PALMGREN®
a CH Hanson brand

9" x 20" Lathe

Read carefully and follow all safety rules and operating instructions before first use of this product.

9643006.01-0318

Preface

The illustration of the lathe might in some details deviate from the illustrations of this operating manual but this will have no influence on the operation of the lathe.

Any changes in the construction, equipment and accessories are reserved for reasons of enhancement. Therefore, no claims may be derived from the indications and descriptions. Errors exepted!

1 Safety

Glossary of symbols

☞	gives additional indications
➔	calls on you to act
❍	Enumerations

This part of the operating manual

- ❍ explains the meaning and use of the warning references contained in the operating manual,
- ❍ explains how to use the lathe properly,
- ❍ highlights the dangers that might arise for you or others if these instructions are not obeyed,
- ❍ tells you how to avoid dangers.

In addition to this operating manual please observe

- ❍ applicable laws and regulations,
- ❍ legal regulations for accident prevention,
- ❍ the prohibition, warning and mandatory signs as well as the warning notes on the lathe.

Consult OSHA, state and local regulations in order to determine compliance, danger and risks to the operator.

ALWAYS KEEP THIS DOCUMENT CLOSE TO THE LATHE FOR FUTURE REFERENCE.

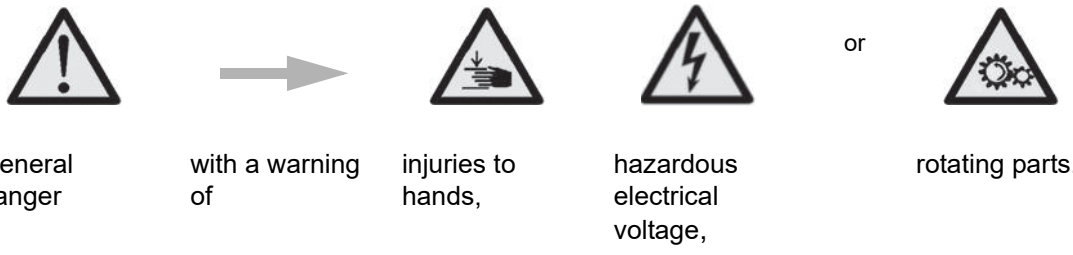
1.1 Safety warnings (warning notes)

1.1.1 Classification of hazards

We classify the safety warnings into various levels. The table below gives an overview of the classification of symbols (pictograms) and warnings for the specific danger and its possible consequences.

Pictogram	Alarm expression	Definition/Consequences
	**DANGER!**	Imminent danger that will cause serious injury or death to personnel.
	WARNING!	Risk: A danger that might cause serious injury or death to personnel.
	CAUTION!	Danger or unsafe procedure that might cause injury to personnel or damage to property.
	**ATTENTION!**	Situation that could cause damage to the machine and product and other types of damage. No risk of injury to personnel.
	**INFORMATION**	Application tips and other important or useful information and notes. No dangerous or harmful consequences for personnel or objects.

In the case of specific dangers, we replace the pictogram



General danger with a warning of injuries to hands, hazardous electrical voltage, or rotating parts.

1.1.2 Other pictograms

Be aware of slipping!

Activation forbidden!

Pull the mains plug!

Use protective goggles!

Use ear protection!

Use protective gloves!

Use protective boots!

Wear a safety suit!

Protect the environment!

Contact address

1.2 Proper use

WARNING!

Improper use of the lathe

- **will endanger personnel,**
- **will endanger the machine and other material property of the operator,**
- **may affect proper operation of the machine.**

The machine is designed and manufactured to be used in environments where there is no potential danger of explosion.

The lathe is designed and manufactured for straight turning and facing round or regularly formed three-, six- or twelve-square workpieces in cold metal, castings and plastics or similar materials that do not constitute a health hazard or do not create dust, such as wood, Teflon®, etc. The lathe must only be installed and operated in a dry and well-ventilated place. The workpieces may only be clamped in the lathe chuck using self ejecting chuck-key provided.

If the lathe is used in any way other than described above, or modified without authorization, then the lathe- is being used improperly.

We do not take liability for damage caused by improper use.

We would like to stress that any modifications to the construction, or technical or technological modifications that have not been authorized will also render the warranty null and void.

It is also part of proper use that

- ❍ the maximum values for the lathe are complied with,
- ❍ the operating manual is observed,
- ❍ inspection and maintenance instructions are observed.

☞ “Technical data“ on page 15

In order to achieve optimum cutting performance, it is essential to choose the right turning tool, feed, tool pressure, cutting speed and coolant.

WARNING!

Very serious injury due to improper use.

It is forbidden to make any modifications or alterations to the operating values of the machine. These could endanger personnel and cause damage to the machine.

1.3 Possible dangers caused by the machine

The lathe has undergone a safety inspection (analysis of danger with assessment of risks). It has been designed and built on the basis of this analysis using the latest technological advances.

Nonetheless, there remains a residual risk, since the machine operates with

- high revolutions,
- rotating parts,
- electrical voltage and currents.

We have used construction resources and safety techniques to minimise the health risk to personnel resulting from these hazards.

If the lathe is used and maintained by personnel who are not duly qualified, there may be a risk resulting from incorrect operation or unsuitable maintenance.

INFORMATION

All personnel involved in assembly, commissioning, operation and maintenance must

- be duly qualified,
- follow this operating manual.

Disconnect the machine from main power source whenever cleaning or maintenance work is being carried out.

WARNING!

The lathe may only be used with the safety devices activated.

Disconnect the lathe from main power source whenever you detect a failure in the safety devices or when they are not fitted!

All additional installations carried out by the operator must incorporate the prescribed safety devices.

As the machine operator, this will be your responsibility!

☞ **“Safety devices“ on page 10**

1.4 Qualification of personnel

1.4.1 Target group

This manual is addressed to

- operators,
- users,
- maintenance stuff.

The warning notes therefore refer to both operation and maintenance of the machine.

Always disconnect the machine plug from the from main power source. This will prevent it being used by unauthorized personnel.

INFORMATION

All personnel involved in assembly, commissioning, operation and maintenance must

- be duly qualified,
- follow this operating manual.

In the event of improper use

- there may be a risk to personnel,

- there may be a risk to the machine and other material property,
- correct functioning of the lathe may be affected.

1.4.2 Authorized personnel

WARNING!

Incorrect use and maintenance of the machine constitutes a danger for personnel, objects and the environment.

Only authorized personnel may operate the machine!

The only personnel authorized to use this machine and perform maintenance on it are trained and instructed technical staff working for the operator and manufacturer.

1.4.3 Obligations of the operator

The operator must instruct staff at least once a year on

- all safety standards that apply to the machine,
- operation,
- accredited technical guidelines.

The operator must also

- check staff's understanding,
- document training/instruction,
- require staff to confirm participation in training/instruction by means of a signature,
- check whether the staff are aware of safety and of dangers in the workplace and whether they observe the operating manual.

1.4.4 Obligations of the user

The user must

- have read and understood the operating manual,
- be familiar with all safety devices and regulations,
- be able to manipulate the machine.

1.4.5 Additional qualification requirements

For work on electrical components or equipment there are additional requirements:

- This work must only be carried out by a qualified electrician or person working under the instructions and supervision of a qualified electrician.
- Before carrying out work on electric components or operating units the following measures must be taken, in the order given.

➔ Disconnect all main electrical power.

➔ Ensure that the machine cannot be turned on again.

➔ Check that there is no voltage.

1.5 User positions

The user must stand in front of the machine.

1.6 Safety measures during operation

CAUTION!

Risk due to inhaling health hazardous dusts and mist.

Depending on the material being processed and any additional dusts and mist in the work area, conditions might impair your health.

Make sure that the generated health hazardous dusts and mist are safely removed at the point of origin and are collected and/or filtered from the working area. Use an appropriate dust collection/filter unit.

CAUTION!

Risk of fire and explosion by using flammable materials or cooling lubricants.

Take additional preventive measures in order to safely avoid health hazards before processing flammable materials (e.g. aluminum, magnesium) or before using flammable additives (e.g. alcohol).

CAUTION!

Risk of winding-up or cutting damages when using hand tools.

The machine is not designed for the use of hand tools (e.g. emery cloth or files). It is forbidden to use any hand tools on this machine.

1.7 Safety devices

Use the lathe only with properly functioning safety devices.

Stop the lathe immediately if there is a failure in the safety device or if it is not functioning for any reason.

It is your responsibility!

If a safety device has been activated or has failed, the lathe must only be used when

- ❍ the cause of the failure has been removed,
- ❍ it has been verified that there is no resulting danger for personnel or objects.

WARNING!

If you bypass, remove or override a safety device in any other way, you are endangering yourself and other personnel working with the machine. The possible consequences are

- **damage as a result of components or parts of components flying off at high speed,**
- **contact with rotating parts,**
- **fatal electrocution.**

WARNING!

The separating protective equipment which is made available and delivered together with the machine is designed to reduce the risk of injury from workpieces or fractions of them which being expelled, but not to remove the risk completely.

The lathe includes the following safety devices:

- ❍ self-latching, lockable EMERGENCY STOP button,
- ❍ a protective cover on the headstock,
- ❍ a self-ejecting key for the lathe chuck,
- ❍ a lathe chuck guard with position switch.

1.8 EMERGENCY-STOP

The EMERGENCY-STOP turns the lathe off.

Pushing the emergency stop device triggers an emergency stop.

After actuating the switch, turn it to the right, in order to rest it.

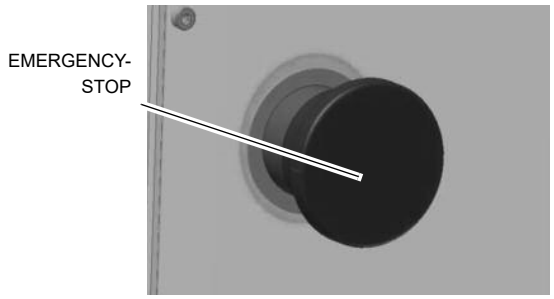


Fig. 1-1: EMERGENCY-STOP

1.8.1 Lockable main switch

It is possible to secure the lockable main switch with a padlock at the position "0" against switching on by mistake or unauthorized switching on.

When the main switch is switched off, the power supply to the machine is completely interrupted.

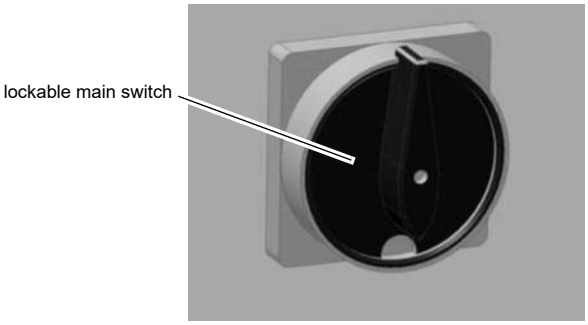


Fig. 1-2: Lockable main switch

1.8.2 Protective cover with safety switch

The spindle head of the lathe is equipped with a fixed, separating protective cover.

The locked position is monitored by means of an electrical limit switch.

INFORMATION

It is not possible to start the machine until the protective cover is closed.

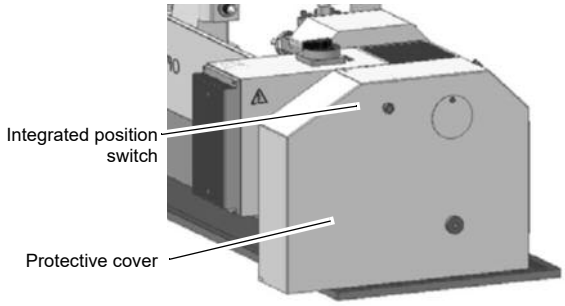
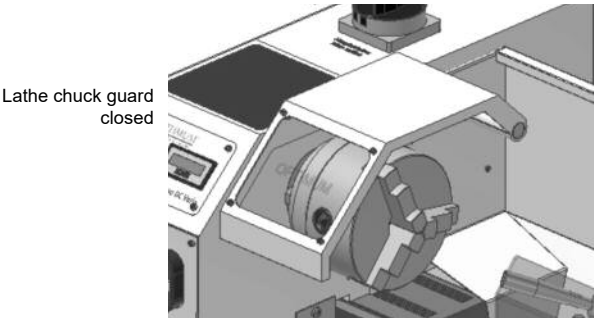


Fig. 1-3: Protective cover of spindle head

1.8.3 Lathe chuck guard

The lathe is provided with chuck guard. The lathe can only be turned on when the chuck guard is closed.



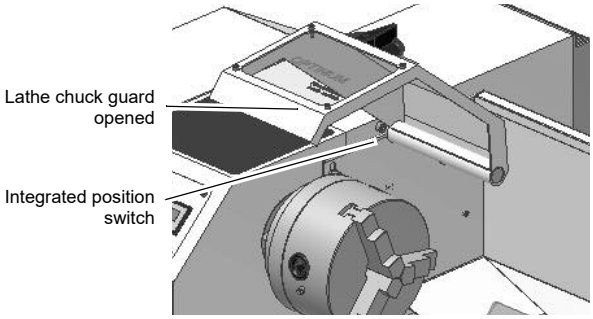


Fig. 1-4: Integrated position switch

1.8.4 Lathe chuck key

The lathe is equipped with self-ejecting key for chucks. Once the chuck key has been released, it will be ejected from the lathe chuck by its spring.

CAUTION!

Exclusively use the supplied chuck key to adjust the lathe chuck.

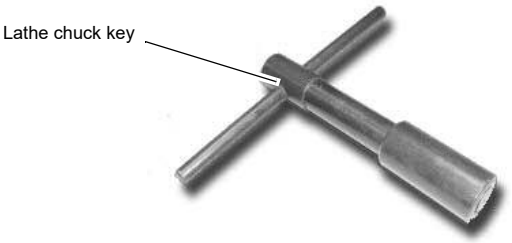


Fig. 1-5: Lathe chuck key

1.9 Safety check

Check the lathe at least once per shift. Inform the person responsible immediately of any damage, defect or change in operating function.

Check all safety devices

- at the beginning of each shift (with the machine stopped)
- once a week (with the machine in operation)
- after every maintenance and repair operation

General check		
Equipment	**Check**	**OK**
Lathe chuck guard	Fitted, firmly bolted and not damaged	
Labels, markings	Installed and legible	
Date:	**Checked by (signature):**	

Run test		
Equipment	**Check**	**OK**
EMERGENCY-STOP switch	When the EMERGENCY-STOP switch is activated, the lathe should switch off automatically.	
Lathe chuck key	After releasing the lathe chuck key it has to eject out of the lathe chuck by itself.	
Date:	**Checked by (signature):**	

Run test		
Equipment	**Check**	**OK**
Lathe chuck guard/ Protective cover headstock	You may only switch on with the button "ON" after closing the lathe chuck guard/ Protective cover headstock	
Date:	**Checked by (signature):**	

1.10 Individual protection gear

For certain work individual protection gear is required.

Protect your face and eyes: During all work, and specifically work during which your face and eyes are exposed to hazards, a safety helmet with a face guard should be worn.

Use protective gloves when lifting or handling pieces with sharp edges.

Wear safety shoes when fitting, dismantling or transporting heavy components.

Use ear protection if the noise level (immission) in the workplace exceeds 80 dB(A).

Before starting work, make sure that the prescribed individual protection gear is available in the workplace.

CAUTION!

Dirty or contaminated body protection gear can cause disease.

Clean it after every use and once a week.

1.11 Safety during operation

In the description of work with and on the machine we highlight the dangers specific to that work.

WARNING!

Before activating the lathe, double check that this will not endanger other people and cause damage to equipment.

Avoid unsafe working practices:

- Make sure your work does not endanger anyone.
- Clamp the workpiece tightly before activating the lathe.
- For clamping workpieces, only use the self-ejecting chuck key supplied.
- Observe the maximum chuck opening.
- Use protective goggles.
- Do not remove turning chips by hand. To remove turning chips, use a chip hook and/or handbrush.
- Clamp the turning tool at the correct height and with the least possible overhang.
- Turn off the lathe before measuring the workpiece.
- The instructions in this manual must be observed during assembly, handling, maintenance and repair.

- Do not work on the lathe if your concentration is reduced, for example, because you are taking medication.
- Observe the rules for preventing accidents issued by your association for the prevention of occupational accidents and safety in the workplace or other inspection authorities.
- Inform the inspector of any danger or failure.
- Stay by the lathe until all rotating parts have come to a halt.
- Use prescribed protection gear. Make sure to wear a well-fitting work suit and, where necessary, a hairnet.

1.12 Disconnecting the lathe and making it safe

- Disconnect the lathe from power before beginning any maintenance or repair work. All machine components and hazardous voltages and movements must have been disconnected.
- Secure the machine using a padlock on the lockable main switch.
- Place a warning sign on the machine.

1.13 Using lifting equipment

WARNING!

Use of unstable lifting and suspension gear that might break under load can cause very serious injuries or even death.

Check that the lifting and load suspension gear is of sufficient load capacity and in perfect condition.

Observe the rules for preventing accidents issued by your association for the prevention of occupational accidents and safety in the workplace or other inspection authorities.

Hold the loads properly.

Never walk under suspended loads!

1.14 Mechanical maintenance work

Remove protection and safety devices as required before beginning maintenance work and reinstall them once the work has been completed. These include:

- Covers
- Safety indications and warning signs
- Earth (ground) connection

If you remove protection or safety devices, refit them immediately after completing the work.

Check that they are working properly!

2 Technical data

The following information gives the dimensions and weight and is the manufacturer's authorized machine data.

