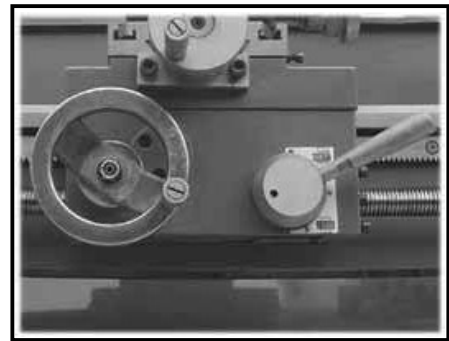


Fig. 7

Leadscrew (Fig. 8)

The leadscrew is mounted on the front of the machine bed. It is connected to the gear box at the left for automatic feed and is supported by bearing on both ends. The two groove nuts (B, Fig. 9) on the right end are designed to take up play on the leadscrew.

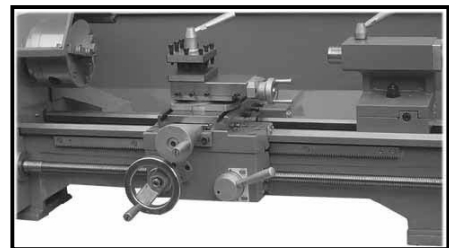


Fig. 8

Tailstock (Fig. 10)

The tailstock slides on a V way and can be clamped at any location. The tailstock has a heavy-duty spindle with a Morse taper No. 2 socket and a graduated scale. The spindle can be clamped at any location with a clamping lever. The spindle is moved with a handwheel at the end of the tailstock.

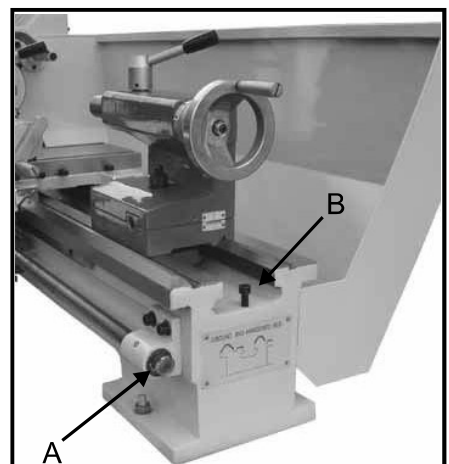


Fig. 9

NOTE:

Fit the securing screw (B, Fig. 9) at the end of the lathe be in order to prevent the tailstock from falling off the lathe bed.

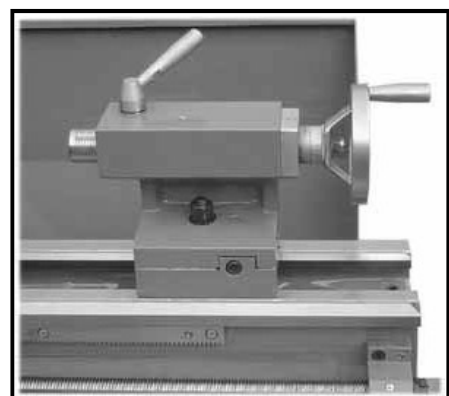


Fig. 10

CONTROLS

1. Change-over Switch (A, Fig. 11)

After the machine is switched on, turn the switch position for counter-clockwise spindle rotation (forwa
Turn the switch to “R” position for clockwise spindle rotation (reverse). “0” position is OFF and the spindle remains idle.

2. Emergency Button Switch (B, Fig. 11)

The switch has the function of emergency stopping and protective function to the machine, electric components and people.

3. ON/OFF switch (C, Fig. 11)

The switch has the function of on and off the machine.
Green push button marked “I” stop start the motor.
Red push button marked “O” to switch the motor off.

4. Feed Direction Selector (D, Fig. 12)

Select carriage travel direction when the chuck is rotating in the forward direction or counter-clockwise as viewed from the front of the chuck.

5. Feed Rate Selector (E, Fig. 12)

Set the desired feed or thread rates.

6. Compound Rest Lock

Turn two hex nuts (F, Fig. 13) clockwise to lock and counter -clockwise to unlock.

7. Compound Slide Lock

Turn hex socket cap screws (G Fig. 13) clockwise, and tighten to lock. Turn counter-clockwise to loosen.

8. Cross Slide Lock

Turn hex socket cap screw (H, Fig. 13) clockwise and tighten to lock. Turn counter-clockwise and loosen to unlock.

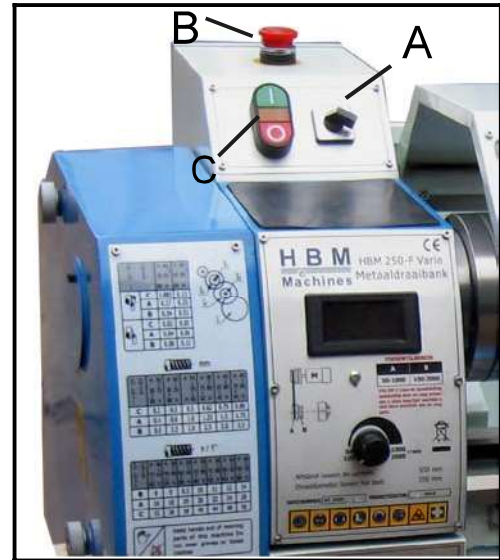


Fig. 11



Fig. 12

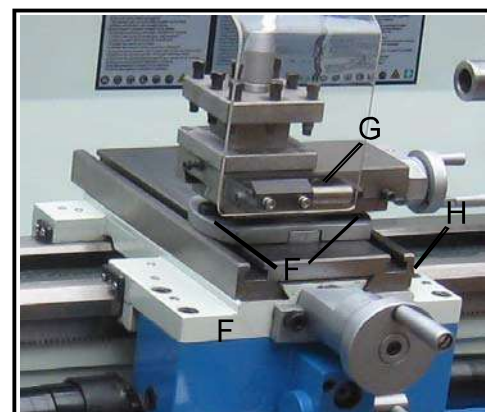


Fig. 13

9. Carriage Lock

Turn hex socket cap screw (A, Fig.14) clockwise and tighten to lock. Turn counter-clockwise and loosen to unlock.

Caution: carriage lock screw must be unlocked before engaging automatic feeds or damage to lathe may occur.

10. Longitudinal Traverse (B, Fig. 15)

Rotate hand wheel clockwise to move the apron assembly toward the tailstock (right). Rotate the hand wheel counter-clockwise to move the apron assembly toward the headstock (left).

11. Half Nut Engage Lever (C, Fig. 15)

Move the lever down to engage. Move the lever up to disengage.

12. Cross Traverse Handwheel (D, Fig. 15)

Clockwise rotation moves the cross slide toward the rear of the machine.

13. Compound Rest Traverse Lever (E, Fig. 15)

Rotate clockwise or counter-clockwise to move or position.

14. Tool Post Clamping Lever (F Fig. 15)

Rotate counter-clockwise to loosen and clockwise to tighten. Rotate the tool post when the lever is unlocked.

15. Corss/Longitudinal Power Feed Lever (Q Fig. 15)

Moving the lever left side and up, engage corss feed. Moving the lever right and down, engage longitudinal feed.

16. Tailstock Clamping Screw (G, Fig. 16)

Turn hex nut clockwise to lock and counter-clockwise to unlock.

17. Tailstock Quill Clamping Lever (H, Fig. 16)

Rotate the lever clockwise to lock the spindle and counter-clockwise to unlock.

18. Tailstock Quill Traverse Handwheel (I, Fig. 16)

Rotate clockwise to advance the quill. Rotate counter-clockwise to retract the quill

19. Tailstock Off-set Adjustment (J, Fig. 16)

Three sets screws located on the tailstock base are used to off-set the tailstock for cutting tapers. Loosen lock screw on tailstock end. Loosen one side set screw while tightening the other until the amount of off-set is indicated on scale. Tighten lock screw.