2.1 Power connection

connection	**9684504**
Motor	115V,~ 60Hz, 1Ph, 0.75 kW (1Hp)

2.2 Machine specifications

	9684504
Diameter three-jaw chuck	125mm (4.92")
Distance between centers	550mm (21.63")
Swing over machine bed	250mm (9.84")
Bed width	135mm (5.31")
Spindle speed [rpm]	150 - 2400
Number of speeds	6
Spindle taper	MT 4
Spindle thru hole	26mm (1.02")
Longitudinal feed	0.003" 0.004" 0.006" 0.008" 0.012" 0.016"
Longitudinal Lead Screw size	3/4" Dia - 10 TPI
Longitudinal Feed Dial graduation	0.01" (1rev = 0.780")
Thread Cutting Pitches - Inches [tpi]	8 9 9 10 11 12 12.5 14 16 18 20 22 24 25 28 32 36 40 44 48 50 56
Thread Cutting Pitches - Metric [mm]	0.2 0.3 0.4 0.5 0.6 0.625 0.75 0.8 0.875 1.0 1.2 1.25 1.5 1.75 2.0 2.5 3.0 3.5 4.0
Operating travel cross slide	110mm (4,33")
Cross feed Lead Screw size	9/16" Dia - 10 TPI
Cross feed Dial graduation	0.002" (1rev = 0.2") indirect
Operating travel compound slide	70mm (2.75")
Adjustment range of the compound slide	+ - 90°
Compound feed Lead Screw size	5/16" Dia - 20 TPI
Compound feed Dial graduation	0.001" (1rev = 0.050")
Distance from Turning Center to Quadruple Tool Holder Surface	13.5mm (0.531")

2.2 Machine specifications

Distance from Turning Center to Compound‘s Surface	25.5mm (1.004˝)
Taper bore of tailstock sleeve	MT 2
Tailstock - sleeve diameter	30mm (1.181")
Tailstock sleeve travel	65mm (2.56")
Tailstock cross adjustment	+ - 10 mm (0.39")
Tailstock feed Lead Screw size	9/16" Dia - 10 TPI
Tailstock feed Dial graduation	0.001" (1rev = 0.1")

2.3 Work area

	9684504
Height	2000mm (78.7")
Length	2200mm (86.6")
Depth	1900mm (74.8")

2.4 Environmental conditions

	9684504
Temperature	40 - 95 °F
Humidity	25 - 80 %

2.5 Operating material

	9684504
Feed gear	Mobilgear 627 or equivalent oil
Bright steel parts and lubricating nipples	Non-corrosive lubricating oil
Change gears	Chain oil (spray)

2.6 Emissions

The level of noise emitted by the lathe is less than 78 dB(A).

INFORMATION

This numeric value had been measured on a new machine under conventional operating conditions. Depending on the age or wear of the machine, the noise behavior of the machine might change.

Furthermore, the extent of the noise emission is also depending on manufacturing influence factors, such as speed, material and clamping conditions.

INFORMATION

The mentioned numerical value is an emission level and not necessarily a safe working level.

Unless the degree of noise emission and the degree of noise disturbance are depending on one another it is not possible to use it in order to reliably determine if it is necessary to take further preventive measures or not.

The following factors influence the actual degree of the noise disturbance of the operator:

- Characteristics of the working chamber, e.g. size or damping behavior,
- Other noise sources, e.g. the number of machines,
- Other processes proceeding nearby and the period during which the operator is exposed to the noise.

Furthermore, the admissible pollution level may be different from one country to another due to the national regulations.
This information regarding the noise emission should allow the operator of the machine to perform a better evaluation of the endangerments and risks.

CAUTION!

The machine operator has to wear an appropriate ear protection depending on the overall stress caused by noise and on the basic limit values.

We generally recommend using a sound and ear protection.

2.7 Dimensions, installation plan D240 x 500 G

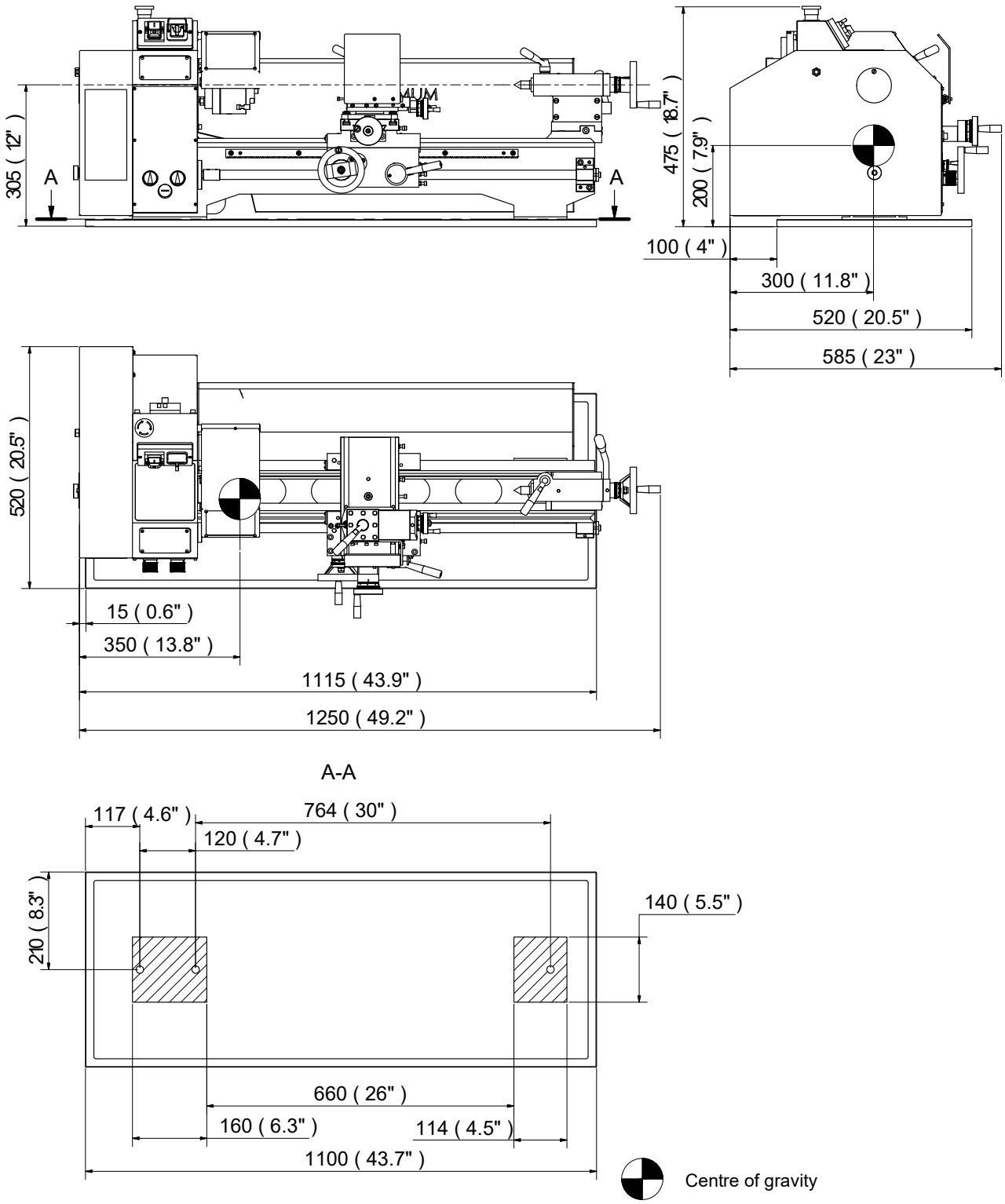


Fig. 2-1: Dimensions, installation plan D240x500 G

2.9 Distance between centres, height of centres 9684504

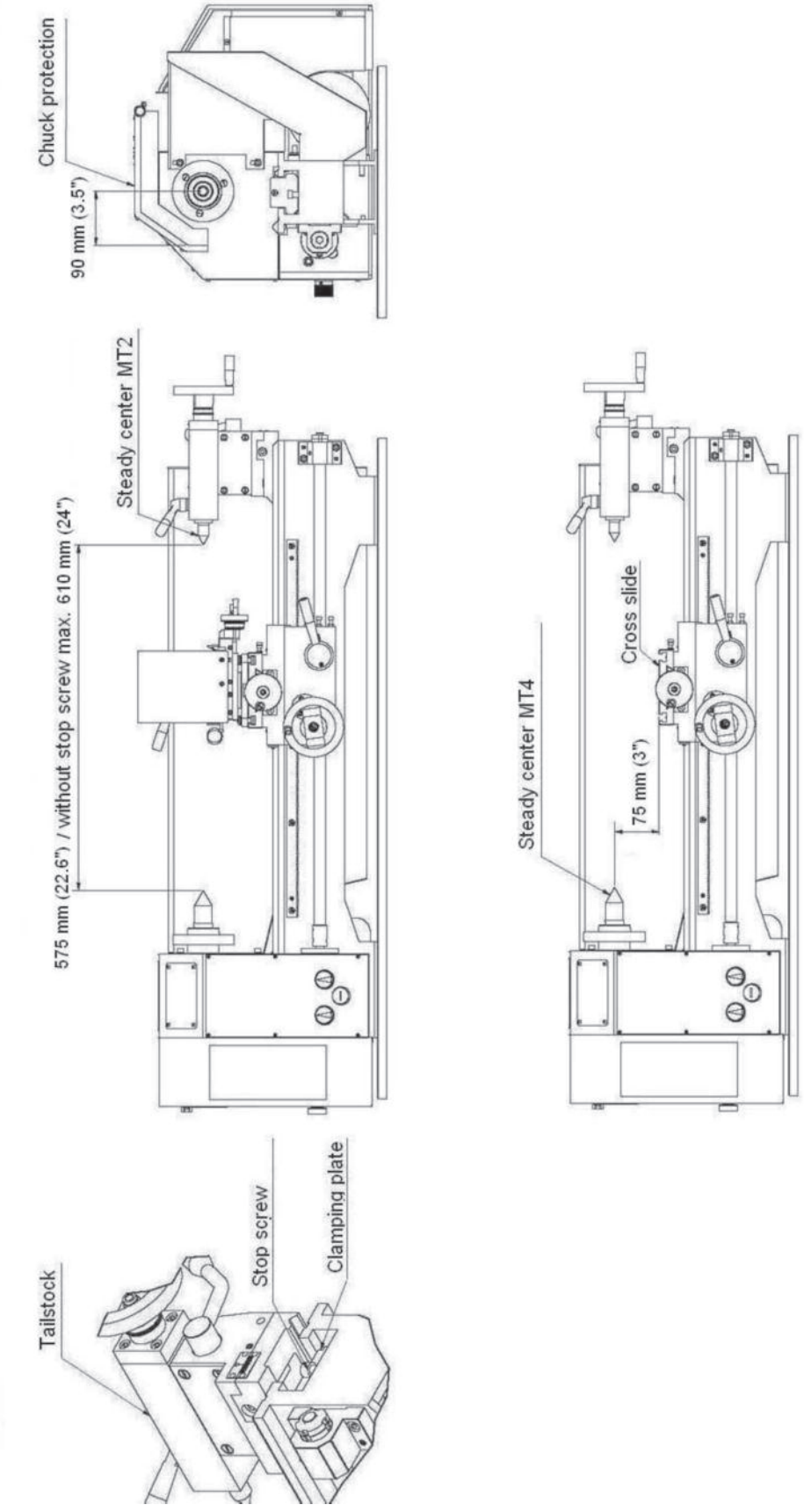


Fig. 2-3: Distance between centres, height of centres

3 Assembly

INFORMATION

The lathe comes pre-assembled.

3.1 Extent of supply

When the machine is delivered, check immediately that the lathe has not been damaged during shipping and that all components are included. Also check that no fastening screws have come loose.

Compare the parts supplied with the information on the packaging list.

3.2 Transport

- Center of gravity

- Attachment positions (marking the positions for the attachment position gear)

- Prescribed transport position (marking the top side)

- Means of transportation to be used
- Weights

WARNING!

Machine parts which fall off forklift trucks or other transport vehicles could cause very serious or even fatal injuries. Follow the instructions and information on the box.

WARNING!

Use of unstable lifting and load suspension gear that breaks under load can cause very serious injuries or even death.

Check that the lifting and load suspension gear has sufficient load capacity and is in perfect condition. Observe the rules for preventing accidents issued by your association for the prevention of occupational accidents and safety in the workplace or other inspection authorities.

Hold the loads properly. Never walk under suspended loads!

3.3 Storage

ATTENTION!

Improper storage may cause important parts to be damaged or destroyed.
Store packed or unpacked parts only under the following ambient conditions.
Please follow the instructions and indications on the transportation box:

- Fragile goods (goods require careful handling)

- Protect against humidity and humid environments
  ☞ “Environmental conditions“ on page 16

- Prescribed position of the packaging box (marking the top side – arrows pointing upward)

- Maximum stacking height

  Example: non-stackable – do not pile any further packaging boxes on top of the first packaging box

3.4 Installation and assembly

3.4.1 Requirements of the installation site

ATTENTION!

Before installing the machine, have the load bearing capacity of the subsoil checked by a specialist. The floor and the ceiling of the hall have to bear the weight of the machine plus all additional parts and additional aggregates as well as the operator and the stocked materials. Reinforce the subsoil, if necessary.

INFORMATION

In order to provide for good functionality and high machining accuracy as well as long durability of the machine the site should fulfill certain criteria.

Observe the following items:

- The device must only be installed and operated in dry ventilated places.
- Avoid places nearby machines generating chips or dust.
- The site has to be vibration-free, i.e. at a distance from presses, planing machines, etc.
- The substructure has to be appropriate for turning. Also make sure that the load bearing capacity and the evenness of the floor are appropriate.
- The substructure has to be prepared in a way that possibly used coolant cannot penetrate into the ground.

- Protruding parts such as stops, handles, etc. need to be secured by measures provided by the customer if necessary in order to avoid dangers for persons.
- Provide sufficient space for assembly and operating staff as well as for material transport.
- Also allow for accessibility for setting and maintenance works.
- Make sure that the main power supply for the machine is freely accessible.
- Provide for sufficient illumination (minimum value: 300 lux, measured at the turning tool tip). In case of insuffiecient intensity of illumination provide for additional illumination i.e. by a separate workplace illuminator.

INFORMATION

The main power supply for the lathe has to be freely accessible for quick action disconnect.

3.4.2 Load suspension point

➔ Fasten the load suspension gear around the lathe bed.

➔ Make sure that you distribute the loads evenly so that the lathe cannot turn over while lifting.

➔ Make sure that no add-on pieces or varnished parts are damaged due to the load suspension.

3.4.3 Installation

WARNING!

Danger of crushing and overturning. The lathe must be installed by at least 2 people.

➔ Check the horizontal orientation of the base of the lathe with level.

➔ Check that the foundation has sufficient floor-load capacity and rigidity.

ATTENTION!

Insufficient rigidity of the foundation leads to the superposition of vibrations between the machine and the foundation (natural frequency of components). Insufficient rigidity of the entire lathe assembly also rapidly causes the lathe to reach critical speeds, with unpleasant vibrations, leading to bad turning results.

➔ Position the lathe on the intended foundation.

➔ Secure the lathe to the foundation or substructure of the machine using the through holes.

☞ “Dimensions, installation plan 9684504 on page 18.

3.5 First use

WARNING!

Personnel and equipment may be endangered if the lathe is first used by inexpert personnel.

We do not take liability for damage caused by incorrect commissioning.

3.5.1 Cleaning and greasing

➔ Remove the anticorrosive agent applied to the machine for transport and storage purposes. We recommend the use of WD-40 oil.

➔ Do not use any solvents, thinners or other cleaning agents which could corrode the varnish on the machine. Follow the specifications and indications of the manufacturer of the cleaning agent.

➔ Lubricate all bright machine parts with non-corrosive machine oil.

➔ Grease the machine using the lubrication chart. ☞ “Inspection and maintenance“ on page 55

3.5.2 Visual inspection

Check the oil level in the inspection glass of the feed gear.
☞ “Oil inspection glass of the feed gear“ on page 55

3.5.3 Run test

➔ Check smooth running of all spindles.

➔ Check the state of the lathe chuck and the turning jaws.

3.5.4 Power supply

➔ Connect the lathe to electrical power supply.

➔ Check the fuse protection (fuse) of your electrical supply according to the technical specifications for the total connected load of the lathe.

3.5.5 Functional test

➔ Clamp a workpiece into the lathe chuck of the machine or close the jaws of the lathe chuck fully before turning on the machine.

WARNING!

- **Observe the maximum chuck opening.**
- **Do not stand in front of the lathe chuck when turning on the machine for the first time.**

3.6 Optional machine accessories

WARNING!

Risk by using improper workpiece clamping fixtures or by operating the machine with inadmissible speed.

Only use the clamping fixtures (e.g. lathe chuck) which had been delivered together with the machine.

Use the working clamping fixtures only in the provided admissible speed range.

Workpiece clamping fixtues must only be modified according to the recommendations of the clamping fixture manufacturer.

Description	Item No
D240	
• Surface plate 240mm (9.5")	344 1352
• Steady rest	344 1315
• Movable rest	344 1310

D240	
• Chuck flange 125mm	344 1311
• 4-Jaw Chuck 125mm	344 2812
• Collet chuck holder ER 25	344 1305
• Collet chuck holder ER 32	344 1306
• Quick change tool holder SWH 1-A	338 4301

3.7 Mounting instructions

3.7.1 Mounting instruction chuck flange

Clean the flange and spindle nose, put the flange onto the spindel nose screws.
Measure the mounting hole of the chuck and turn the flange to a diameter as a H7 fit.
Put the jaw chuck onto the flange.

INFORMATION

Position the chuck on the spindle nose step and tap it in with rubber-faced hammer (distribute uniformly easy strokes over the front panel).