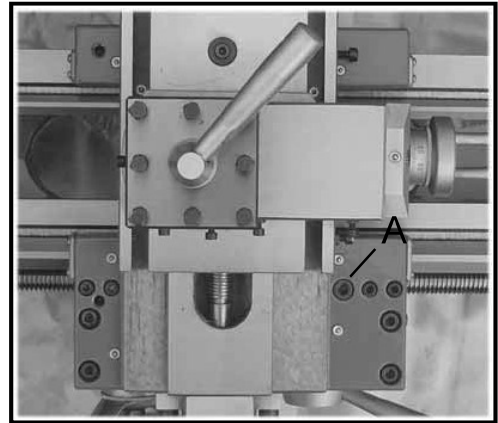


Fig. 14

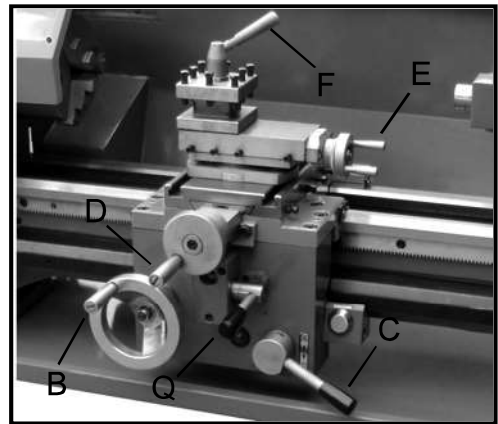


Fig. 15

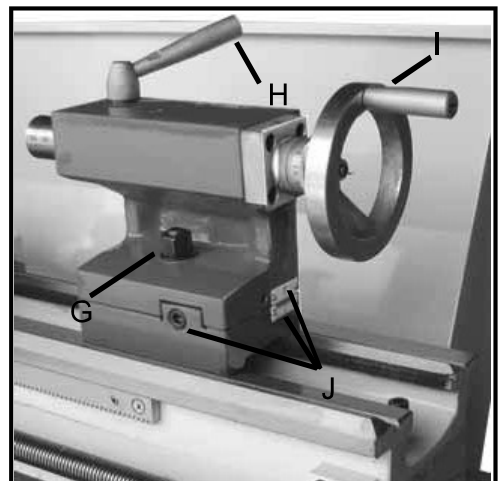


Fig. 16

OPERATION

Replacement of Chuck

The head spindle holding fixture is cylindrical. Loose three set screws and nuts (A, Fig.17, only two are shown) on the lathe chuck flange to remove the chuck. Position the new chuck and fix it using the same set screws and nuts.

Tool Set-Up

Clamp the turning tool into the toolholder.

The tool must be clamped firmly. When turning, the tool has a tendency to bend under the cutting force generated during the chip formation. For best results, tool overhang should be kept to a minimum of 3/8" or less.

The cutting angle is correct when the cutting edge is in line with the center axis of the work piece. The correct height of the tool can be achieved by comparing the tool point with the point of the center mounted in the tailstock. If necessary, use steel spacer shims under the tool to get the required height. (Fig. 18)

Change H/L Speed

1. Unscrew the two fastening screws (B, Fig.19) and remove the protective cover.
2. To selection A or B according to your requirement? A is low speed, B is high speed. (Fig. 20)

Caution: we suggestion our customers to select low speed position to work, it is could provides stronger torque for working!

Belt Adjusted

Loosen the four nuts and screws (C, Fig. 20) to remove the plate of mounting motor and position!

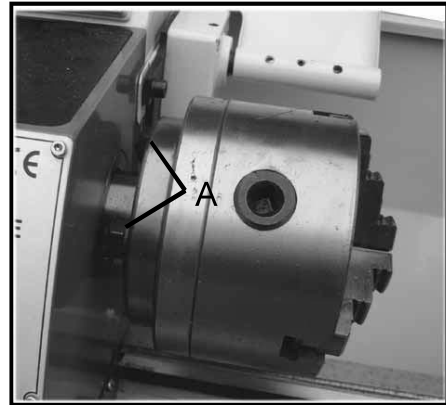


Fig. 17

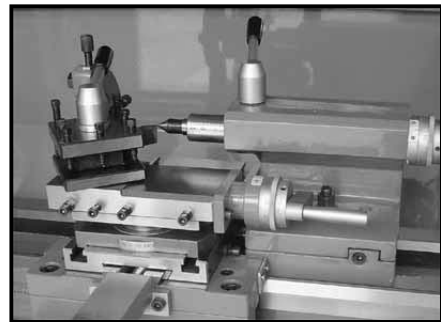


Fig. 18

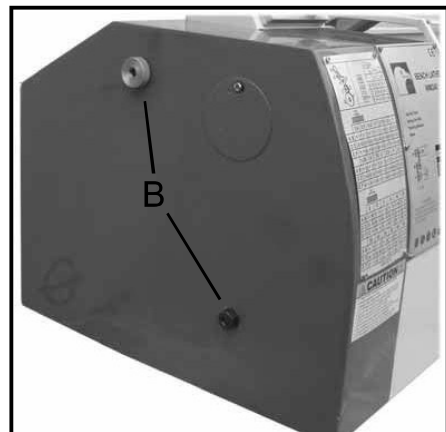


Fig. 19

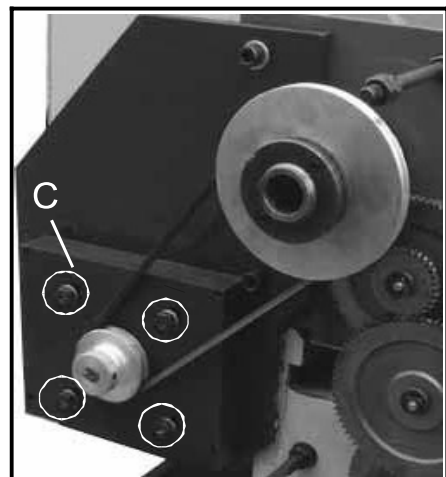


Fig. 20

Manual Turning

Apron travel, cross travel, and top slide handwheel can be operated for longitudinal or cross feeding. (Fig.21)

Longitudinal Turning with Auto-Feed

1. Set the selector knob (A, Fig.22) to select the feed direction and feed speed.
2. Use the table (B, Fig.22) on the lathe for selecting the feed speed or the thread pitch. Adjust the change gear if the required feed or thread pitch cannot be obtained with the installed gear set.

Change Gears Replacement

1. Disconnect the machine from the power source.
2. Unscrew the two fastening screws and remove the protective cover.
3. Loosen the locking screw (C, Fig.23) on the quadrant.
4. Swing the quadrant (D, Fig.23) to the right.
5. Unscrew the bolt (E, Fig.23) from the leadscrew or the square bolts (F, Fig.23) from the quadrant bolts in order to remove the change gears from the front.
6. Install the gear couples according to the thread and feed table (Fig.24) and screw the gearwheels onto the quadrant again.
7. Swing the quadrant to the left until the gearwheels have engaged again.
8. Readjust gear backlash by inserting a normal sheet of paper as an adjusting or distance aid between the gearwheels.
9. Immobilize the quadrant with the locking screw.
10. Install the protective cover of the headstock and reconnect the machine to the power supply.

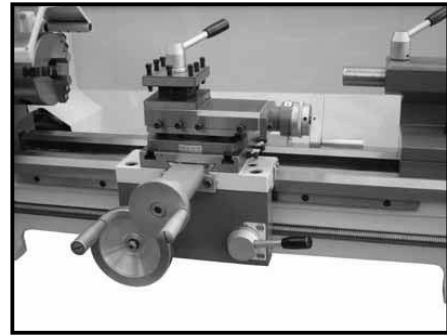


Fig. 21



Fig. 22

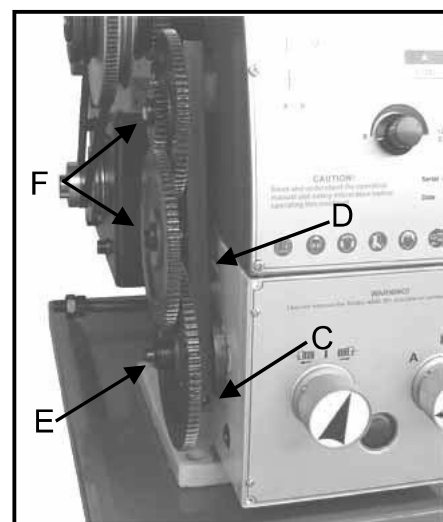
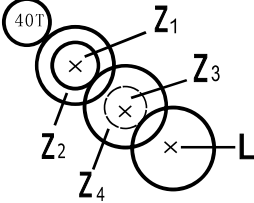
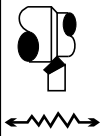
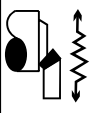


Fig. 23

THREADING AND FEEDING TABLE FOR METRIC LATHE

Z_1 Z_4 L	Z_2 Z_3	H 40 30 85 80 H	H 30 45 85 80 H	
	C	0.08	0.12	
	A	0.16	0.24	
	B	0.32	0.48	
	C	0.026	0.039	
	A	0.052	0.078	
	B	0.104	0.156	

 mm

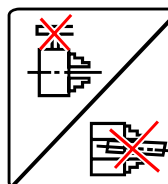
Z_1 Z_4 L	Z_2 Z_3	H 50 30 75 80 H	H 60 30 50 80 H	H 70 30 30 H 80	H 30 75 80 60 H	H 45 60 80 40 H	H 45 70 80 40 H
C		0.2	0.3	0.5	0.62	0.75	0.88
A		0.4	0.6	1.0	1.25	1.5	1.75
B		0.8	1.2	2.0	2.5	3.0	3.5

 n / 1"

Z_1 Z_4 L	Z_2 Z_3	H 40 75 63 60 H	H 30 70 80 50 H	H 50 60 45 80 H	H 30 75 80 60 H	H 30 75 80 65 H	H 65 50 63 60 H	H 60 45 50 80 H
C		8	9	9.5	10	11	12	14
A		16	18	19	20	22	24	28
B		32	36	38	40	44	48	56



Keep hands out of moving parts of this machine. Do not wear gloves or loose clothes.