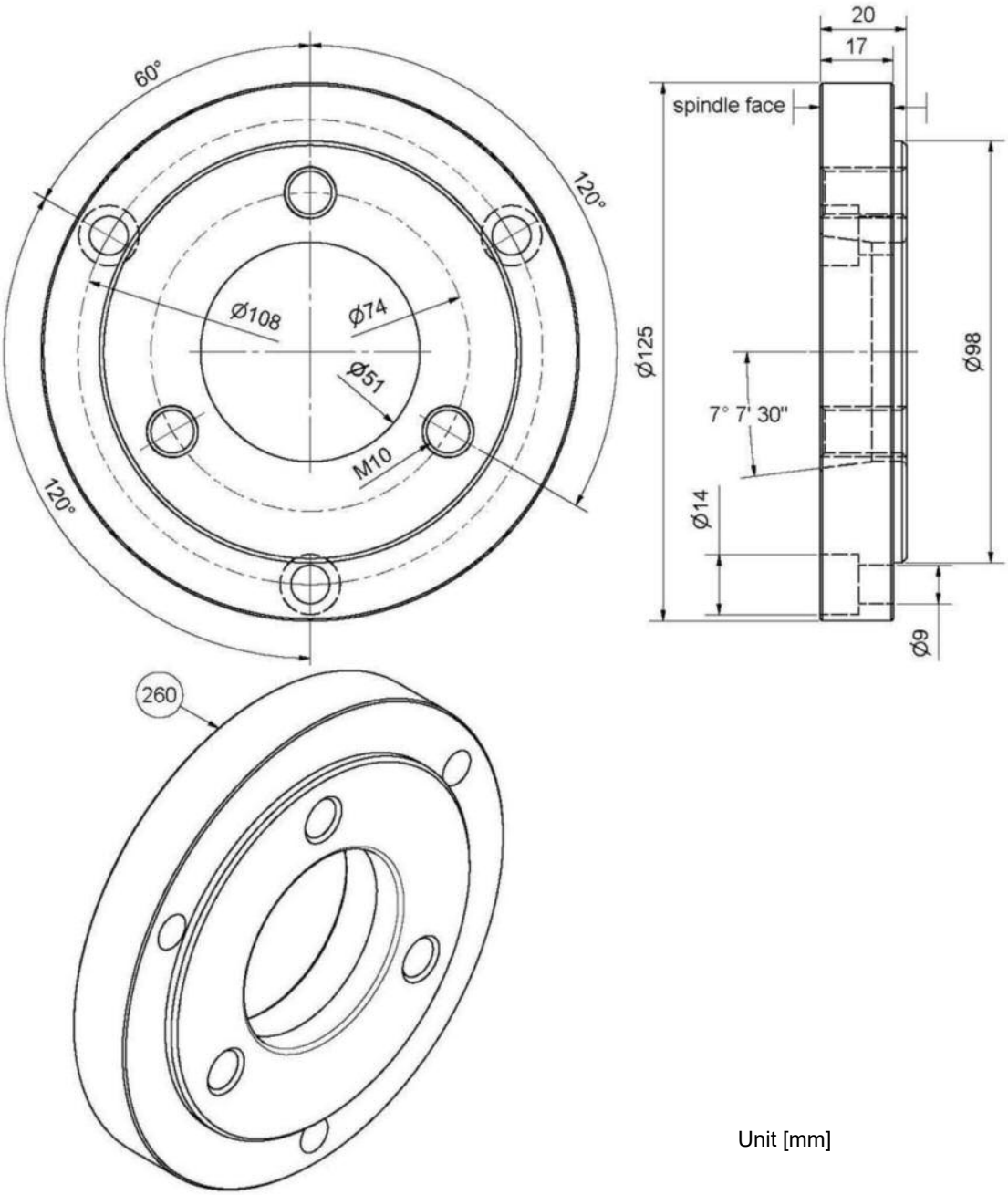
Tighten studs nuts alternatingly and uniformly.

Do not ever tighten studs when installing them into the chuck flange as this could deform chuck's body - jaws will lock in place or would be hard to move.

Furthermore, radial runout can occur.

Recutting chuck jaws is inadmissible!

3.7.2 Chuck flange D240



Unit [mm]

Fig. 3-1: Chuck flange D240

3.7.3 Mounting instruction of collet chuck holder

Mounting of collet chuck holder 344 1305 on your lathe D240.

Proceed as follows.

➔ Mark out the position of the lathe chuck at the spindle flange before dismantling with an e.g. felt-tipped pen.

➔ Dismantle the lathe chuck.

➔ Clean all faces of the spindle nose and of the collet chuck holder extremely thoroughly.

➔ Remove threaded studs from the lathe chuck and install into the collet chuck holder.

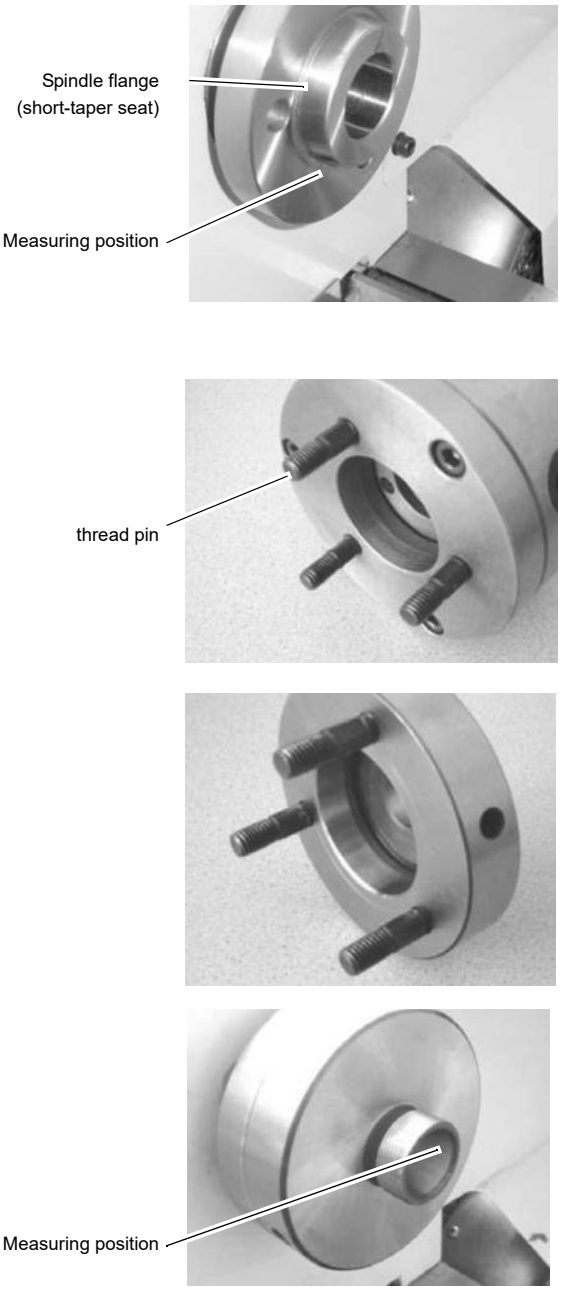
➔ Measure the true running of the spindle nose. Mark out the greatest positive amplitude of the dial gauge at the spindle nose with an e.g. felt-tipped pen.

➔ Attach the collet chuck holder to the spindle flange, hand tighten the nuts. Tighten in the nuts stepwise once and uniformly alternating at least three times in successively (only this way you will get the best true running).

➔ Measure the true running of the collet chuck holder at the conical surface.

➔ Position the collet chuck holder by turning each 120° at the spindle flange to the highest run out precision is achieved.

➔ Mark out the position of the highest circularity accuracy of spindle flange with collet chuck holder and assemble then the collet chuck holder on the highest circularity accuracy position.



Illustr. 3-2: 344 1305 without union nut.

3.7.4 Mounting of movable rest - D240

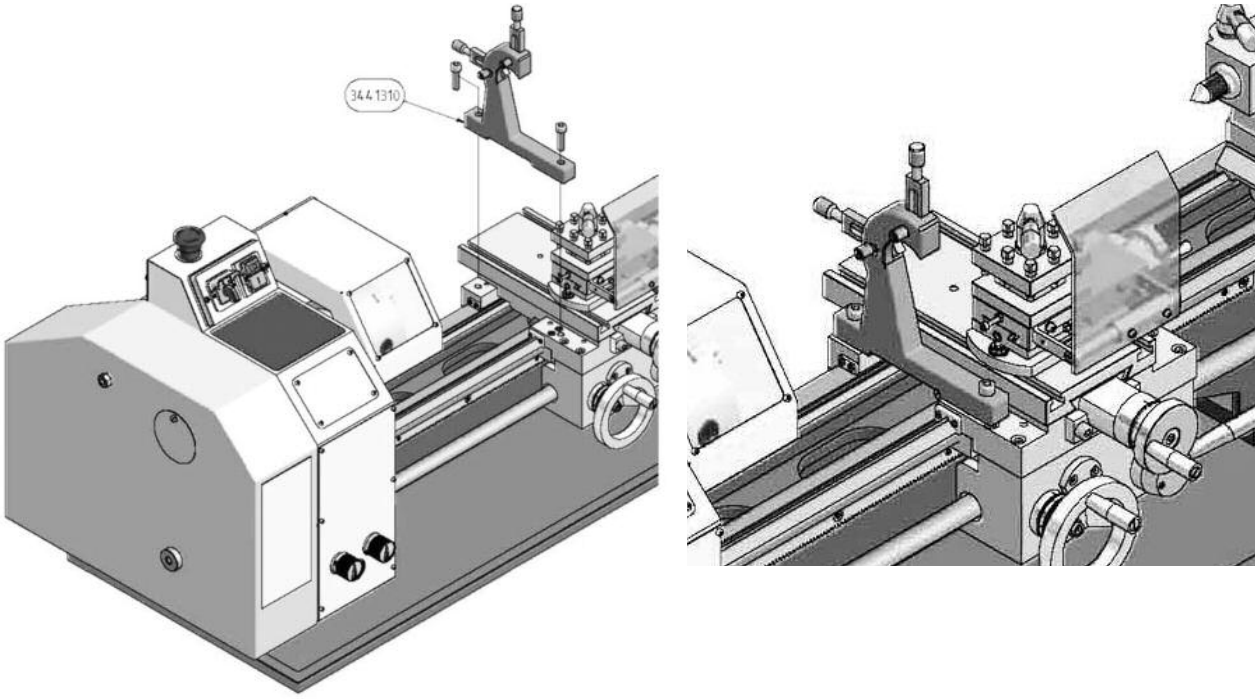
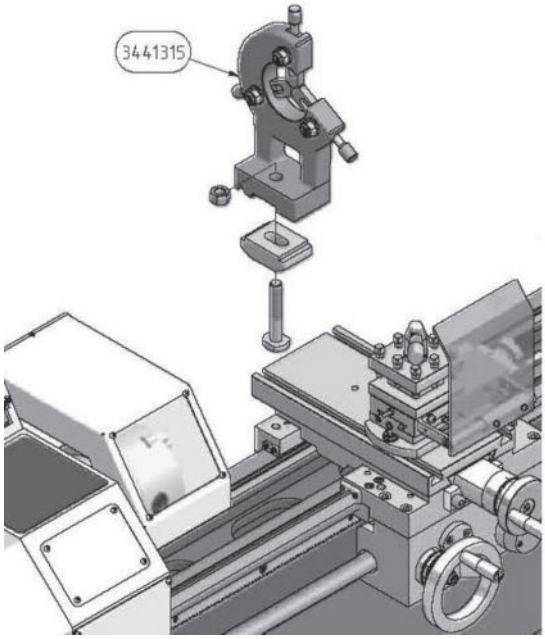


Fig. 3-3: Movable rest - D240

3.7.6 Mounting of steady rest - D240



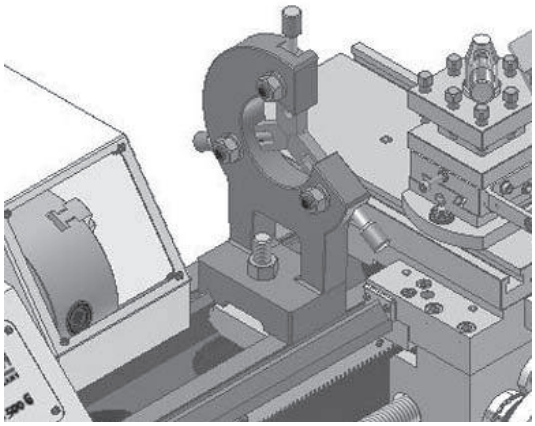


Fig. 3-5: Steady rest - D240

4 Operation

4.1 Safety

Use the lathe only under the following conditions:

- The lathe is in proper working order.
- The lathe is used as prescribed.
- The operating manual is followed.
- All safety devices are installed and activated.

All Troubleshooting should be eliminated immediately. Stop the machine immediately in the event of any abnormality in operation and make sure it cannot be started up accidentally or without authorisation.

Notify the person responsible immediately of any modification.

☞ “Safety during operation“ on page 13

4.2 General working advice - coolant

Friction during the cutting process causes high temperatures at the cutting edge of the tool.

The tool should therefore be cooled during the cutting process. Cooling the tool with a suitable cooling lubricant ensures better working results and a longer edge life of the cutting tool.

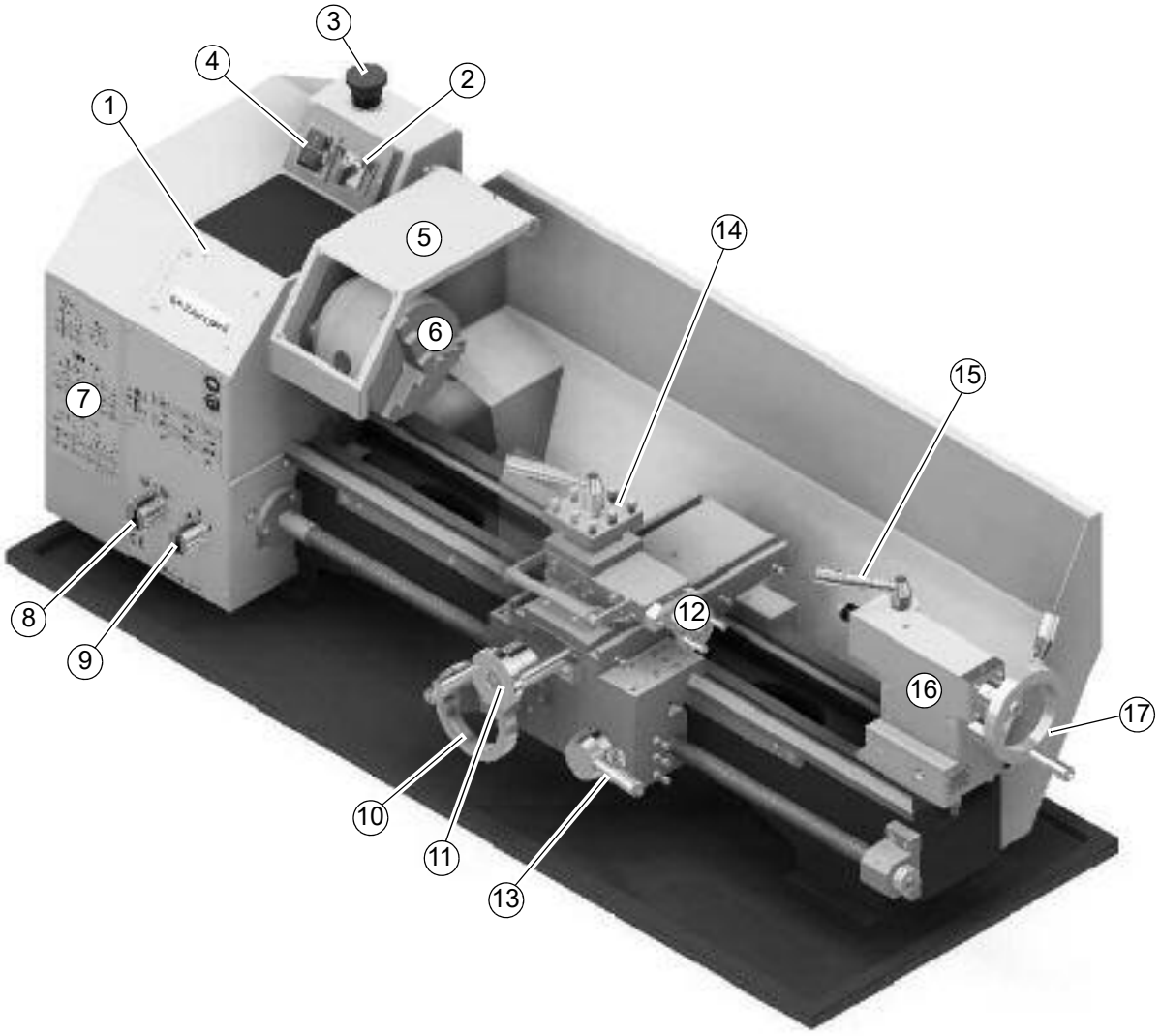
INFORMATION

Use a water-soluble and non-pollutant emulsion as a cooling agent. This can be acquired from authorized distributors.

Make sure that the cooling agent is properly retrieved. Respect the environment when disposing of any lubricants and cooling agents. Follow the manufacturer's disposal instructions.

4.3 Operation D240

4.3.1 Control and indicating elements



No.	Denomination	No.	Denomination
1	Protective cover of headstock	2	Change-over switch with OFF position
3	Emergency stop button	4	Switch ON/ OFF
5	Lathe chuck guard	6	Jaw chuck
7	Change gears and pitch/ feed table	8	Selector switch for feed direction
9	Selector switch for speed of feed of lathe saddle	10	Handwheel lathe saddle
11	Handwheel cross slide	12	Handwheel compound slide
13	Feed activation lever	14	Quadruple toolholder
15	Clamping lever for tailstock sleeve	16	Tailstock
17	Handwheel tailstock sleeve		

4.3.2 Switching elements

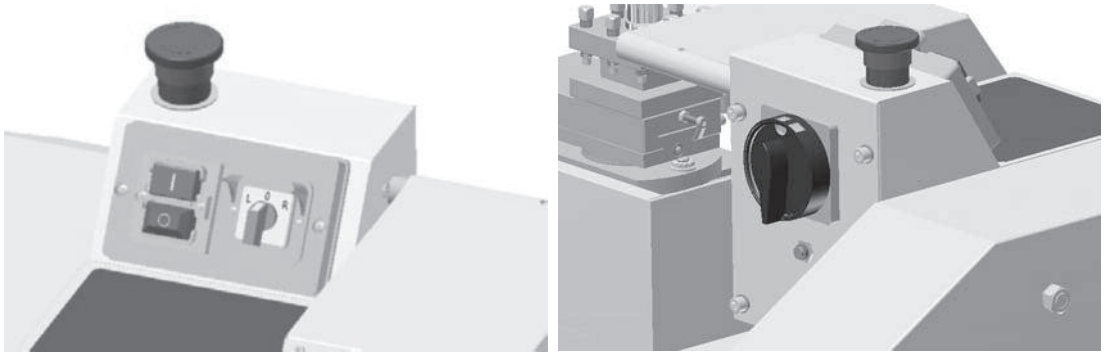


Fig.4-1: panel

Hand actuated auxiliary switch ON

The “hand actuated auxiliary switch ON” switches the rotation of the lathe on.

Hand actuated auxiliary switch OFF

The “hand actuated auxiliary switch OFF” switches the rotation of the lathe off.

Main switch

Disconnects or connects the power supply.

Change-over switch

The direction of rotation of the spindle can be switched by actuating the change-over switch.

It is possible to select a speed for each direction of rotation.

- The labeling “R” means right-handed rotation (clockwise).
- The labeling “L” means left-handed rotation.

ATTENTION!

Wait until the rotation of the spindle has come to complete standstill before changing the direction of rotation by actuating the change-over switch.

If the direction of rotation is changed during operation, the motor and the change-over switch might get damaged.

4.3.3 Turning ON the machine

➔ Perform basic setting on the lathe (speed stage, infeed, etc.).

➔ Check if the lathe chuck guard and the protective cover are closed – close the protective covers if necessary.

➔ Select the direction of rotation.

➔ Actuate the hand-actuated auxiliary switch “On".

4.3.4 Turning OFF the machine

➔ Actuate the hand-actuated auxiliary switch “Off”.

➔ If the machine stands still for a longer period of time, turn off the main power supply.

4.5 Operating elements for infeed

Feed speed

Thread - Metric

Threads Per Inch

Leadscrew nut disengaged
(Feed deactivated)

Leadscrew nut engaged
(Feed activated)

Feed direction

4.6 Toolholder

Clamp the turning tool into the toolholder.

The tool must be clamped firmly and with the least possible overhang in order to absorb well and reliably the cutting force generated during the chip formation.

Adjust the height of the tool. Use the tailstock with lathe centre to adjust the tool to the required height. If necessary, use steel spacer shims under the tool to get the required height.

4.7 Lathe chuck

The workpieces must be clamped firmly and securely onto the lathe before they are machined. The clamp should be tight enough to ensure that the workpiece will not come out (fly out) during machining, but not so tight that it is damaged or deformed

WARNING!

Do not clamp any workpieces that exceed the permitted chucking capacity of the lathe chuck. The clamping force of the chuck is too low if its capacity is being exceeded. The jaws might break off and fly out.

ATTENTION!

When disassembling the jaw chuck might fall on the lathe bed and might damage the guide rail. Put a wooden board or another appropriate part on the lathe bed in order to prevent damages.

➔ Disconnect the lathe from the electrical power supply.

➔ Block the turn of the spindle. Put an extension levers into one of the square key of the jaw chuck. Make sure that the lathe bed is not damaged by the extension lever.

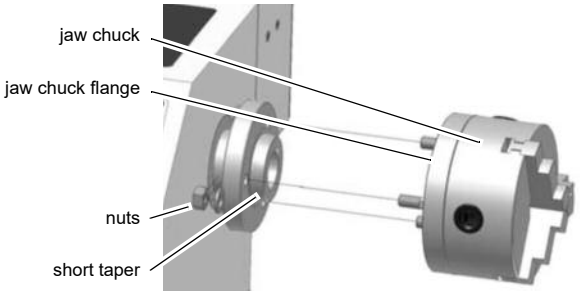


Fig.4-2: jaw chuck

➔ Unscrew the 3 nuts holding chuck's studs.

➔ Remove the chuck.

➔ If necessary, loosen the chuck by hitting it gently with a plastic-tipped hammer or a rubber mallet.

4.8 Adjusting the speed

WARNING!

Disconnect the lathe from electrical power before opening the protective cover.

Adjust the speed by changing the position of the V-belt on the pulleys.

With the "Vario" equipment variant, the speed can be regulated within the corresponding speed ranges with the aid of a frequency converter. The speed can then be adjusted using the potentiometer on the control panel of the lathe.

In order to change the speed or feed, you must first remove the protective cover.

Unscrew the two thumb nuts.

➔ Remove the protective cover.

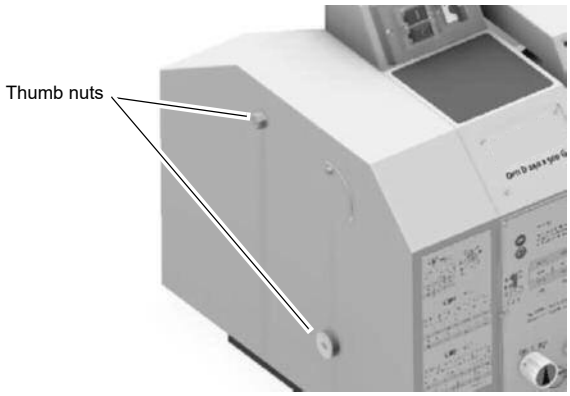


Fig. 4-3: Protective cover of the headstock

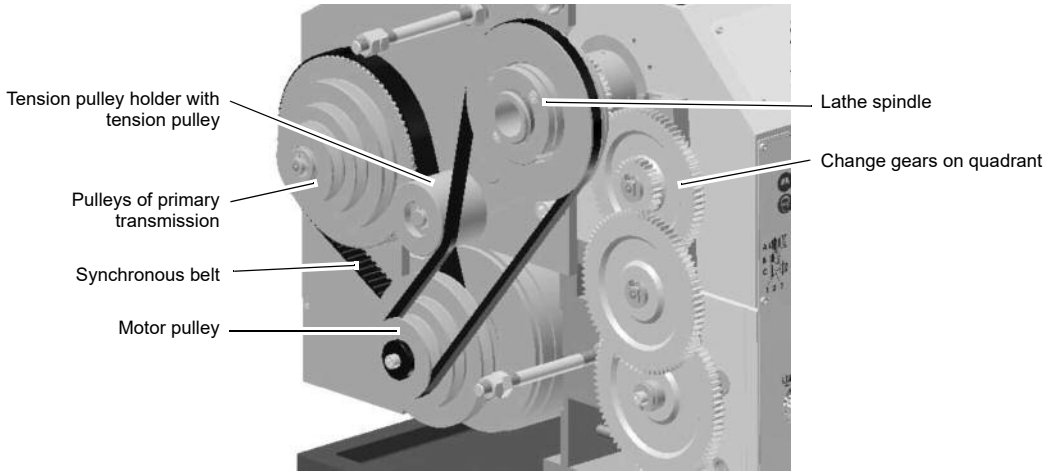


Fig. 4-4: D 240 x 500 G

4.8.1 Changing the speed range

➔ Loosen the nut on the tension pulley holder and release the tension of the V-belt.

➔ Install the V-belt into the corresponding position.

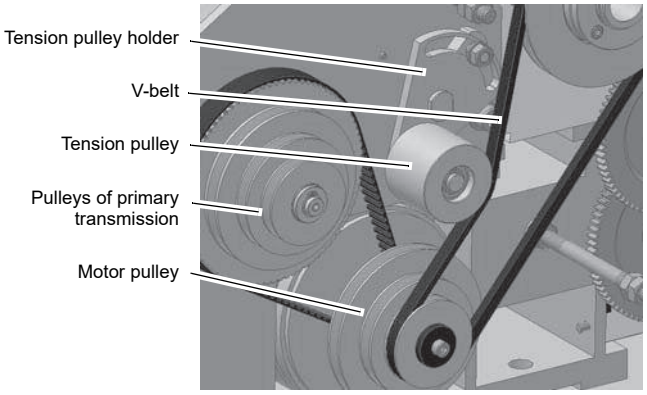


Fig.4-5: Tension pulley D240 x 500 DC Vario

❍ Depending on the speed selected, the V-belt will have to be lifted directly onto the motor pulley or onto the pulley of the primary transmission. Handle the V-belt with care. It must not be damaged or overstretched.

➔ Tighten the tension pulley and fasten the nut again.

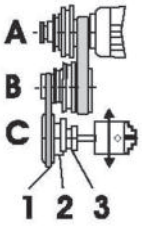
❍ The correct tension of the synchronous belt has been reached when you can still bend it approximately 3 mm with your index finger.

ATTENTION!

Make sure the tension pulley is in contact with the outside of the V-belt at all times!

Make sure the tension of the V-belt is correct. Excessive or insufficient tension can cause damage to the bearings and belt itself.

4.8.2 Speed table



AC 1	AC 2	AC 3
744	1200	2400
BC 1	BC 2	BC 3
150	252	540

INFORMATION

For Vario lathes the maximum speeds are technically limited to 4000 rpm at the V-belt position AC2. It is impossible to have an effective controlling variable of 225% in the V-belt position AC2. The full range of controlling variables from 15% to 225% are only available by using BC, AC1and AC2 belt positions.

4.9 Adjusting the feed

4.9.1 Selector switches

Use the selector switches to select the feed direction and feed speed.

ATTENTION!

Wait until the machine has come to a complete halt before making any change to the selector switches.

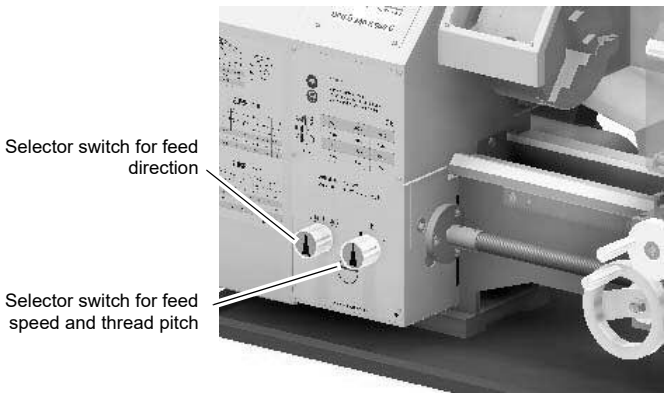


Fig.4-6: Selector switches

INFORMATION

Use the table on the lathe for selecting the feed speed or the thread pitch. Change the change gears if the required thread pitch cannot be obtained with preinstalled gear set.

4.9.2 Changing the change gears

The change gears for the feed are mounted on a quadrant.

➔ Disconnect power supply.

➔ Loosen the locking screw on the quadrant.

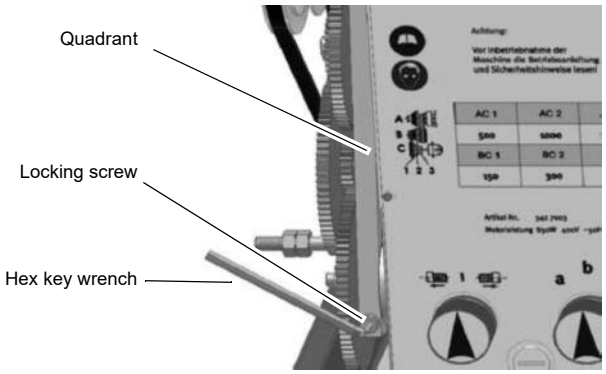


Fig.4-7: Side view of the change gears

➔ Swing the quadrant to the right.

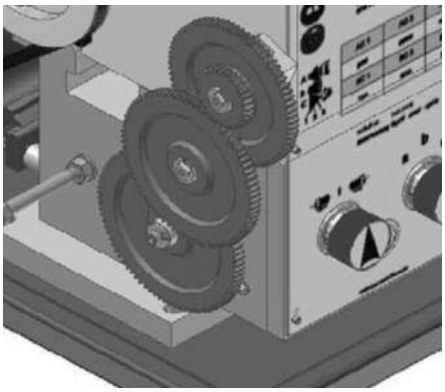


Fig.4-8: Front view of the change gears

➔ Loosen the clamping nuts on the change gears.

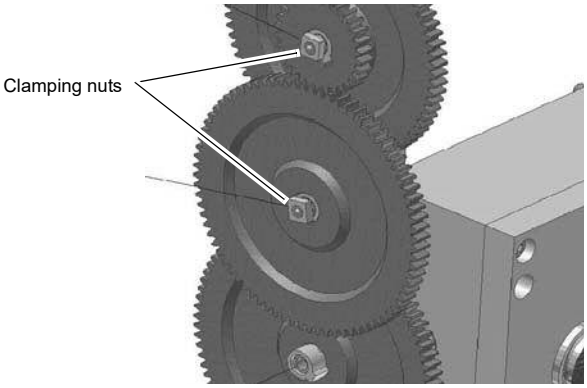


Fig.4-9: Attachment of change gears

➔ Remove the slotted washers.

Remove the screw from the shaft of the feed gear.

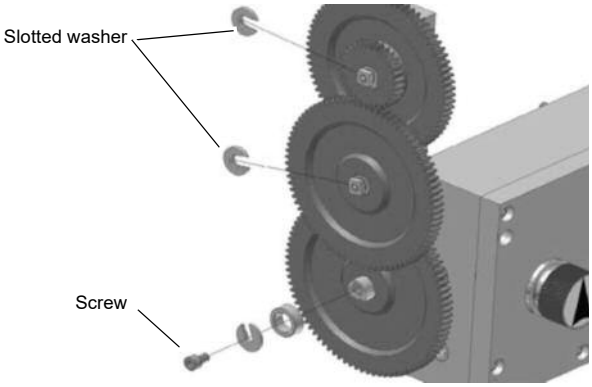


Fig.4-10: Attachment of change gears

➔ Install the gear couples using the feed or change gear table and secure the gears onto the quadrant again.

➔ Swing the quadrant to the left until the gears have engaged again.

➔ Readjust gear flank clearance by inserting a normal sheet of paper as an adjusting or distance aid between the gearwheels.

➔ Immobilise the quadrant with the locking screw.

➔ Attach the protective cover of the headstock and reconnect the machine to the power supply.

4.10 Assembly of the change gears

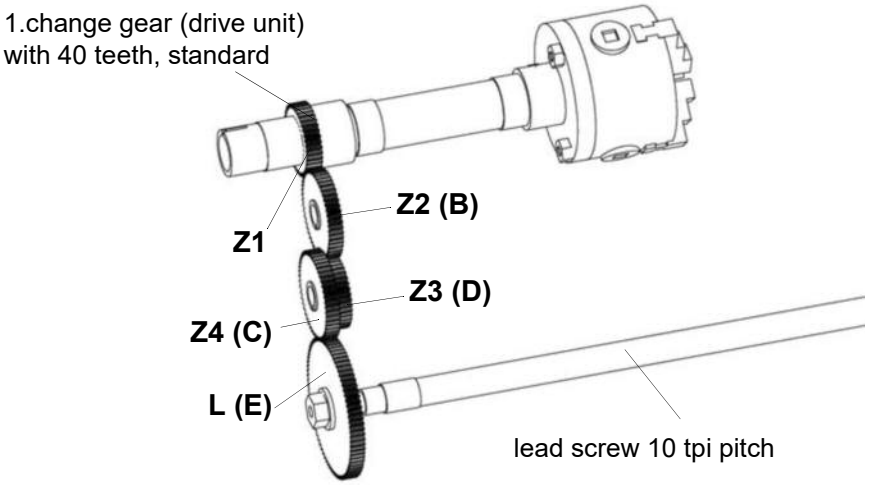


Fig.4-11: Change gear

INFORMATION

The assembly of the change wheels may be performed in the sequence that the standard gear (1st drive unit) first cams into gear A, then gear A to gear C and gear D to gear F.

An additional gear is mounted behind the 1st gear (drive unit) so that by removing this gear the turning direction of the lead screw is being changed and that you may machine a left-handed thread. By removing the gear, the gear transmission ratio is not being changed, the thread pitch remains the same. The lead screw have a right-handed thread. As you may see in the following example for a calculation, the size of the gear B is not important as in the calculation they cancel each other out (reducing a fraction). Therefore you may use a gear of any size in the position B if you want to machine a left-handed thread in order to bridge the gap to the 1st drive unit which results from the removed gear.

General

According to DIN 868, the gear transmission ratio is the ratio of the driving gears to the driven gears.

Example

To calculate metric pitch (mm), multiply lead screw pitch (mm) by gear transmission ratio:

$$\text{Pitch (mm)} = \frac{25.4}{10} \times \frac{Z1 \times Z2 \times Z4}{Z2 \times Z3 \times Z5} \times Vg = 2.54 \times \frac{40 \times C}{D \times E} \times Vg$$

To calculate imperial pitch (tpi), divide lead screw pitch tpi (threads per inch) by gear transmission ratio:

$$\text{Pitch (tpi)} = 10 : \frac{Z1 \times Z2 \times Z4}{Z2 \times Z3 \times Z5} \times Vg = 10 : \frac{40 \times B \times C}{B \times D \times E} \times Vg = 10 : \frac{40 \times C}{D \times E} \times Vg = 10 \times \frac{D \times E}{40 \times C} \times Vg$$

The number 10 in the above calculation is the tpi pitch of the lead screw.

The number 40 is the number of the teeth on 1st drive unit.

Vg in the above calculation is gearbox transmission ratio:

- (Vg) position "A" transmission ratio = 1
- (Vg) position "B" transmission ratio = 0.5
- (Vg) position "C" transmission ratio = 2

Gear Z2 (B) acts as idler gear and does not have any effect on gear transmission ratio.