Be sure the key is removed from the chuck and workpiece is completely gripped before rotating the spindle!

Straight Turning (Fig. 25)

In the straight turning operation, the tool feeds parallel to the axis of rotation of the workpiece. The feed can be either manual by turning the handwheel on the lathe saddle or the top slide, or by activating the automatic feed. The crossfeed for the depth of cut is achieved using the cross slide.

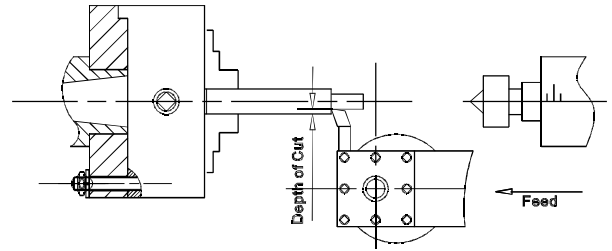


Fig. 25

Facing and Recesses (Fig. 26)

In the facing operation, the tool feeds perpendicular to the axis of rotation of the workpiece. The feed is made manually with the cross slide handwheel. The crossfeed for cut depth is made with the top slide or lathe saddle.

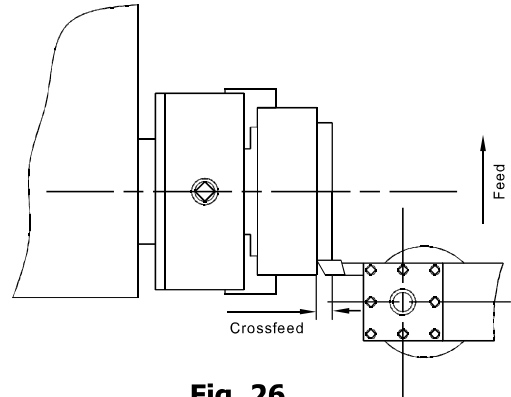


Fig. 26

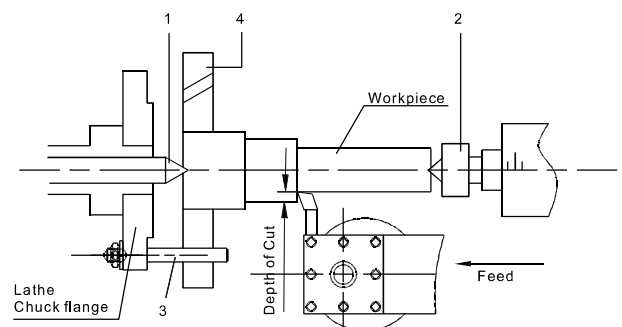
Turning Between Centers (Fig. 27)

For turning between centers, it is necessary to remove the chuck from the spindle. Fit the M.T.3 center into the spindle nose and the M.T. 2 center into the tailstock. Mount the workpiece fitted with the driver dog between the centers. The driver is driven by a catch or face plate.

Note: Always use a small amount of grease on the tailstock center to prevent center tip form overheating.

Taper Turning Using Tailstock Off-Set

Work to a side angle of 5 can be turned by off-setting the tailstock. The angle depends on the length of the workpiece.



- 1.Fixed Centre 60°
- 2.Living Centre 60°
- 3.Dog Drive Pin
- 4.Dog Plate

Fig. 27

To off-set the tailstock, loosen locking screw (A, Fig.28) Unscrew the set screw (B, Fig.28) on right end of the tailstock. Loosen the front adjusting screw(C, Fig.28) and take up the same amount by tightening the rear adjusting screw (D, Fig.28) until the desired taper has been reached. The desired cross-adjustment can be read off the scale. (E, Fig.28). First retighten the set screw (B, Fig.28) and then the two (front and rear) adjusting screw to lock the tailstock in position. Retighten the locking screw (A, Fig.28) of the tailstock. The workpiece must be held between to centers and driven by a face plate and driver dog.

After taper turning, the tailstock should be returned to its original position according to the zero position on the scale of tailstock. (E, Fig.28)

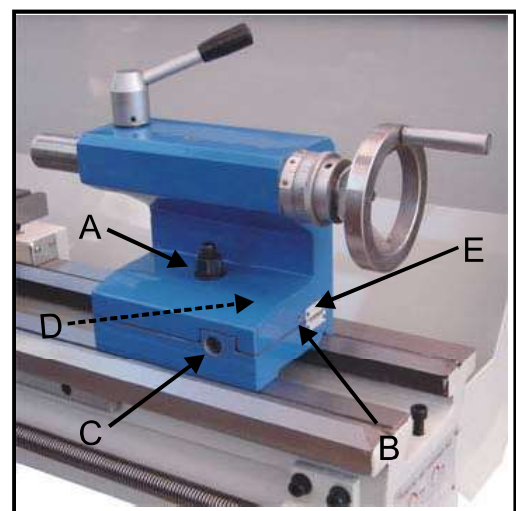


Fig. 28

Taper Turning by Setting the Top Slide

By angling the top slide, tapers may be turned manually with the top slide. (Fig. 29)

Rotate the top slide to the required angle. A graduated scale permits accurate adjustment of the top slide. The crossfeed is performed with the cross slide. This method can only be used for short tapers.

Thread Cutting

Set the machine up to the desired thread pitch (according to the threading chart, Fig.24). Start the machine and engage the half nut. When the tool reaches the part, it will cut the initial threading pass. When the tool reaches the end of the cut, stop the machine by turning the motor off and at the same time back the tool out of the part so that it clears the thread. Do not disengage the half nut lever. Reverse the motor direction to allow the cutting tool to traverse back to the starting point. Repeat these steps until you have obtained the desired results.

NOTES

Example: Male Thread

- The workpiece diameter must have been turned to the diameter of the desired thread.
- The workpiece requires a chamfer at the beginning of the thread and an undercut at the thread runout.
- The speed must be as low as possible.
- The change gears must have been installed according to the required pitch.
- The thread cutting tool must be exactly the same shape as the thread, must be absolutely rectangular and clamped so that it coincides exactly with the turning center.
- The thread is produced in various cutting steps so that the cutting tool has to be turned out of the thread completely (with the cross slide) at the end of each cutting step.
- The tool is withdrawn with the leadscrew nut engaged by inverting the change-over switch.
- Stop the machine and feed the thread cutting tool in low cut depths using the cross slide.
- Before each passage, place the top slide approximately 0.2 to 0.3mm to the left and right alternately in order to cut the thread free. This way, the thread cutting tool cuts only on one thread flank with each passage. Keep cutting the thread free until you have almost reached the full depth of thread.

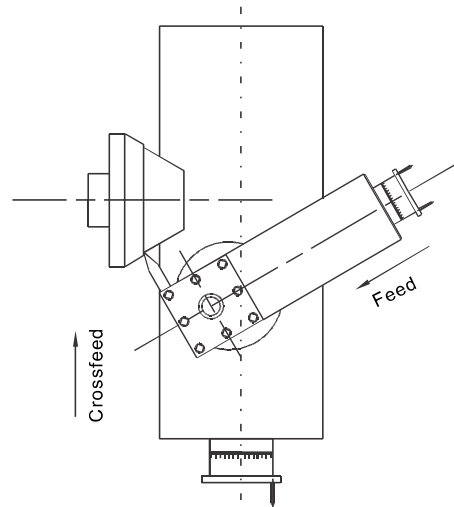


Fig. 29

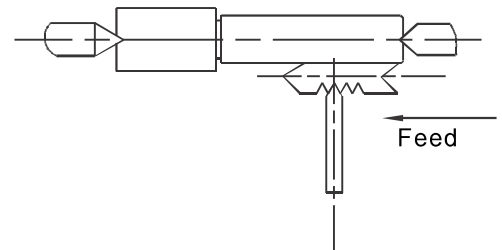


Fig. 30

LATHE ACCESSORIES

Three Jaw Universal Lathe Chuck

Using this universal chuck, round, triangular, square, hexagonal octagonal, and twelve-cornered stock may be clamped. (Fig.31)

Note: new lathes have very tight fitting jaws. This is necessary to ensure accurate clamping and long service life. With repeated opening and closing, the jaw adjust automatically and their operation becomes progressively smoother.

Note:

For the original 3-jaw chuck that mounted on the lathe, the factory has mounted the chuck in the best way to guarantee the holding accuracy with two "0" mark (A, Fig.) showed on the chuck and chuck flange.