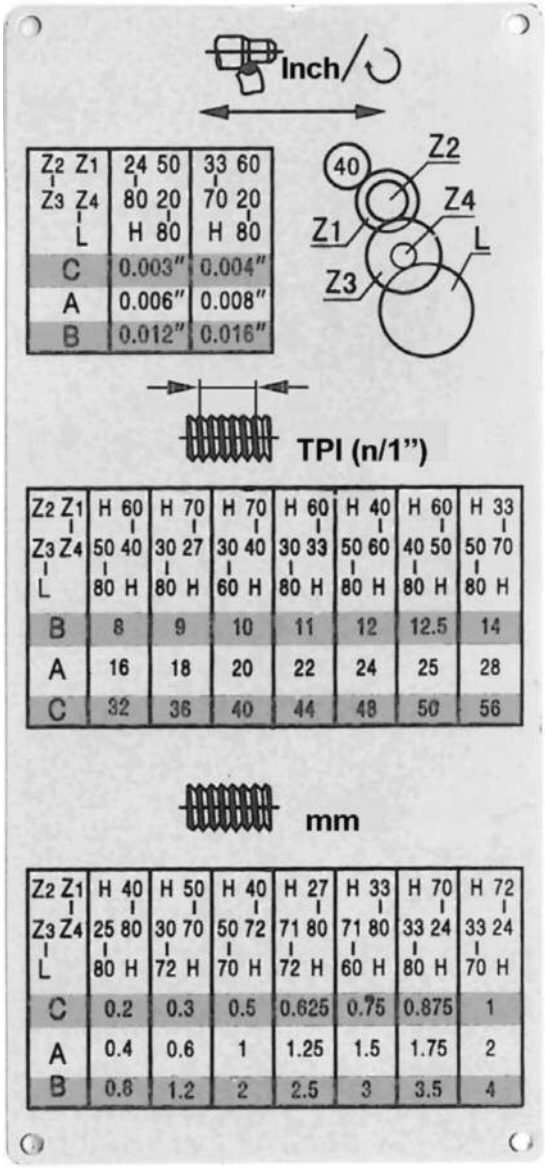
4.10.1 Gear threading tables

INFORMATION

The leads of thread, and/or longitudinal feeds represented in the following tables are possible with the gear wheels in the scope of supply.

The tables are built up in a way that you may assemble the required combination of the gears to cut a thread without having to look up the details. Ligatures from one figure to the following one represent the caming of one gear to the following one. The identifier "H" stands for bushing or a small gear as distance spacer. This smaller gear used as distance spacer must of course not be camed in with any other gear.

D240



Z2 Z1 / Z3 Z4 / L	24 50 / 80 20 / H 80	33 60 / 70 20 / H 80
C	0.003"	0.004"
A	0.006"	0.008"
B	0.012"	0.016"

Z2 Z1 / Z3 Z4 / L	H 60 / 50 40 / 80 H	H 70 / 30 27 / 80 H	H 70 / 30 40 / 60 H	H 60 / 30 33 / 80 H	H 40 / 50 60 / 80 H	H 60 / 40 50 / 80 H	H 33 / 50 70 / 80 H
B	8	9	10	11	12	12.5	14
A	16	18	20	22	24	25	28
C	32	36	40	44	48	50	56

Z2 Z1 / Z3 Z4 / L	H 40 / 25 80 / 80 H	H 50 / 30 70 / 72 H	H 40 / 50 72 / 70 H	H 27 / 71 80 / 72 H	H 33 / 71 80 / 60 H	H 70 / 33 24 / 80 H	H 72 / 33 24 / 70 H
C	0.2	0.3	0.5	0.625	0.75	0.875	1
A	0.4	0.6	1	1.25	1.5	1.75	2
B	0.8	1.2	2	2.5	3	3.5	4

Fig.4-12: Threading tables

4.10.2 Example - assembly of gear wheels for thread 14 TPI, 28 TPI and 56 TPI on D240

Ligatures from one figure to the following one represent the caming of one gear to the following one. The identifier "H" stands for bushing or a small gear as an auxiliary distance, see position 523 of spare parts drawing.

With the shims, see position 518 and 519 of the spare parts drawing, the disalignment of the gear wheels is reached.

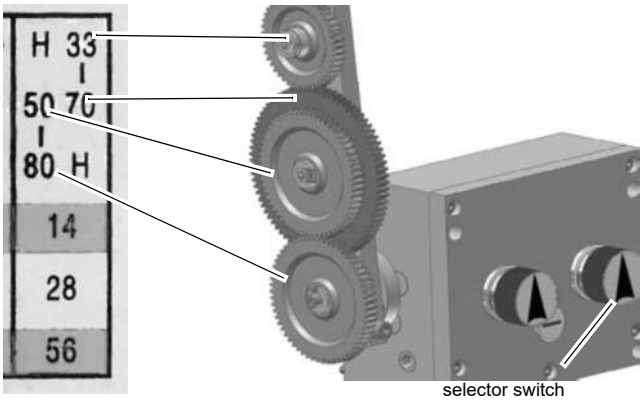


Fig.4-13: example of gear wheel combination for D240

The designation a b c of the threading table is the meaning of the position of selector switch on feed gear.

4.12 Immobilising the lathe saddle

The cutting force produced during facing, recessing or slicing process may displace the lathe saddle.

➔ Secure the lathe saddle using the tightening screw.

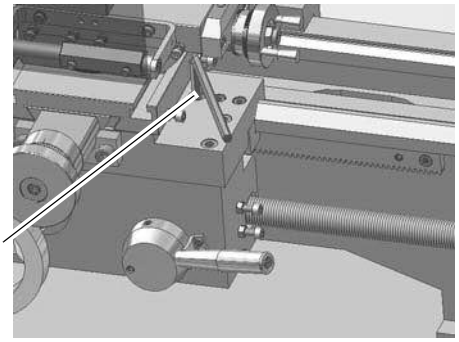


Fig.4-15: Lathe saddle D240

4.12.1 Turning tapers with the top slide

See also ☞ “Turning Speeds & Feeds“ on page 48

It is possible to turn short tapers with the top slide. The scaling takes place to 60° degree of angle. Adjusting of the top slide over the 60° angle mark outside is possible.

➔ Loosen the two nuts on the left and the right of the top slide.

➔ Swivel the top slide.

➔ Clamp the top slide again.

4.12.2 Cross-adjustment of the tailstock

See also ☞ “Turning Speeds & Feeds“ on page 48

The cross-adjustment of the tailstock is used for turning long, thin shafts.

➔ Loosen the locking handle of the tailstock.

➔ Unscrew the locking screw approximately half a turn.

❍ By alternately loosening and tightening the two (front and rear) adjusting screws, the tailstock is moved out of the central position. The desired cross-adjustment can be read off the scale.

➔ First retighten the locking handle and then the two (front and rear) adjusting screws.

ATTENTION!

Check clamping of the tailstock and the quill, respectively, for turning jobs between centres! Fit the securing screw at the end of the lathe bed in order to prevent the tailstock from falling off the lathe bed.

4.13 Tailstock sleeve

The tailstock quill is used to hold the tools (bits, lathe centres, etc.)

➔ Install the required tool in the tailstock quill.

❍ Use the scale on the quill to re-adjust and / or adjust the tool.

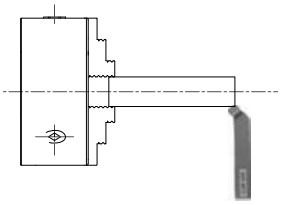
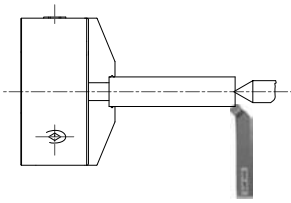
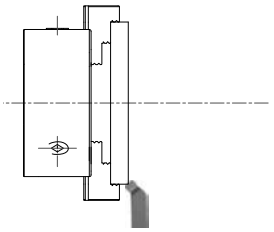
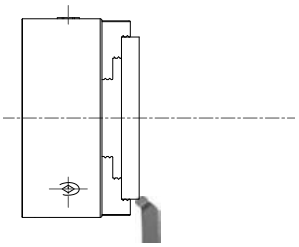
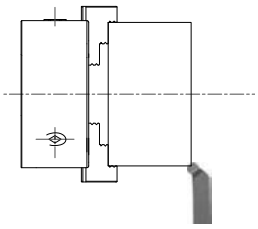
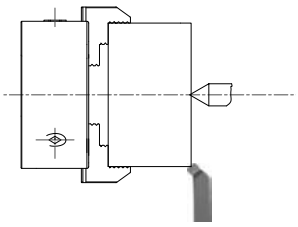
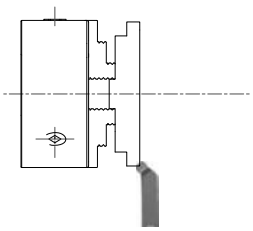
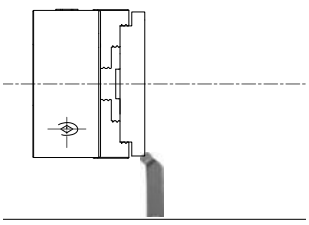
➔ Clamp the quill with the clamping lever.

❍ Use the handwheel to move the quill back and forth.

The quill of the tailstock can be used to hold a drill chuck for holding bits and countersinks.

4.14 Clamping a workpiece into the lathe chuck

When the workpiece is being clamped unprofessionally, there is a risk of injury as the workpiece may fly off or the jaws may break. The following examples do not show all possible situations of danger.

incorrect		**correct**	
	Clamping length too long, overhang too long.		Additional support over center.
	Clamping diameter too large.		Use larger lathe.
	Workpiece is too heavy and clamping grade too short.		Support over center, enlarges clamping grade. Enlarged clamping grades are not available for this three-jaw chuck. Possibly use larger lathe.
	Clamping diameter too short.		Clamp on the largest clamping diameter possible.

4.15 Replacing the clamping jaws on the lathe chuck

The clamping jaws and the three-jaw chuck are provided with numbers. Check before the change, if the numbers are readable and, if necessary, mark the jaws and their primary position. Insert the clamping jaws at the correct position and in the right order into the three-jaw chuck.

After the replacement, bring the jaws completely together in order to see if they are inserted correctly.

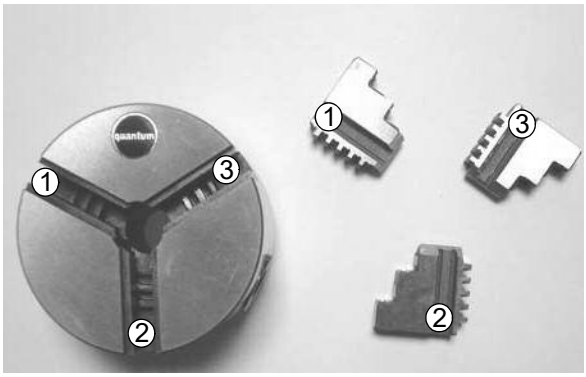


Fig.4-17: Three- jaw chuck / clamping jaws

4.16 Turning Speeds & Feeds

There are rules and principles of cutting speeds and RPM (revolutions per minute) calculations that apply to all metal cutting operations. The operating speed for all metal cutting operations is based on the cutting tool material and the hardness of the material to be cut. The hardness of the work material has a great deal to do with the recommended cutting speed. The harder the work material, the slower the cutting speed. The softer the work material, the faster the recommended cutting speed Fig.4-18: “Recommended cutting speed“ on page 48.

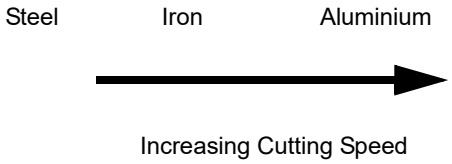


Fig.4-18: Recommended cutting speed

The hardness of the cutting tool material influences recommended cutting speed as well. The harder the cutting tool material, the faster the cutting speed. The softer the cutting tool material, the slower the recommended cutting speed Fig.4-19: “Recommended cutting speed“ on page 48.

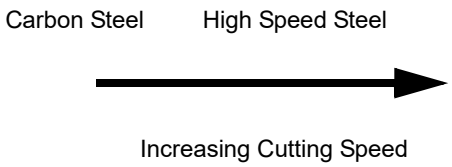


Fig.4-19: Recommended cutting speed

The depth of the cut and the feed rate will also affect the cutting speed, but not to as great as the workpiece hardness. These three factors, cutting speed, feed rate and depth of cut, are known as cutting conditions. Cutting conditions are determined by the machinability rating. Machinability is the comparing of materials on their ability to be machined. From machinability ratings you can derive recommended cutting speeds. Recommended cutting speeds are given in charts. These charts can be found in your Machinery's Handbook or in a chart given to you by your tool salesperson. In Table 3 you will find a typical recommended cutting speed chart.

4.17 Recommended Cutting Speeds in Feet per Minute for Turning Ferrous and Nonferrous Metals*

Material	Condition	Hardness HB	Cutting Speed, fpm	
			High-Speed Steel	Carbide
Free Machining, Plain Carbon Steels (Resulphurized) AISI B1111, B1112, B1113, 1113, 1119, 1212, 1213	HR, A CD	100 to 150 150 to 200	160 180	500 600
AISI 1108, 1115, 1118, 1120, 1126	HR, A CD	100 to 150 150 to 200	140 150	450 500
AISI 1132, 1137, 1140, 1145, 1151	HR, A, N, CD Q & T Q & T Q & T	175 to 225 275 to 325 325 to 375 375 to 425	130 90 50 30	500 250 175 140

Material	Condition	Hardness HB	Cutting Speed, fpm	
			High-Speed Steel	Carbide
Plain Carbon Steels AISI 1012, 1015, 1018, 1019, 1020, 1022, 1024, 1025	HR, A, N, CD HR, A, N, CD HR, A, N, CD CD	100 to 125 125 to 175 175 to 225 225 to 275	140 120 100 70	500 400 350 300
AISI 1027, 1029, 1030, 1032, 1035, 1037, 1040, 1043, 1045, 1047, 1050	HR, N, A, CD HR, N, A, CD N, CD, Q & T, N, Q & T Q & T Q & T	125 to 175 175 to 225 225 to 275 275 to 325 325 to 375 375 to 425	120 100 70 60 50 40	400 350 300 240 200 175
AISI 1055, 1060, 1065, 1070, 1074, 1080, 1085, 1090, 1095	HR, N, A, CD HR, N, A, CD N, CD, Q & T, N, Q & T Q & T Q & T	125 to 175 175 to 225 225 to 275 275 to 325 325 to 375 375 to 425	100 90 65 55 45 30	375 325 275 225 180 150
Free Machining Alloy Steels (Resulphurized) AISI 3140, 4140, 4150, 8640	HR, N, A, CD HR, N, A, CD Q & T Q & T Q & T	175 to 200 200 to 250 250 to 300 300 to 375 375 to 425	125 100 70 60 40	450 400 325 225 150
Alloy Steels AISI 1320, 2317, 2512, 2517, 3115, 3120, 3125, 3310, 3316, 4012, 4017, 4023, 4028, 4320, 4615, 4620, 4720, 4815, 4820, 5015, 5020, 5024, 5120, 6118, 6120, 6317, 6325, 6415, 8115, 8615, 8620, 8625, 8720, 8822, 9310, 9315	HR, A, CD HR, A, N, CD CD, N, Q & T N, Q & T N, Q & T Q & T	150 to 175 175 to 220 220 to 275 275 to 325 325 to 375 375 to 425	110 80 70 60 50 40	400 350 300 250 200 175

* Based upon a feed of 0.012 inch per revolution and a depth of cut 0.125 inch.

Material Condition: HR - Hot Rolled, A - Annealed, N - Normalized, CD - Cold Drawn or Cold Rolled, Q & T - Quenched and Tempered, AC - As Cast, ST & A - Solution Treated and Aged.

The lathe RPM must be set so that the cutting tool will be operating at the correct cutting speed. To set the proper speed, you need to calculate the proper revolution per minute or RPM setting.

4.18 Calculating RPM

The RPM setting depends on the cutting speed and the diameter of the part. The RPM setting will change with the diameter of the part. As the diameter of the part gets smaller, the RPM must increase to maintain the recommended surface feed. Conversely, as the diameter of the part gets larger, the RPM must decrease. Therefore, to maintain the recommended cutting speed, larger diameter parts must be run at slower speeds than a smaller diameter part.

To calculate the proper RPM for the tool and the workpiece, the following formula should be used:

$$\frac{\textbf{Cutting Speed (Cs) x 4}}{\textbf{Part Diameter (D)}}$$

This simplified version of the RPM formula can be used for other machining operations as well.

Let's use this formula to work in calculating the RPM for the machining example below. Use the recommended cutting speed charts ☞. Recommended Cutting Speeds in Feet per Minute for Turning Ferrous and Nonferrous Metals* on page 48.

A cut is to be made with a high-speed steel (HSS) tool on a 2-inch diameter piece of 1018 steel with a Brinnel Hardness of 150 HB. Calculate the RPM setting to perform this cut.

Cutting Speed (CS) = 120 fpm
Diameter of part (D) = 2”

$$\textbf{RPM} = \frac{\textbf{Cs x 4}}{\textbf{D}} = \frac{\textbf{120 x 4}}{\textbf{2}} = \frac{\textbf{480}}{\textbf{2}} = \textbf{240 RPM}$$

Since the available spindle speed settings are generally not infinitely variable, the machine cannot be set precisely to the calculated RPM setting. Some judgment must be made in selecting the speed to use. Try to get to the speed which is nearest to the calculated RPM, but if you can't, consider these conditions. Are you roughing or finishing? If you are roughing, go slower. If you are finishing, go faster. What is your depth of cut? If it is a deep cut, go to the slower RPM setting. Is the setup very rigid? Go slower for setups that lack a great deal of rigidity. Are you using coolant? You may be able to go to the faster of the two settings if you are using coolant.

The greatest indicator of cutting speed is the color of the chip. When using a high-speed steel cutter the chips should never be turning brown or blue. Straw-colored chips indicate that you are on the maximum edge of the cutting speed for your cutting conditions. When using carbide, chip colors can range from amber to blue, but never black. A dark purple color will indicate that you are on the maximum edge of your cutting conditions.

Let's try some other examples:

A cut is to be taken with a (HSS) turning tool on a 1/2 inch piece of 1045 steel with a Brinnel Hardness of 250 HB. Calculate the RPM setting to perform this cut.

Cutting Speed (CS) = 70 fpm

Diameter of part (D) = 0.5"

$$\textbf{RPM} = \frac{\textbf{Cs x 4}}{\textbf{D}} = \frac{\textbf{70 x 4}}{\textbf{0.5}} = \frac{\textbf{280}}{\textbf{0.5}} = \textbf{560 RPM}$$

A 3/8-inch (HSS) drill is used on a 4-inch diameter piece of 1012 steel with a hardness of 100 HB. Calculate the RPM setting to perform this drilling operation.