There are two types of jaws: Internal and external jaws. Please note that the number of jaws fit with the number inside the chuck's groove. Do not mix them together. When you are going to mount them, please mount them in ascending order 1-2-3, when you are going to take them out, be sure to take them out in descending order 3-2-1, one by one. After you finished this procedure, rotate the jaws to the smallest diameter and check that the three jaws are well fitted.

Four Jaw Independent Lathe Chuck

This special chuck has four independently adjustable chuck jaws. These permit the holding of asymmetrical pieces and enable the accurate set-up of cylindrical pieces. (Fig.32)

Drill Chuck (Optional)

Use the drill chuck to hold centering drills and twist drills in the tailstock. (A, Fig.33)

Morse Taper Arbor (Optional)

An arbor is necessary for mounting the drill chuck in the tailstock. It has a No. 2 Morse taper. (B, Fig.33)

Live Center (Optional)

The live center is mounted in ball bearings. Its use is highly recommended for turning at speeds in excess of 600 RPM. (Fig. 34)

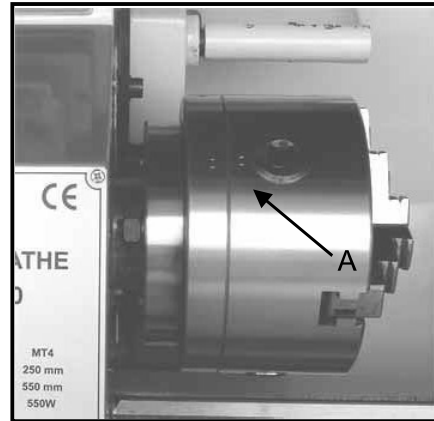


Fig. 31



Fig. 32

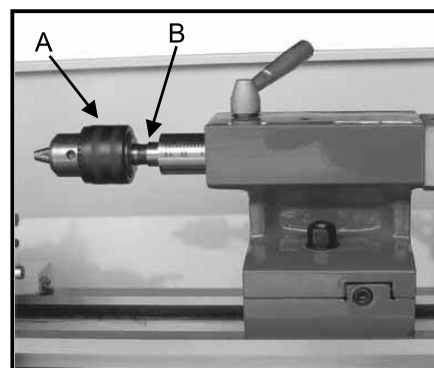


Fig. 33

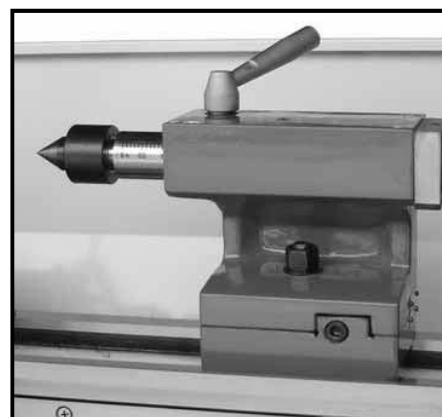


Fig. 34

Steady Rest

The steady rest serves as a support for shafts on the free tailstock end. For many operations the tailstock can not be used as it obstructs the turning tool or drilling tool, and therefore, must be removed from the machine. The steady rest, which function as an end support, ensures chatter-free operation. The steady rest is mounted on the bedways and is secured from below with a locking plate. The sliding fingers require continuous lubrication at the contact points to prevent premature wear. (Fig.35)

Setting the Steady Rest

1. Loosen three hex nuts. (A, Fig.36)
2. Loosen knurled screw (B, Fig.36) and open the sliding fingers. (C, Fig.36) until the steady rest can be moved with its finger around the workpiece. Secure the steady rest in position.
3. Tighten knurled screws so that fingers are snug but not tight against the workpiece. Tighten three nuts (A, Fig.36). Lubricate the sliding points with machine oil.
4. When, after prolonged operation, the jaw show wear, the tips of the fingers may be filed or remilled.

Follow Rest

The follow rest is mounted on the saddle and follow the movement of the turning tool. Only two sliding fingers are required. The place of the third finger is taken by the turning tool. The follow rest is used for turning operations on long, slender workpieces. It prevents flexing of the workpiece under pressure from the turning tool. (Fig.37)

Set the fingers snug to the workpiece but not overly tight. Lubricate the fingers during operation to prevent premature wear.

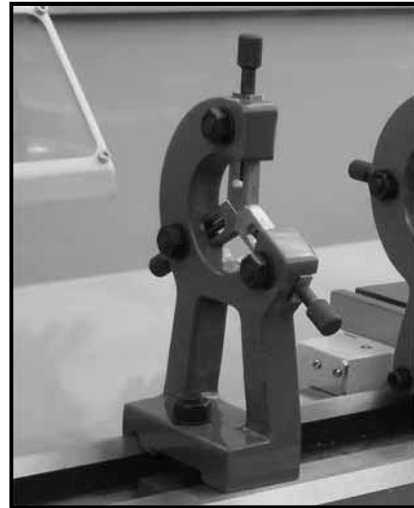


Fig. 35

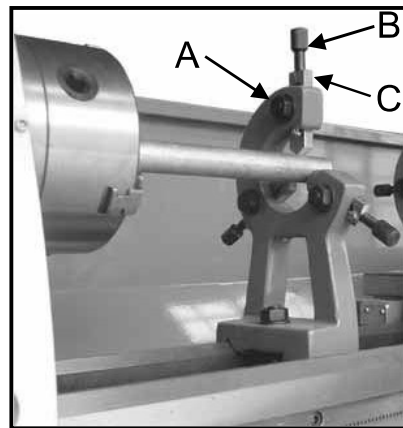


Fig. 36



Fig. 37

ADJUSTMENT

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

Main Spindle Bearings

The main spindle bearings are adjusted at the factory. If end play becomes evident after considerable use, the bearings may be adjusted.

Loosen two hex socket cap screws (A, Fig.38) in the slotted nut (B, Fig.38) on the back of the spindle. Tighten slotted nut until all end play is taken up. The spindle should still revolve freely. Tighten two hex socket cap screws (A, Fig.38).

Caution: excessive tightening or preloading will damage the bearings.

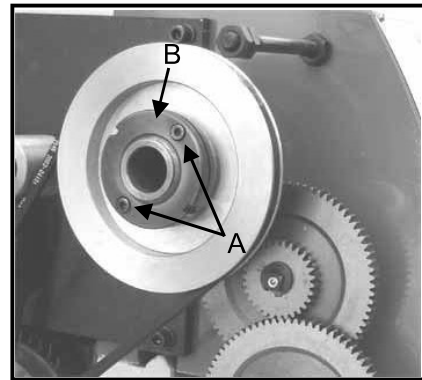


Fig. 38

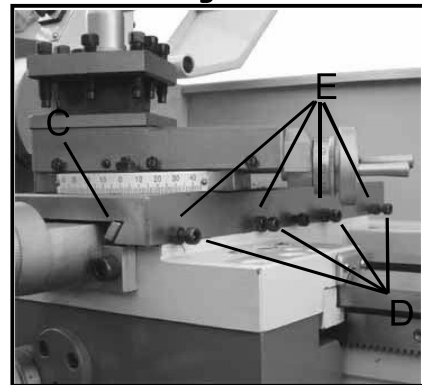


Fig. 39

Adjustment of Cross Slide

The cross slide is fitted with a gib strip(C, Fig.39) and can be adjusted with screws (D, Fig.39) fitted with lock nuts. (E, Fig.39) Loosen the lock nuts and tighten the set screws until slide moves freely without play. Tighten lock nuts to retain adjustment.

Adjustment of Top Slide

The top slide is fitted with a gib strip(F, Fig.40) and can be adjusted with screws (G, Fig. 40) fitted with lock nuts. (H, Fig. 40) Loosen the lock nuts and tighten the set screws until slide moves freely without play. Tighten lock nuts to retain adjustment.

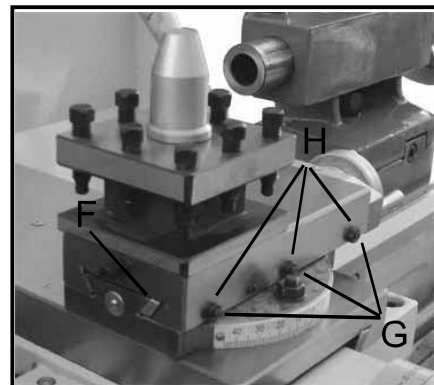


Fig. 40

Adjustment of Half Nut Guide

Loosen the nuts (I, Fig.41) on the right side of the apron and adjust the control screws (J, Fig.41) until both half nuts move freely without play. Retighten the nuts.

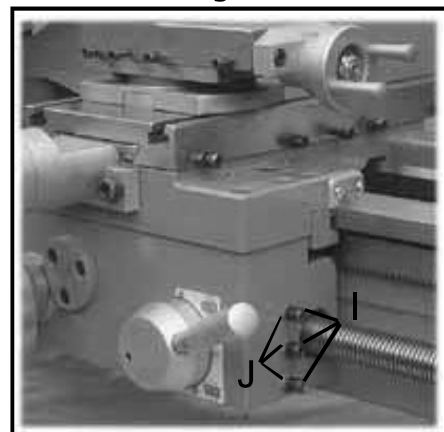


Fig. 41

LUBRICATION



CAUTION

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

NOTES:

Lubricate all slideways lightly before every use. Lubricate the change gears and the leadscrew slightly with a lithium-based grease.