Cutting Speed (CS) = 140 fpm

Diameter of the drill (D) = 0.375"

$$\textbf{RPM} = \frac{\textbf{Cs x 4}}{\textbf{D}} = \frac{\textbf{140 x 4}}{\textbf{0.375}} = \frac{\textbf{560}}{\textbf{0.375}} = \textbf{1493 RPM}$$

Note that the diameter of the drill and not the workpiece was used for RPM calculation. This was done because the cutting takes place at the diameter of the drill, not on the outside diameter of the workpiece.

A turning operation is to be done on a 3.00-inch piece of 4140-alloy steel with a hardness of 200 HB. A carbide turning tool is to be used. Calculate the RPM setting to perform this cut.

Cutting Speed = 400 fpm
Diameter of part = 3”

$$\text{RPM} = \frac{\text{Cs x 4}}{\text{D}} = \frac{\text{400 x 4}}{\text{3}} = \frac{\text{1600}}{\text{3}} = \text{533 RPM}$$

4.18.1 Selecting Feed per Revolution

There are three factors that make up cutting conditions; cutting speed, depth of cut, and feed rate. The feed rate for turning is given in terms of inches per revolution (IPR). Inches per revolution is the rate at which the tool will advance for every revolution of the workpiece Fig.4-20: “Feed per revolution“ on page 51. The feed rate is determined by the size of the chip that the tool can withstand. The feed rate in inches per tooth is also known as chip load. Because turning tools have only one cutting edge, the chip load is expressed as inch per revolution.

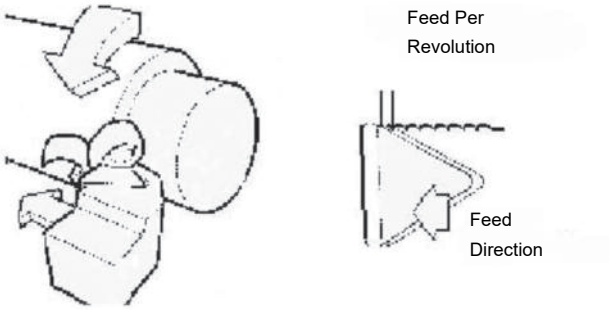


Fig.4-20: Feed per revolution

The recommended values for chip load are based on the cutting tool material and the hardness or machinability rating of the workpiece material. The recommended values for IPR (chip load) can be found in charts in the Machinery's Handbook and charts given to you by your turning tool salesperson. A typical feed in inches per revolution is shown ☞. Recommended Feed Rate Selection in Inches Per Revolution for Turning“ on page 52.

4.18.2 Recommended Feed Rate Selection in Inches Per Revolution for Turning

Material	High-Speed Steel		Carbide	
	Roughing	Finishing	Roughing	Finishing
Low Carbon Steel	0.010 to 0.020	0.002 to 0.008	0.008 to 0.035	0.006 to 0.010
Med. Carbon Steel	0.008 to 0.018	0.002 to 0.008	0.008 to 0.030	0.006 to 0.010
High Carbon Steel	0.008 to 0.015	0.002 to 0.008	0.008 to 0.030	0.006 to 0.010
Cast Iron	0.010 to 0.025	0.003 to 0.010	0.010 to 0.040	0.008 to 0.012
Bronze	0.015 to 0.025	0.003 to 0.010	0.010 to 0.040	0.008 to 0.012
Aluminum	0.015 to 0.030	0.003 to 0.012	0.015 to 0.045	0.008 to 0.012

While the recommended feed rates found in these charts represent good fundamental machining practice, they are only recommended values. Deviations from these values may be necessary due to certain circumstances, such as long, small diameter workpieces. The feed rate used on small diameter workpieces may need to be reduced. The work-holding technique has a great deal to do with the feed rate selection. Setups, which lack rigidity, may require a slower feed rate. The distance that the unsupported part sticks out of the work-holding mechanism must be kept to a minimum to assure proper rigidity. The required workpiece finish will also affect the feed rate selection. Finer finish requirement will require a slower feed rate selection. When using carbide-turning tools, the available horsepower and the rigidity of the spindle bearings could influence the feed rate as well.

5 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repair

of the lathe.

The diagram below shows which of these headings each task falls under.

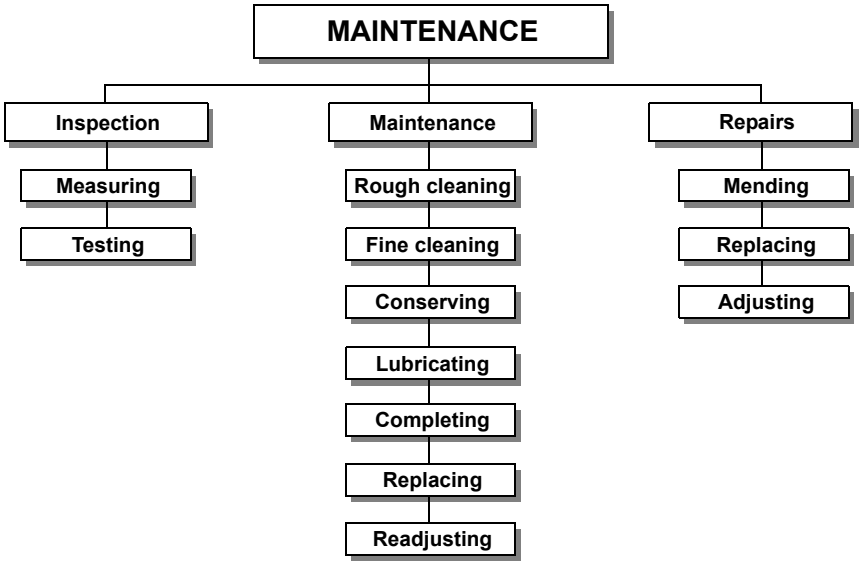


Fig. 5-1: Maintenance - Definition according to DIN 31051

ATTENTION!

Properly-performed regular maintenance is an essential prerequisite for

- **safe operation**
- **fault-free operation**
- **long service life of the lathe and**
- **the quality of the products you manufacture.**

Installations and equipment from other manufacturers must also be in optimum condition.

ENVIRONMENTAL PROTECTION

During work on the bit-holder head, make sure that

- **collector vessels are used, with sufficient capacity for the amount of liquid to be collected.**
- **liquids and oils are not spilt on the ground.**

Clean up any spilt liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current legal requirements on the environment.

Cleaning up spillages

Do not re-introduce liquids spilt outside the system during repair or as a result of leakage from the reserve tank: collect them in a collecting vessel to be disposed of.

Disposal

Never dump oil or other pollutant substances in water inlets, rivers or channels.

Used oils must be delivered to a collection centre. Consult your superior if you do not know where the collection centre is.

5.1 Safety

WARNING!

The consequences of incorrect maintenance and repair work may include:

- **Very serious injury to personnel working on the lathe**
- **Damage to the lathe**

Only qualified personnel should carry out maintenance and repair work on the lathe.

5.1.1 Preparation

WARNING!

Only carry out work on the lathe if it has been unplugged from the main power supply.

☞ “Disconnecting the lathe and making it safe“ on page 14

Attach a warning label.

5.1.2 Restarting

Before restarting run a safety check.

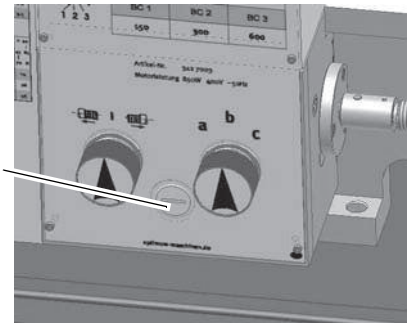
☞ “Safety check“ on page 12

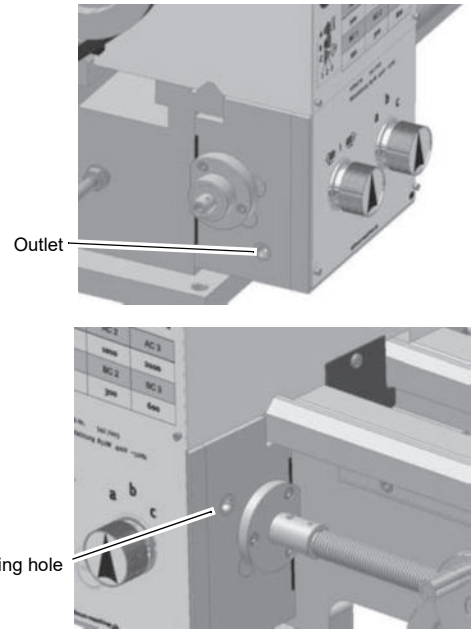
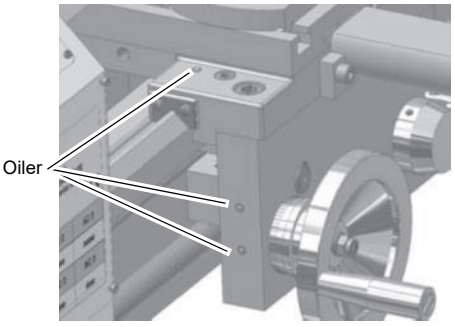
WARNING!

Before connecting the machine you must check that there is no danger for personnel and the lathe is undamaged.

5.2 Inspection and maintenance

The type and extent of wear depends to a large extent on individual usage and service conditions. For this reason, all the intervals are only valid for the authorized conditions.

Interval	Where?	What?	How?
Start of work after every maintenance and repair operation	Lathe	☞ “Safety check“ on page 12	
Start of work after every maintenance and repair operation	Lathe	Lubricate	➔ Lubricate all slideways. ➔ Lubricate the change gears and leadscew slightly with lithium-based grease.
Start of work after every maintenance and repair operation	Feed gear	Visual inspection	➔ Check the oil level in the gear's inspection glass. It must reach at least the centre of the inspection glass. ➔ If necessary, fill up to the reference mark with Mobilgear 627 or equivalent oil.  Illustr. 5-2: Oil inspection glass of the feed gear

Interval	Where?	What?	How?
First after 200 hours in service, then after every year	Feed gear	Oil change	➔ Use an adequate collector vessel with sufficient capacity for the oil change. ➔ Unscrew the bolt of the outlet. ➔ Unscrew the bolt of the charging hole. ➔ Close the outlet when no more oil is running off. ➔ Refill with Mobilgear 627 or an equivalent oil up to the reference mark in the centre of the inspection glass using a suitable funnel in the filling hole.  Illustr. 5-3: Gear openings
every month	Lathe **9684504** D240 x 500	Lubricate	➔ Lubricate all oilers with machine oil , do not use a grease gun or similar greasing equipment. Use the oil bottle in the delivery volume. ☞ “Operating material“ on page 16  Illustr. 5-4: Example, oiler on D280

Interval	Where?	What?	How?
All 100 and 500 operation hours	Jaw chuck	Cleaning and greasing	Approximately every 100 operation hours a cleaning of the jaw guidance is to be performed, depending on the operating conditions, a complete cleaning is to be performed about every 500 operating hours. ➔ Leave the jaw chuck on the machine. ➔ Clean the jaws (do not use compressed air) and then unscrew them. Thoroughly clean with kerosene or with benzine. ➔ Relubricate with Molykote TP 42. ➔ Make sure that the jaws are in the correct order. **WARNING!** **Unadequate lubricants may reduce the clamping force by more than 50%**

INFORMATION

The spindle bearings are permanently greased. Greasing during the maintenance intervals is not necessary. Further greasing of the spindle bearings is only necessary in case of de- and remounting of the spindle bearing.

5.3 Repair

Repairs must be carried out only by qualified technical staff; and must follow the instructions and guidelines given in this manual. Should technical assistance be required, contact CH Hanson at (800) 327-3398.

For repairs only use

- Proper and suitable tools,
- Parts purchased from Optimum, or its authorized agent.

6 Spare parts - 9684504

6.1 Compound slide

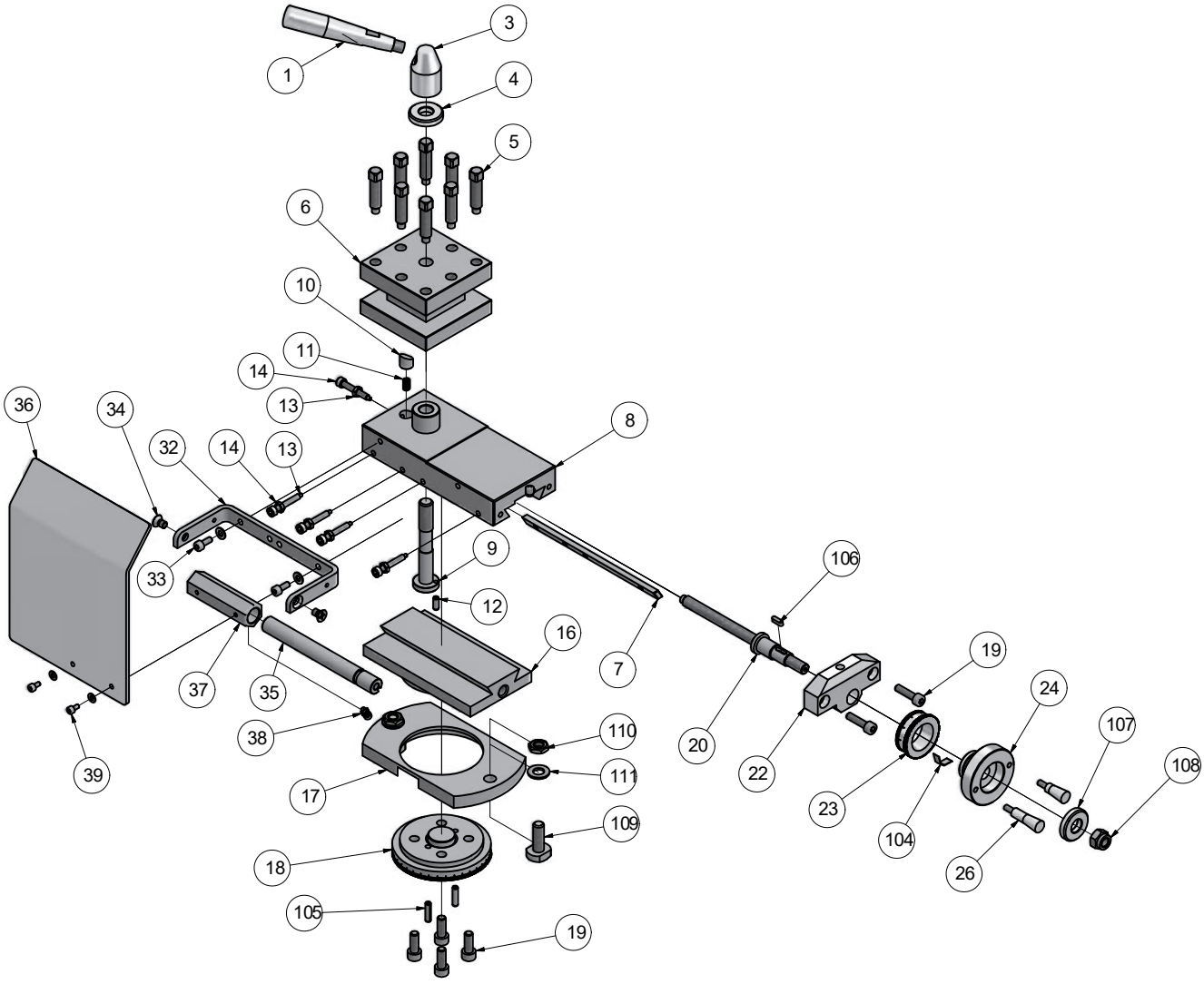


Fig. 6-1: Compound slide D240

6.2 Cross slide

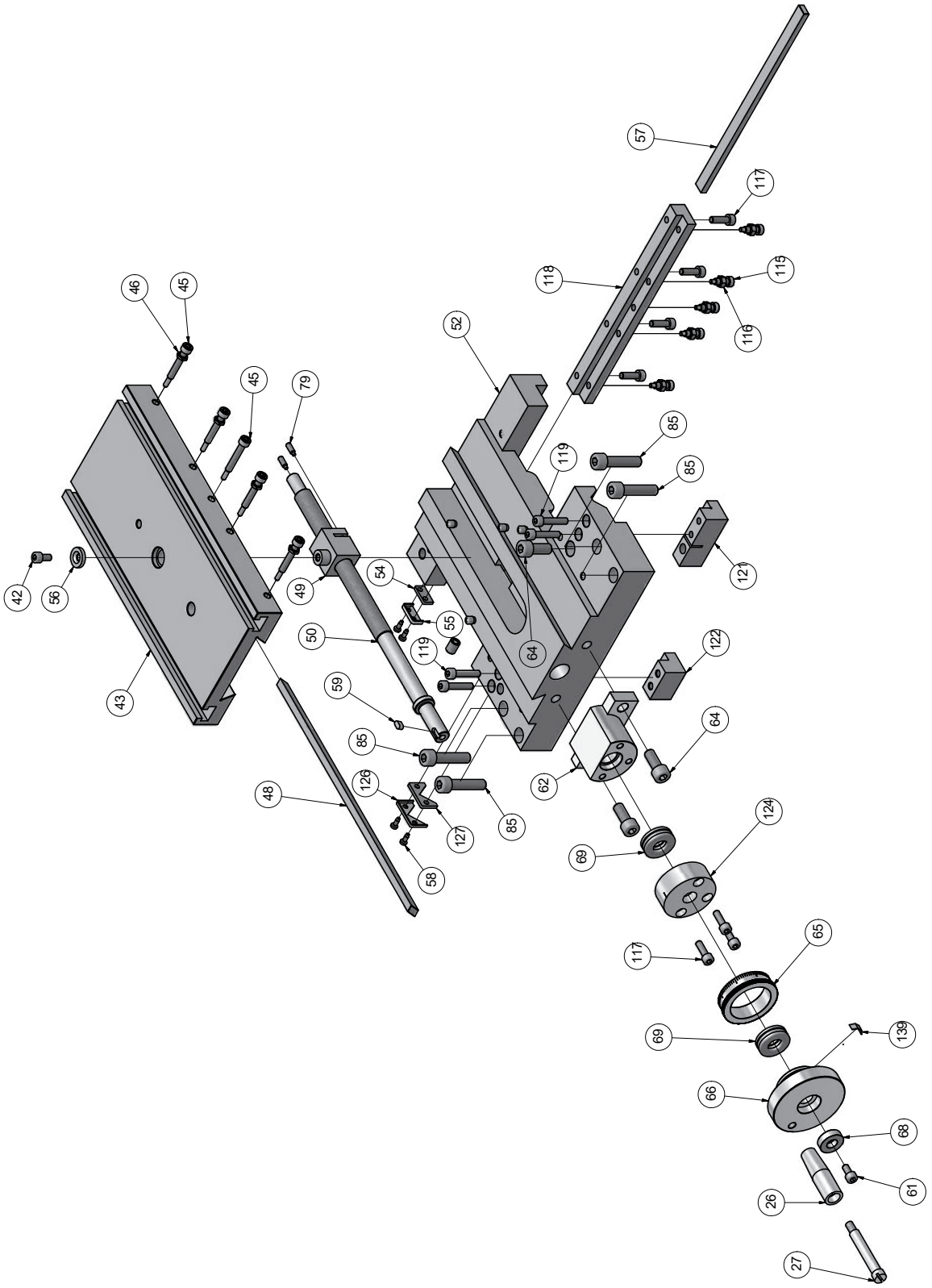
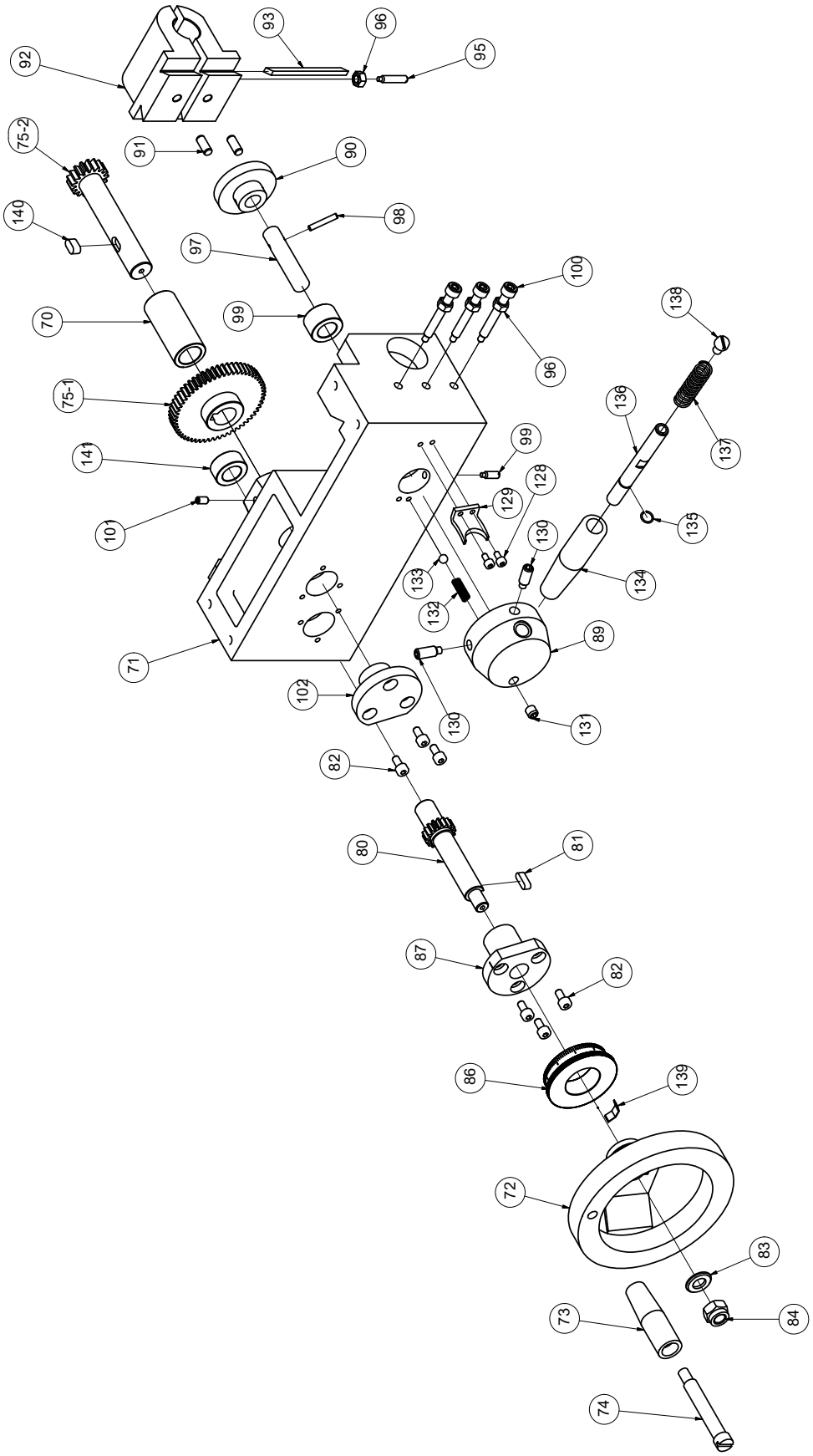


Fig.6-2: Cross slide D240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6.3 Bed slide