1. Gearbox

Oil Must be up to indicator mark in oil sight glass (A, Fig. 42). Top off with Mobilgear 627 or equivalent. Fill by pulling plug (B, Fig. 42). To drain, remove drain plug on the right side of headstock (C, Fig. 43). Drain oil completely and refill after the first three months of operation. Then, change oil in the headstock annually.

2. Change Gear

Lubricate two oil ports (D, Fig. 43) on the gear shafts with 20W machine oil once daily.

3. Carriage

Lubricate Four oil ports (E, Fig. 44) with 20W machine oil once daily.

4. Top Slide

Lubricate one oil port (F, Fig. 44) with 20W machine oil once daily.

5. Cross Slide

Lubricate two oil ports (G, Fig. 44) with 20W machine oil once daily.

6. Apron

Lubricate one oil ports (H, Fig. 45) with 20W machine oil once daily.

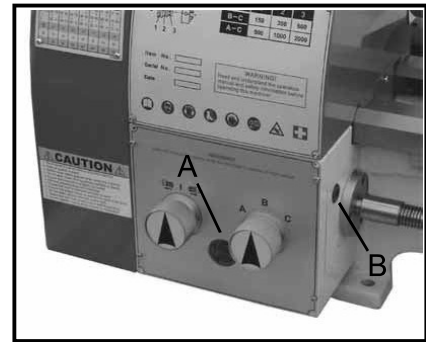


Fig. 42

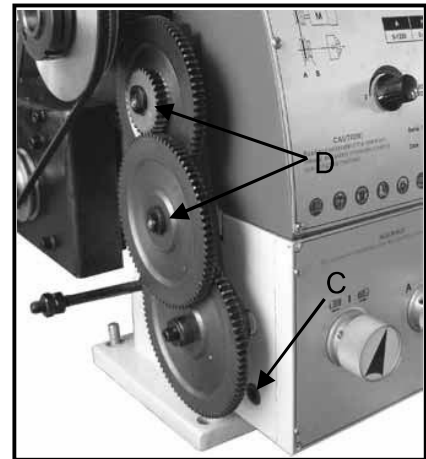


Fig. 43

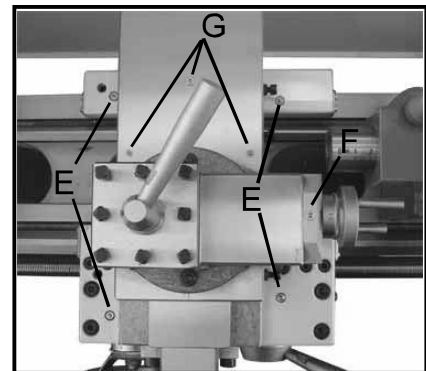


Fig. 44

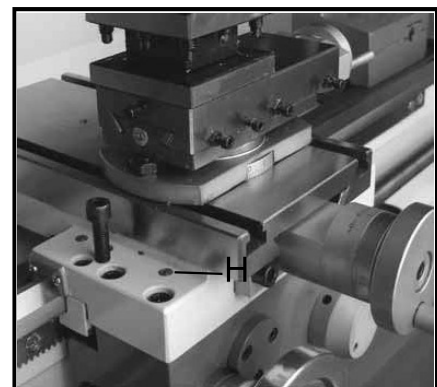


Fig. 45

6. Leadscrew

Lubricate the oil port (A, Fig. 46) with 20W machine oil once daily.

7. Tailstock

Lubricate two oil ports (B, Fig. 46) with 20W machine oil once daily.

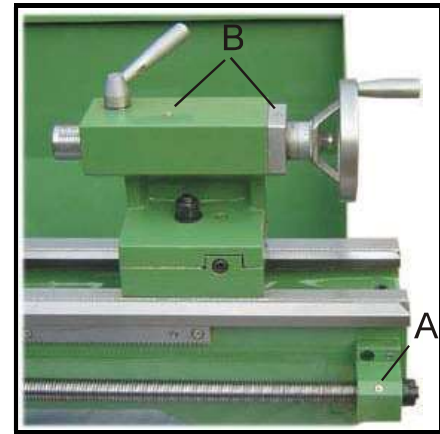


Fig. 46

ELECTRICAL CONNECTIONS

WARNING!

Connection of the lathe and all other electrical work may only be carried out by an authorized electrician!

Failure to comply may cause serious injury and damage to the machinery and property!

The HBM 250V Lathe is rated at 1.100W, 1PH, 230V only. Confirm power available at the lathe's location is the same rating as the lathe. Using the wiring diagram (Fig.47) for connecting the lathe to the mains supply.

Make sure the lathe is properly grounded.

The following is wiring diagram of the lathe: (Fig.47)

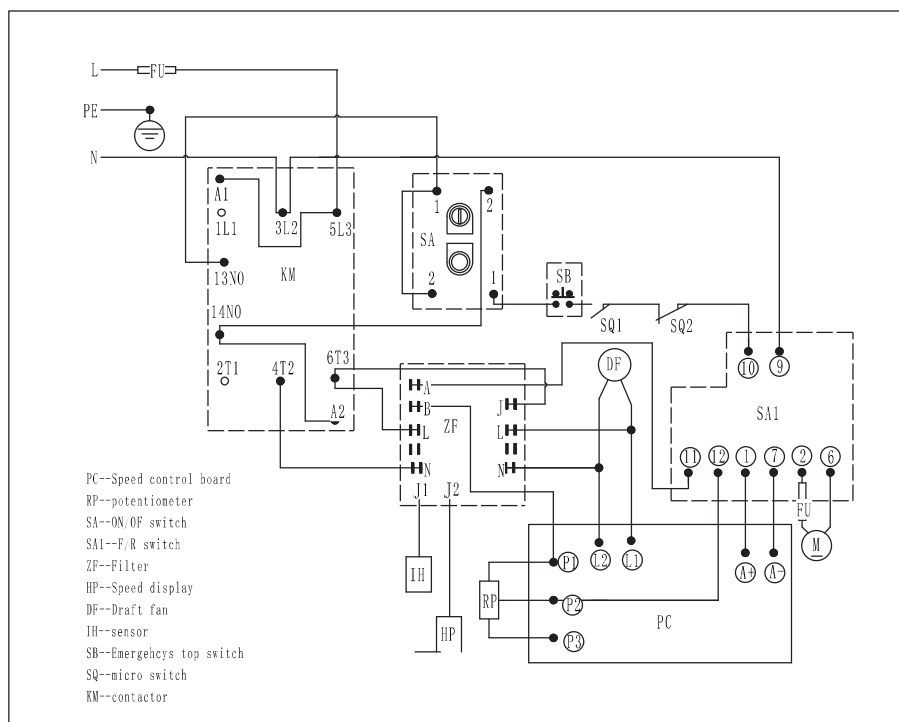


Fig. 47

MAINTENANCE

Keep the maintenance of the machine tool during the operation to guarantee the accuracy and service life of the machine tool.

1. In order to retain the machine's precision and functionality, it is essential to treat it with care, keep it clean and grease and lubricate it regularly. Only through good care, you can be sure that the working quality of the machine will remain constant.

NOTES:

Disconnect the machine plug from the mains supply whenever you carry out cleaning, maintenance or repair work!

Oil, grease and cleaning agents are pollutants and must not be disposed of through the drains or in normal refuse. Dispose of those agents in accordance with current legal requirements on the environment. Cleaning rags impregnated with oil, grease and cleaning agents are easily inflammable. Collect cleaning rags or cleaning wool in a suitable closed vessel and dispose of them in an environmentally sound way – do not put them with normal refuse!

2. Lubrication all slideways lightly before every use. The change gears and the leadscrew must also be lightly lubricated with lithium base grease.
3. During the operation, the chips which falls onto the sliding surface should be cleaned timely, and the inspection should be often made to prevent chips falling into the position between the machine tool saddle and lathe bed guide way. Asphalt felt should be cleaned at certain time.

NOTES:

Do not remove the chips with your bare hands. There is a risk of cuts due to sharp-edged chips. Never use flammable solvents or cleaning agents or agents that generate noxious fumes! Protect electrical components such as motors, switches, switch boxes, etc., against humidity when cleaning.

4. After the operation every day, eliminate all the chips and clean different part of the machine tool and apply machine tool oil to prevent rusting.
5. In order to maintain the machining accuracy, take care of the center, the surface of the machine tool for the chuck and the guide way and avoid mechanical damage and the wear due to improper guide.
6. If the damage is found, the maintenance should be done immediately.

NOTES:

Repair work may only be carried out by qualified personnel with the corresponding mechanical and electrical knowledge.

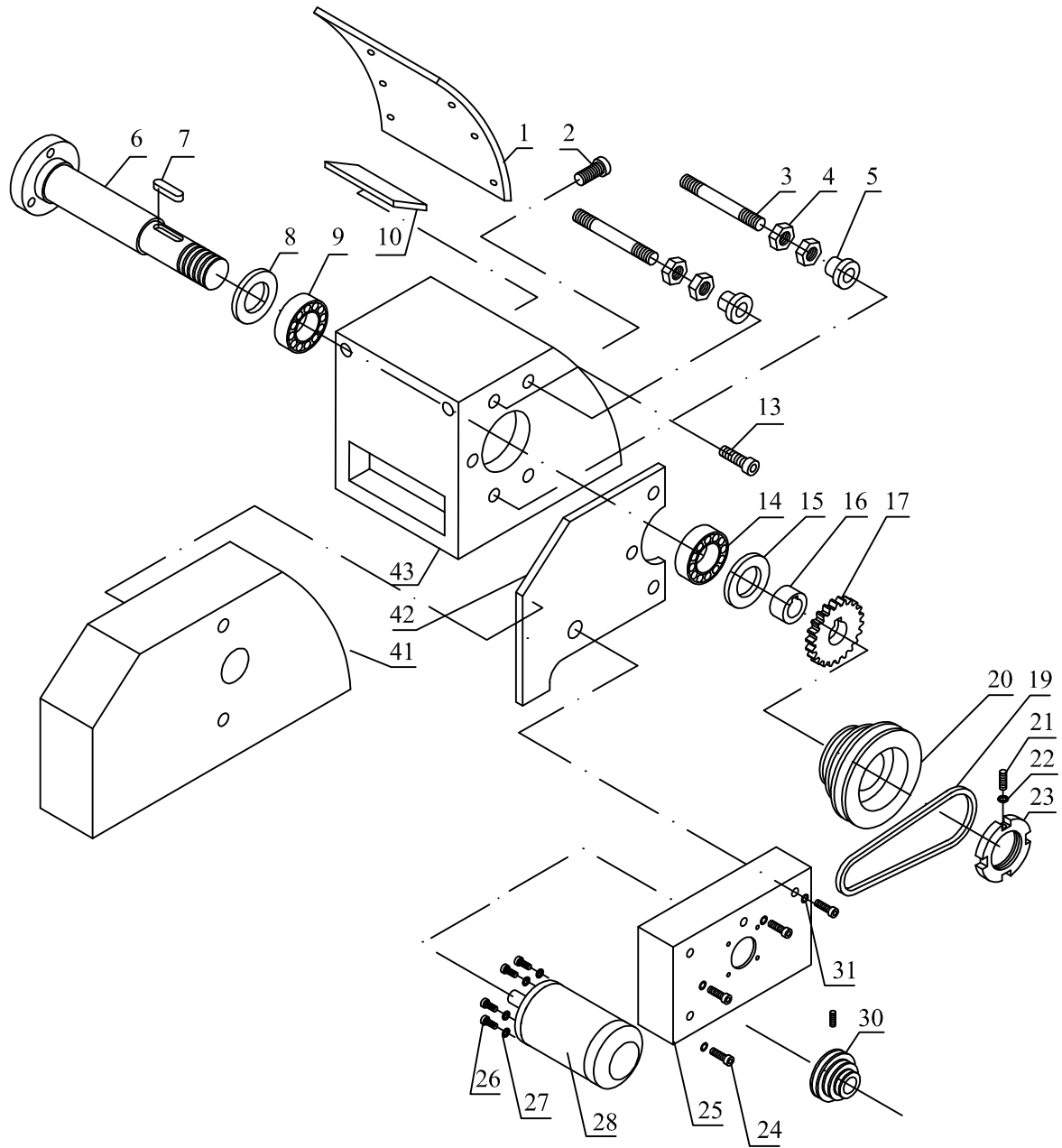
TROUBLESHOOTING

Problem	Possible Reason	Elimination
Surface of workpiece too rough	Tool blunt Tool springs Feed too high Radius at the tool tip too small	Resharpen tool Clamp tool with less overhang Reduce feed Increase radius
Workpiece becomes coned	Centers are not aligned (tailstock has offset) Top slide not aligned well (cutting with the top slide)	Adjust tailstock to the center Align top slide well
Lathe is chattering	Feed too high Slack in main bearing	Reduce feed Adjust the main bearing
Center runs hot	Workpiece has expanded	Loosen tailstock center
Tool has a short edge life	Cutting speed too high Crossfeed too high Insufficient cooling	Reduce cutting speed Lower crossfeed(finishing allowance should not exceed 0.5mm) More coolant
Flank wear too high	Clearance angle too small Tool tip not adjusted to center high	Increase clearance angle Correct height adjustment of the tool
Cutting edge breaks off	Wedge angle too small (heat build-up) Grinding crack due to wrong cooling Excessive slack in the spindle bearing Arrangement (vibrations)	Increase wedge angle Cool uniformly Adjust the slack in the spindle bearing arrangement
Cut thread is wrong	Tool is clamped incorrectly or has been started grinding the wrong way Wrong pitch Wrong diameter	Adjust too to the center Grind angle correctly Adjust the right pitch Turn the workpiece to the correct diameter
Spindle does not activate	Emergency stop switch activated	Unlock emergency stop switch

HBM 250-F Vario

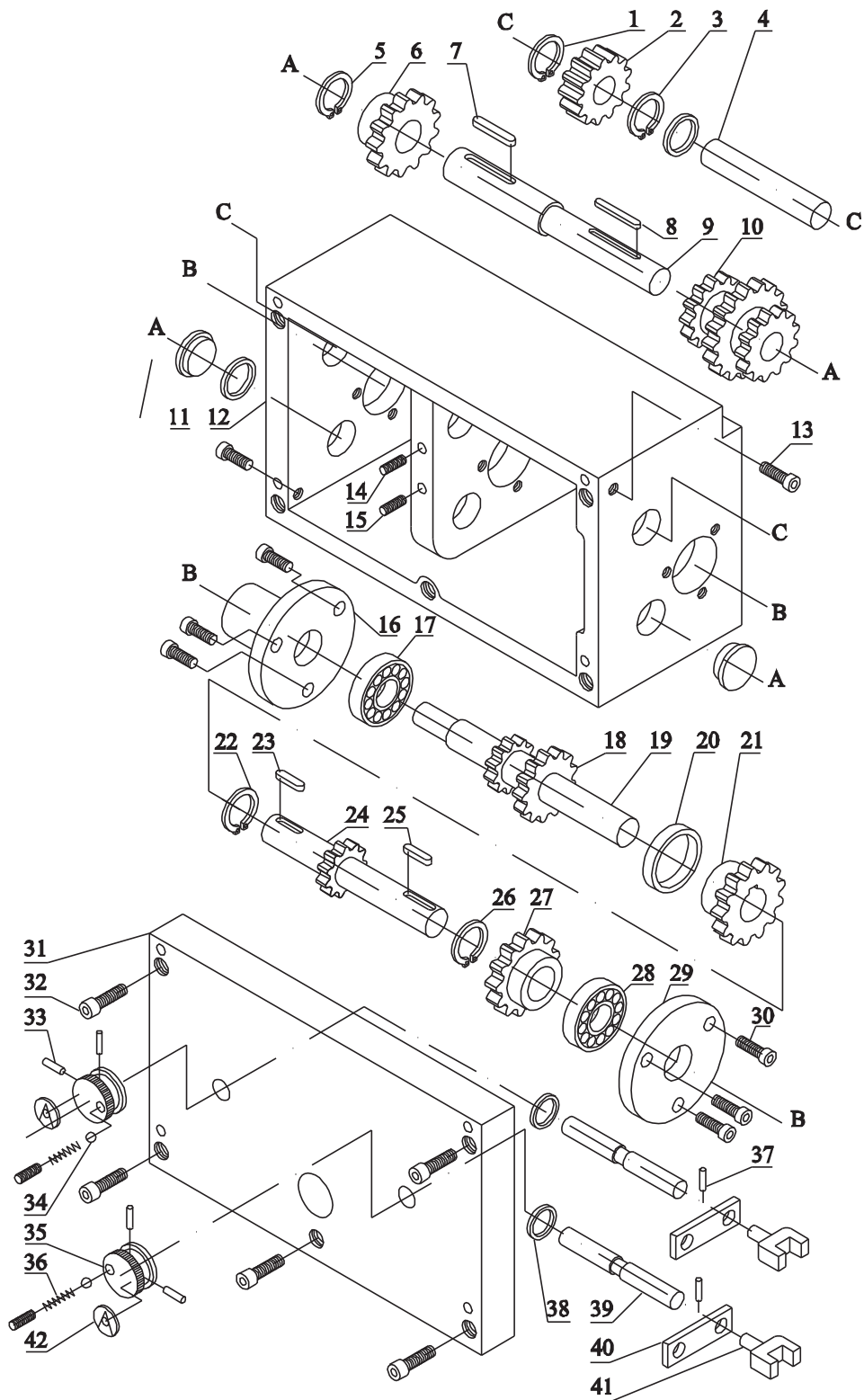
PARTS LIST

Headstock and Driving Assembly



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Lathe Gearbox Assembly



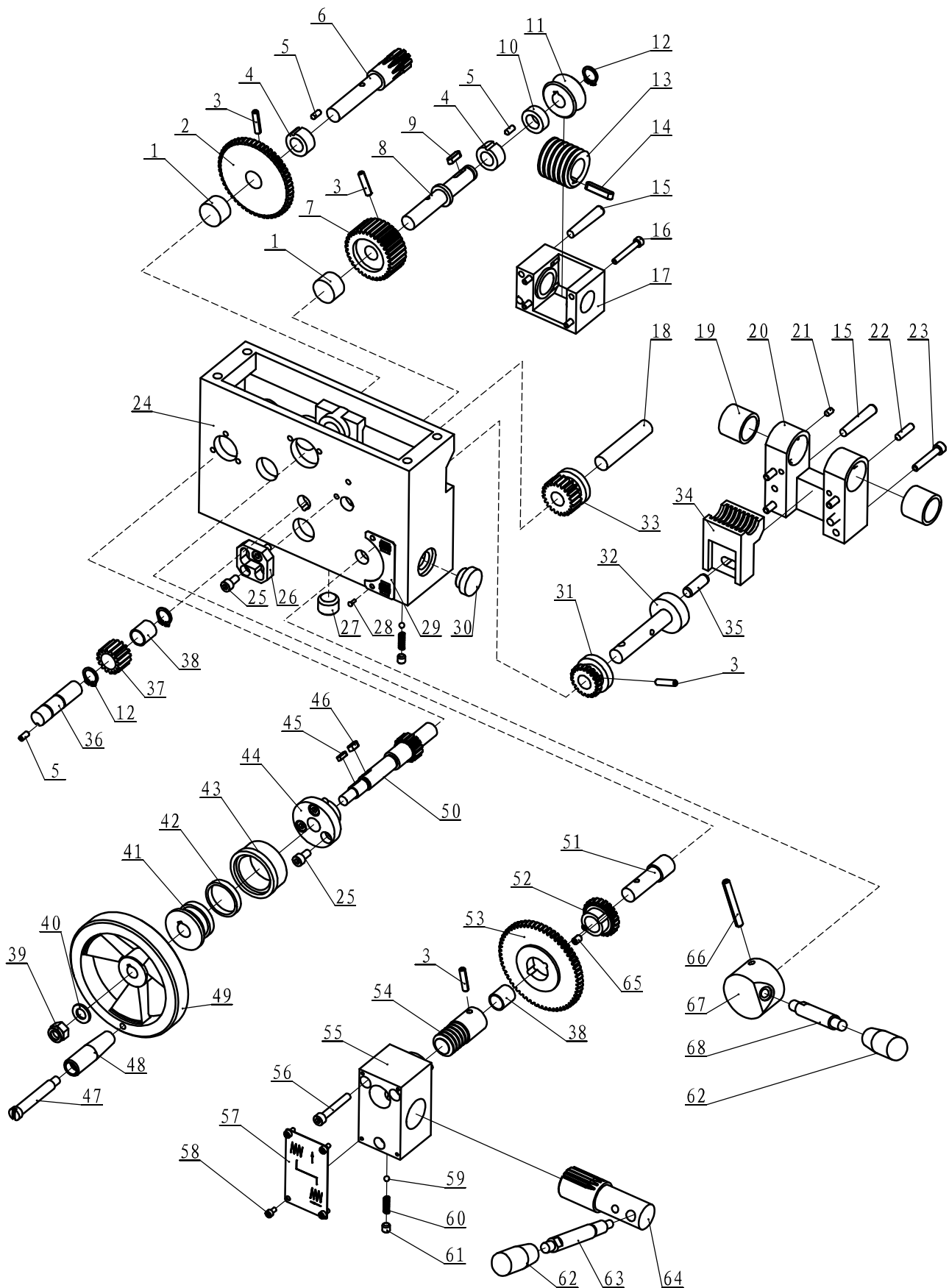
No.	Parts No.	Description	Specification	Qty
39	1	Snap Ring	Φ12	1
40	2	Gear		1
41	3	Snap Ring		1
42	4	Shaft		1
43	5	Snap Ring	Φ12	1
44	6	Gear		1
45	7	Key	4x30	1
46	8	Key	4x60	1
47	9	Shaft		1
48	10	Gear		1
49	11	Drain Plug		1
50	12	Gearbox		1
51	13	Screw		1
52	14	Screw	M6x10	1
53	15	Screw	M6x10	1
54	16	Flange		1
55	17	Bearing		1
56	18	Gear		1
57	19	Shaft		1
58	20	Separator		1
59	21	Gear		1
60	22	Snap Ring	Φ15	1
61	23	Key	4x14	1
62	24	Shaft		1
63	25	Key	4x10	1
64	26	Snap Ring	Φ15	1
65	27	Gear		1
66	28	Bearing		1
67	29	Flange		1
68	30	Screw	M6x12	3
69	31	Cover		1
70	32	Screw		1
71	33	Pin		1
72	34	Ball	Φ5	2
73	35	Knob		2
74	36	Spring		2
75	37	Pin	Φ5x20	1
76	38	Seal Ring		1
77	39	Shaft		1
78	40	Bracket		2
79	41	Fork		2
80	42	Label		2

This technical drawing is an exploded view of a mechanical assembly, likely a machine tool or a large valve actuator. It consists of 70 numbered components. The main body is a large rectangular block (1) with a central longitudinal slot. A long, threaded rod (15) passes through the center of the assembly. At one end, there is a large circular flange (20) with a central hub (21) and a smaller flange (22). The other end features a similar flange (23) with a central hub (24). A large, circular gear or pulley (54) is mounted on the rod near the bottom. Various other components, including bolts (e.g., 2, 3, 4, 5, 6, 11, 12, 13, 14, 16, 17, 18, 19, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70), nuts, washers, and spacers, are shown in their relative positions to be assembled onto the main body and the central rod. The diagram uses standard engineering conventions for exploded views, with lines indicating the assembly path for each part.

No.	Parts No.	Description	Specification	Qty
81	1	Handle		1
82	2	Screw		8
83	3	Tool Slide		1
84	4	Pin	Φ4x8	1
85	5	Screw		3
86	6	Nut	M6	3
87	7	Handle Base		1
88	8	Washer		1
89	9	Tool Rest		1
90	10	Pin		1
91	11	Bolt		1
92	12	Gib		1
93	13	Swivel Base		1
94	14	Nut		1
95	15	Leadscrew		1
96	16	Key		1
97	17	Screw		1
98	18	Zero Indicator		1
99	19	Handle		1
100	20	Nut		2
101	21	Clamping Ring		1
102	22	Screw		2
103	23	Graduated Collar		1
104	24	Screw		4
105	25	Pin		1
106	26	Nut		2
107	27	Screw		1
108	28	Screw		1
109	29	Bush		1
110	30	Bracket		1
111	31	Graduated Collar		1
112	32	Handlewheel		1
113	34	Nut		1
114	35	Pin		1
115	36	Screw	M4x12	3
116	37	Nut		3
117	39	Pin		3
118	40	Screw	M8x25	1
119	41	Cross Slide		1
120	42	Gib		1
121	44	Nut		1
122	45	Screw		2
123	46	Wiper		1
124	47	Lock Screw		1
125	48	Screw		2

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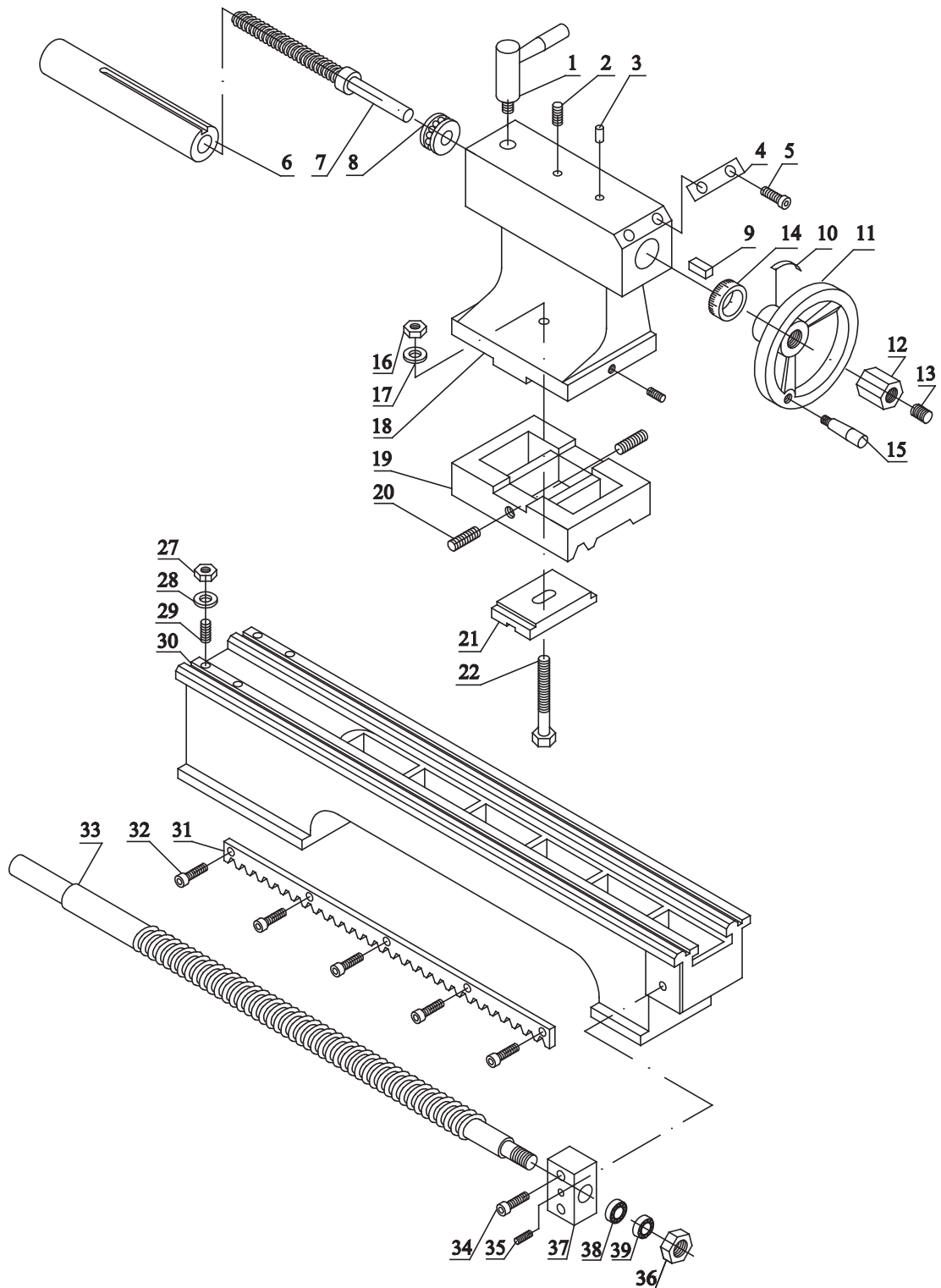
LATHE APRON ASSEMBLY



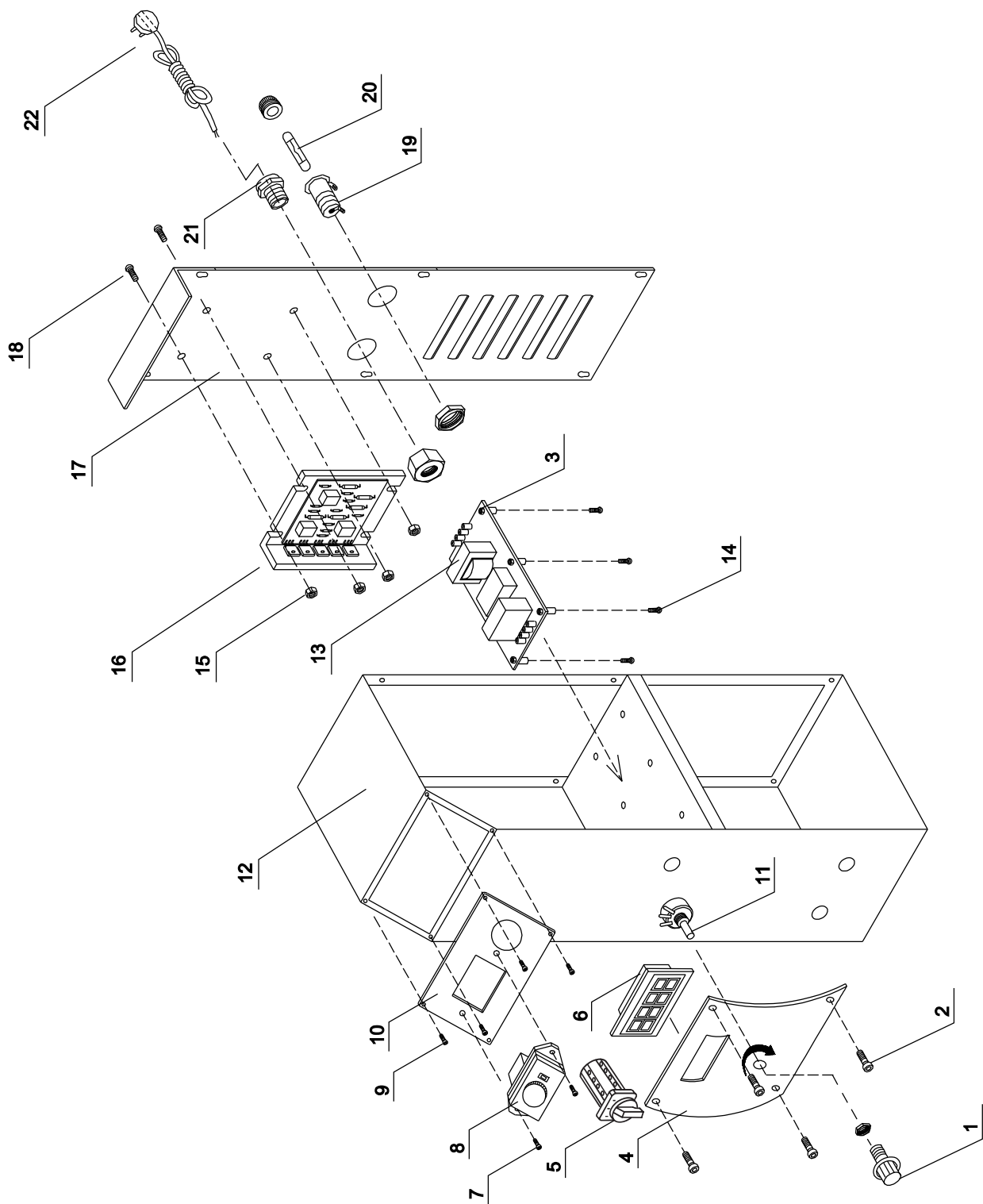
No.	Parts No.	Description	Specification	Qty.
145	1	collar		2
146	2	gear		1
147	3	pin		4
148	4	collar		2
149	5	screw		3
150	6	shaft		1
151	7	gear		1
152	8	worm shaft		1
153	9	key		1
154	10	washer		1
155	11	worm gear		1
156	12	circlip for shaft		3
157	13	worm		1
158	14	key		1
159	15	pin		4
160	16	scrwe		4
161	17	worm knob		1
162	18	shaft		1
163	19	collar		2
164	20	nut knob		1
165	21	screw		2
166	22	screw		2
167	23	screw		4
168	24	apron		1
169	25	screw		5
170	26	control knob		1
171	27	screw		1
172	28	screw		2
173	29	label		1
174	30	oil sight		1
175	31	control cam		1
176	32	cam shaft		1
177	33	wheel		1
178	34	nut		1
179	35	pin		1
180	36	shaft		1
181	37	gear		1
182	38	sliding bearing		2
183	39	nut		1
184	40	washer		1
185	41	dial indexing plate		1
186	42	spring		1
187	43	indexing plate		1
188	44	bracket		1
189	45	key		1

[illegible]

Lathe tailstock, Bed Assembly



[illegible]



[illegible]



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EC - DECLARATION OF CONFORMITY

(*Certificate of Compliance*)

In Compliance with

EG-Machinery Ruling 98/37/EG

EG-Low Voltage Appliances Ruling 73/23/EWG

Ruling 89 / 336 / EU

Ruling: 2001 / 14 / EU

We hereby declare that the concept and design of the machine name hereafter complies with the relevant basic safety and health requirements of EC directives , as does the version marketed by us. Any modification carried out on the machine without our consent shall cause this declaration to be null and void.

Description and nature of the Machine:	Metal Lathe
Model and Series:	HBM 250 x 550 Vario Metaaldraaibank Compleet Met Dwarsvoeding
Serial Number:	ST 250F
Year of construction:	2011
Harmonised EC rulings which are applied;	EN 12840-2001
Date and Place :	NL 2741 PA Waddinxveen 03 - 11 - 2009
Signature / Stamp:	Herman Buitelaar (Manager) 