6.5 Tailstock 2

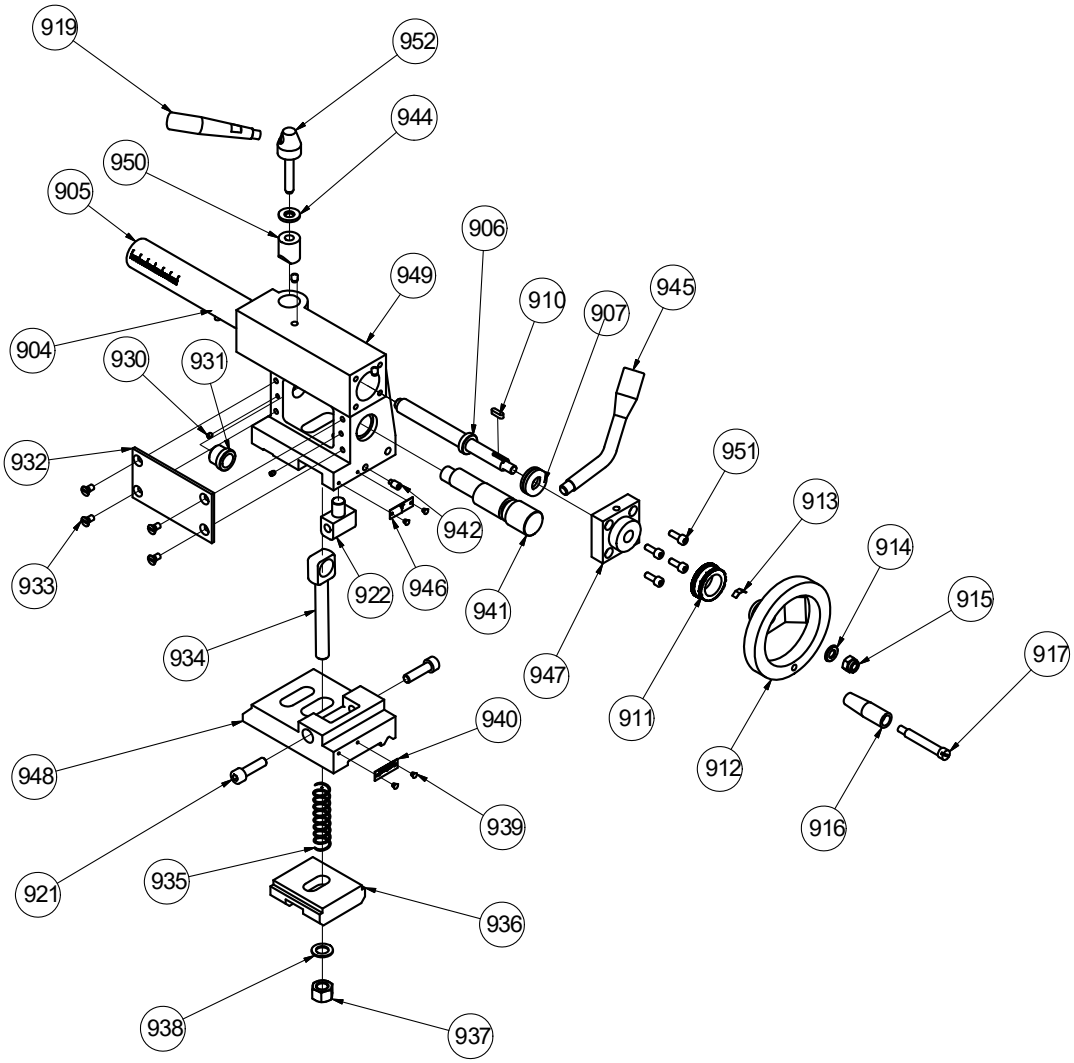

Fig.6-5: Tailstock D240

6.6 Machine bed

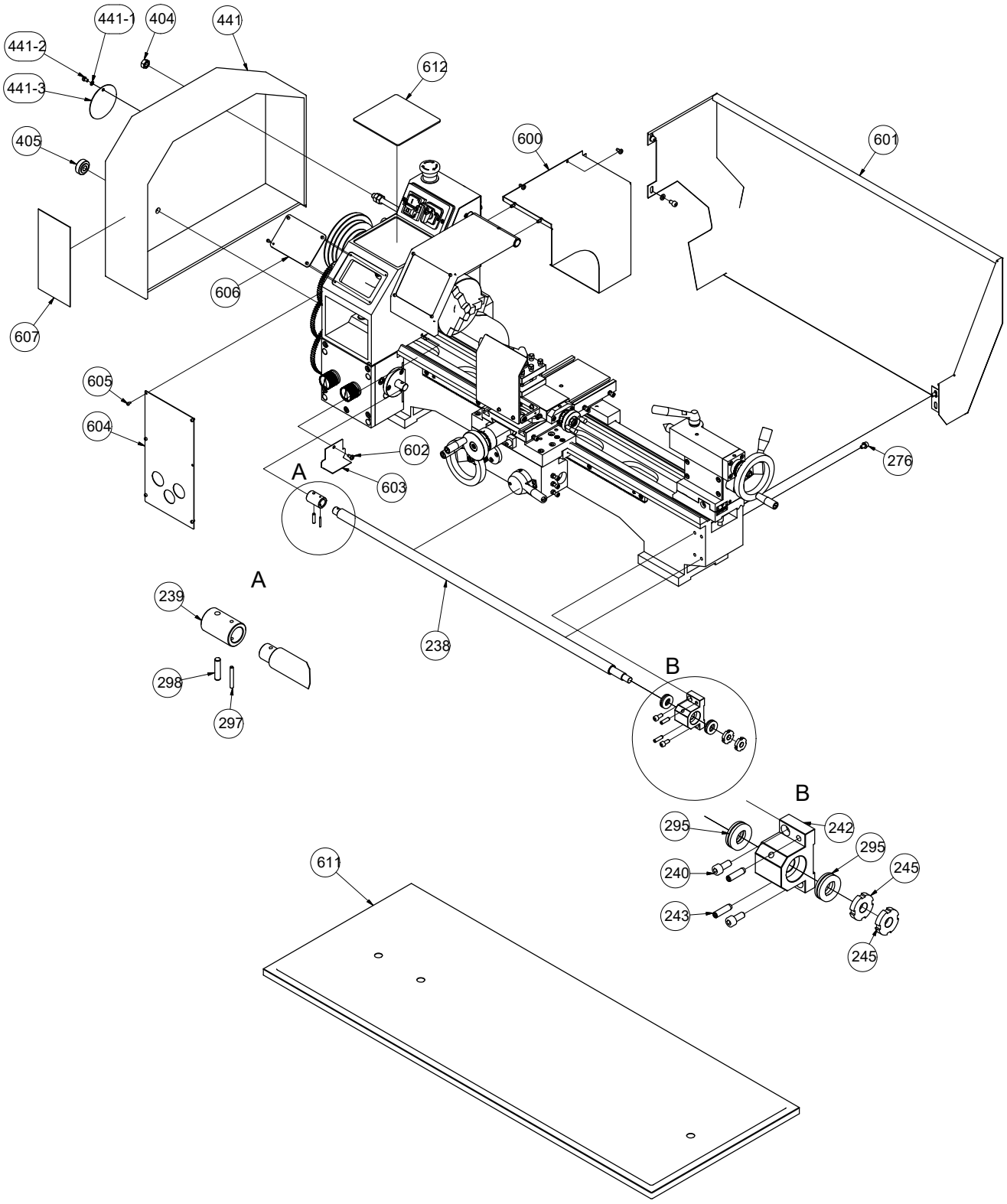

Fig. 6-6: Machine bed D240

6.7 Feed gear 1 of 2

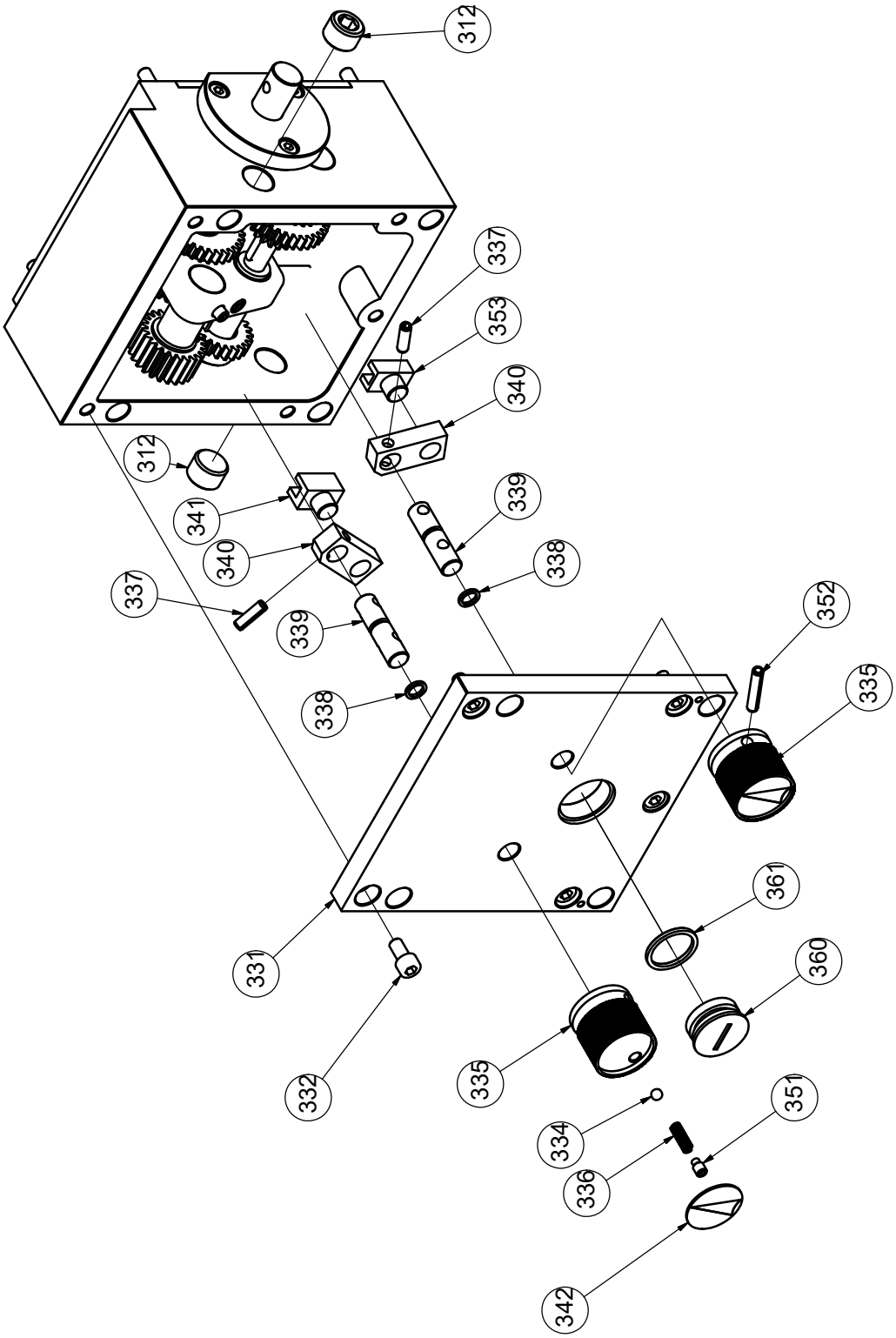

Fig.6-7: Feed gear D240 1 of 2

6.8 Feed gear 2 of 2

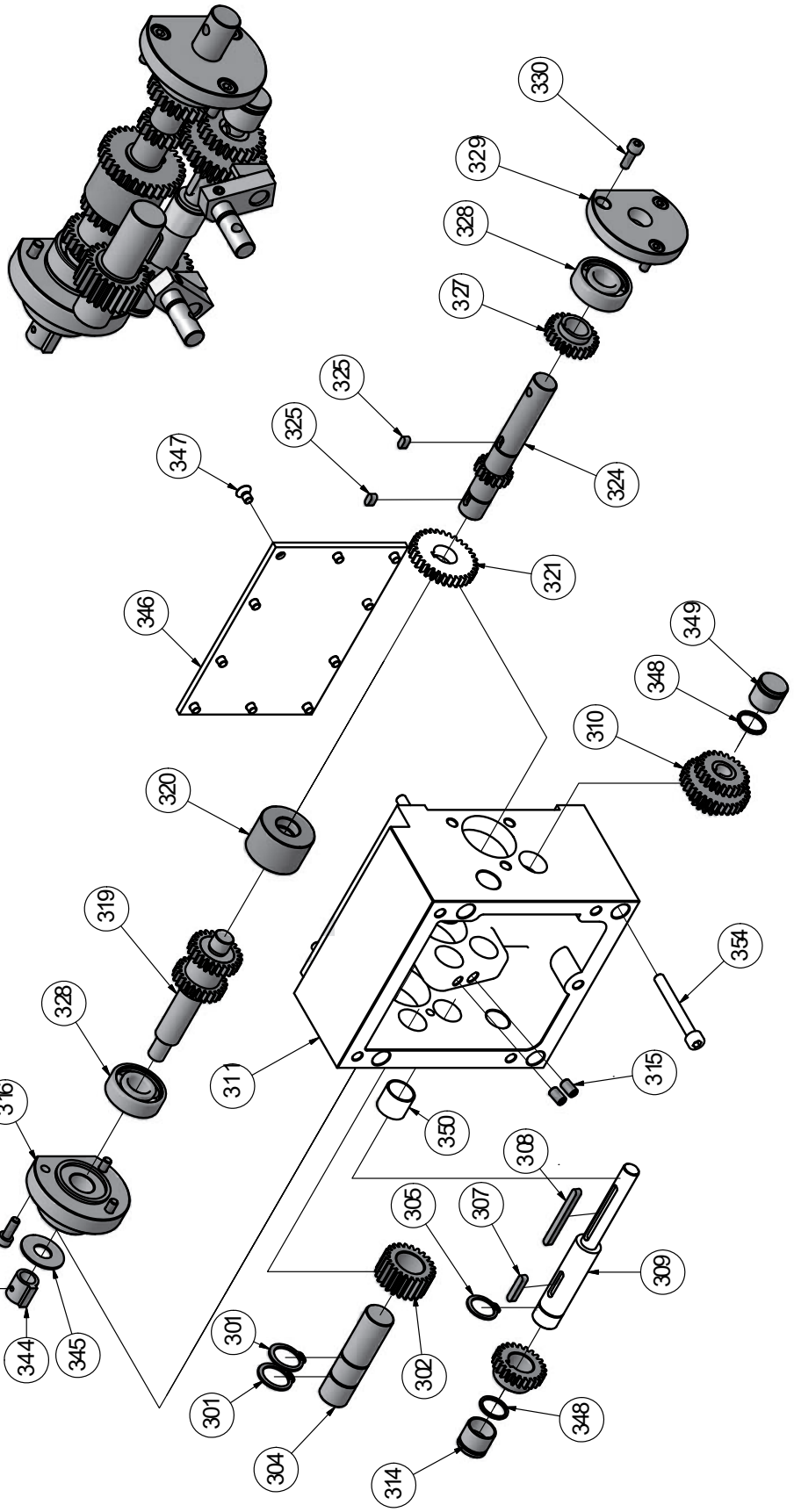

Fig.6-8: Feed gear D240 2 of 2

6.9 Headstock 1 of 2

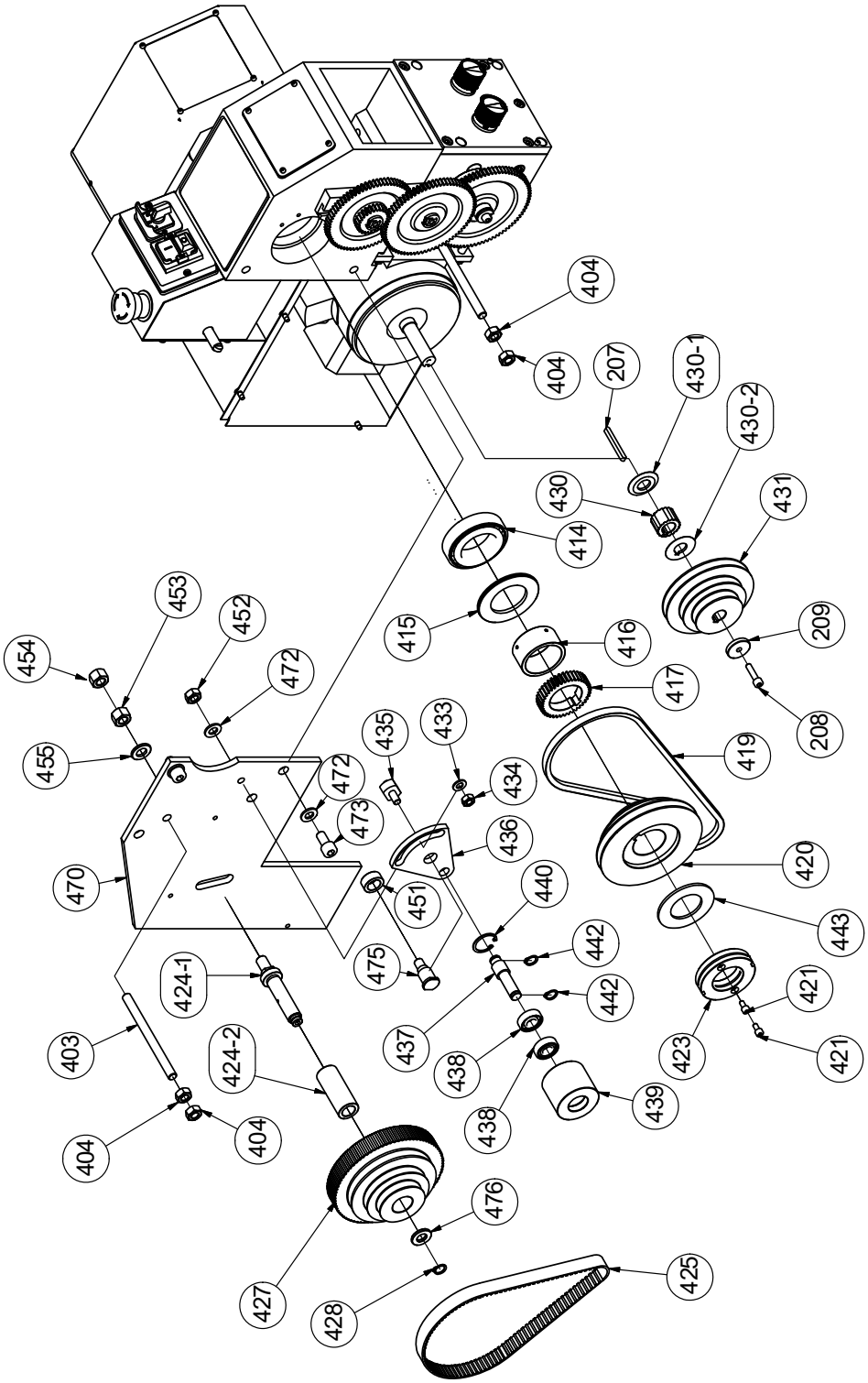

Fig. 6-9: Headstock D240 1 of 2

6.10 Headstock 2 of 2

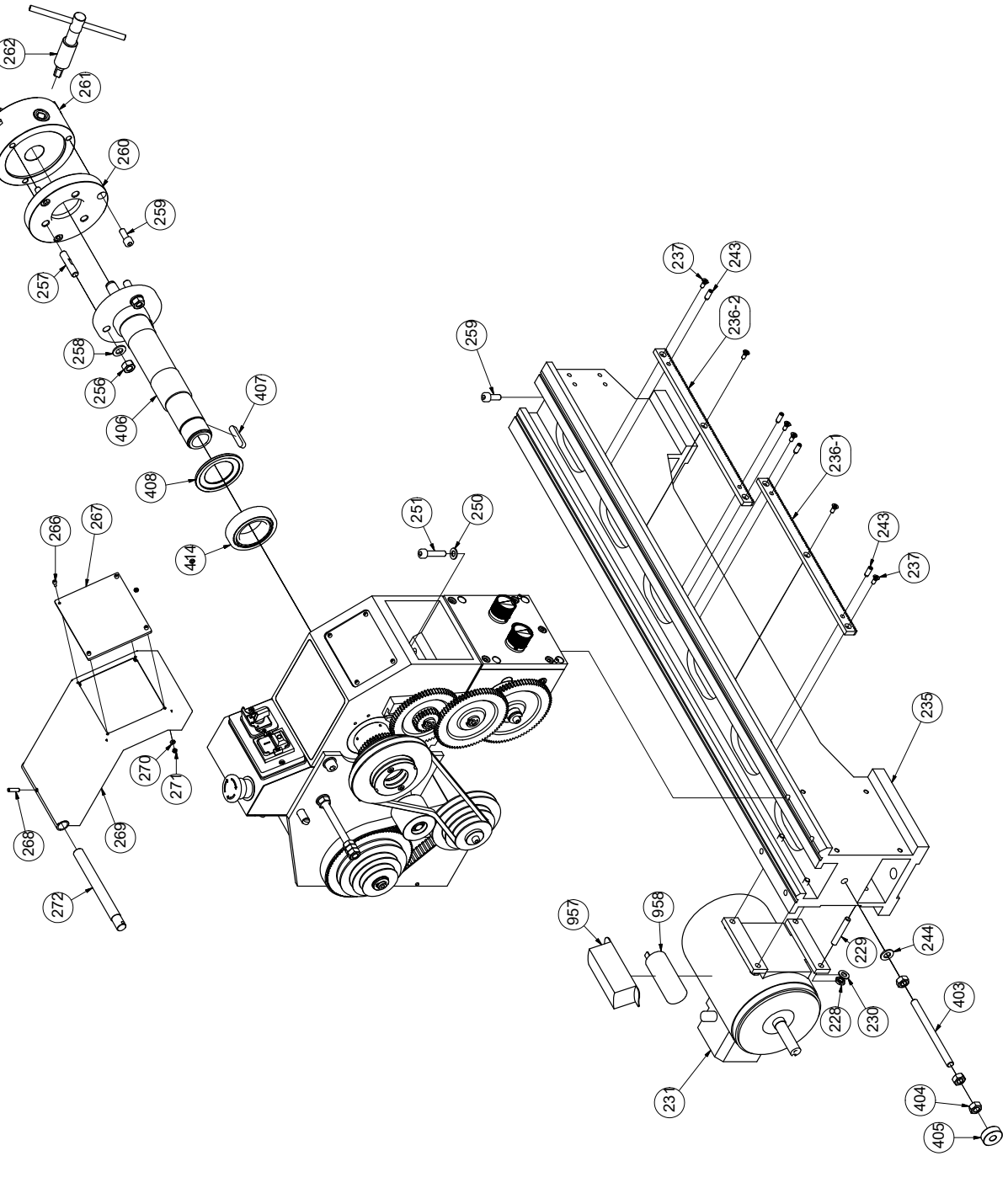

Fig.6-10: Headstock D240 2 of 2

6.11 Change gear

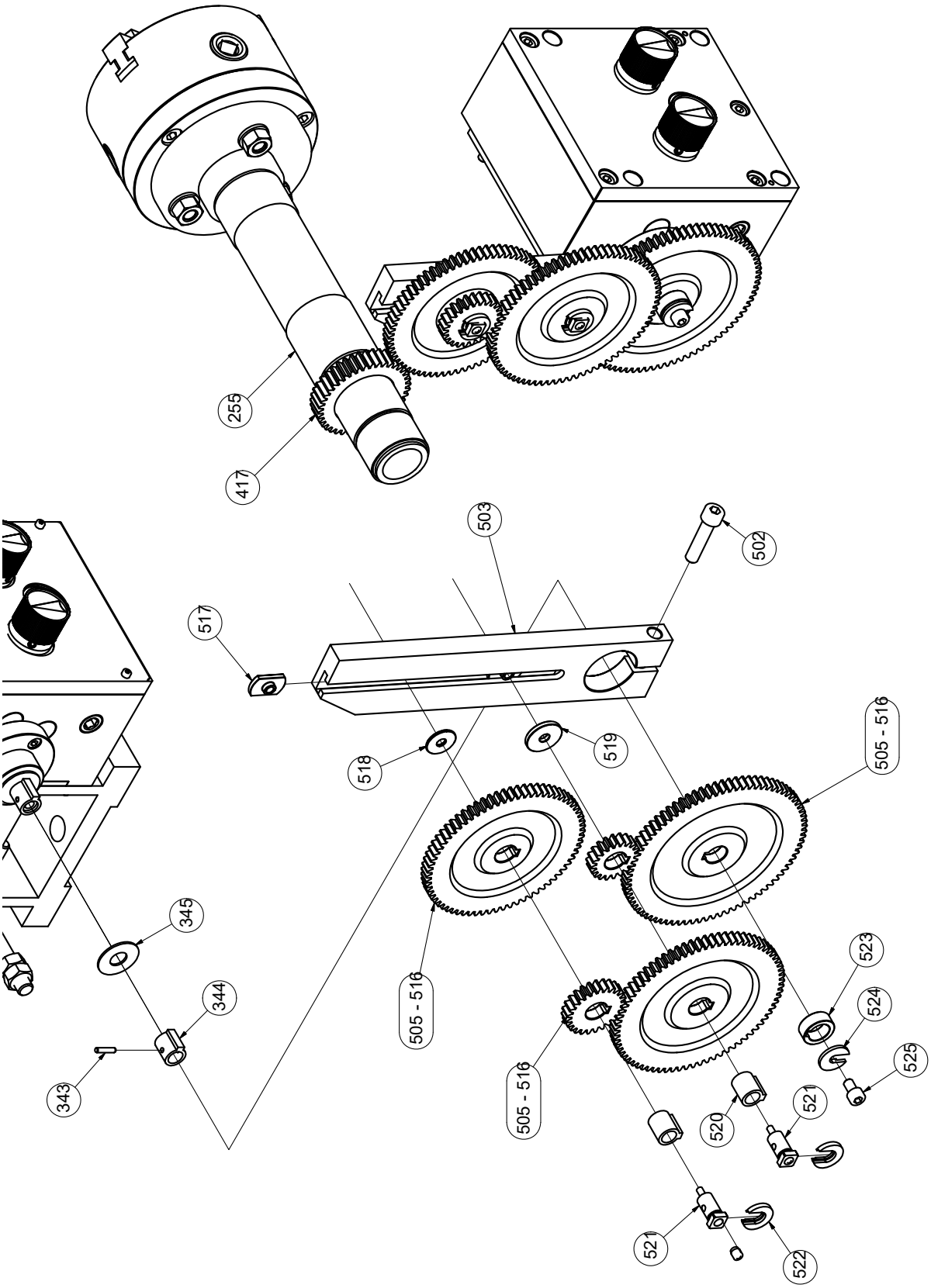

Fig.6-11: Change gear

6.12 Operating panel

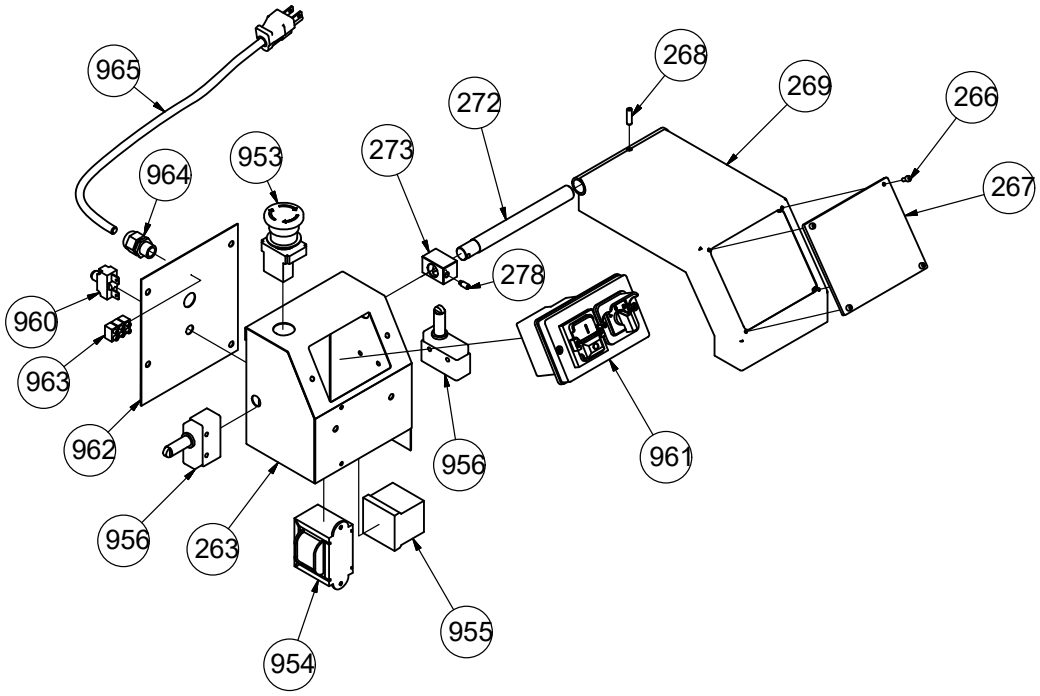

Fig. 6-12: switching elements USA

6.13 Spare parts list D240

D240				
Pos.	Description	Qty.	Size	Item no.
1	Handle locking lever	1		034250011
3	Clamping nut tool holder	1		034250013
4	Washer clamping nut	1		034250014
5	Clamping screw	8		034250015
6	Quadruple tool holder	1		034250016
7	Pressure border top slide	1		034250017
8	Top slide	1	with included inch thread	034250018-inch
9	Threaded rod quadruple tool holder	1		034250019
10	Fixing pin	1		0342500110
11	Spring	1		0342500111
12	Spring pin	1	ISO 8752 - 4x10 - A	
13	Nut	5	ISO 4032 - M4	
14	Socket head screw	5	GB 70-85 - M4 x 30	
16	Dove tail guidance top slide	1	inch	0342500116-inch
17	Clamping ring top slide	1		0342500117
18	Angle scales ring top slide	1		0342500118
19	Socket head screw	1	GB 70-85 - M6 x 16	
20	Spindle top slide	1	inch	0342500120-inch
22	Saddle spindle top slide	1		0342500122
23	Scales ring handwheel top slide	1	inch	0342500123-inch
24	Guide disk scales ring	1		0342500124
25	Lever handle	1		0342500125
26	Handle handwheel top slide	2		0342500126
26	Handle handwheel cross slide	1		0342500126
27	Fixing bolt for handle handwheel	1		0342500127
32	Holder	1		0342500132
33-1	Socket head screw	2	GB 70-85 - M4 x 10	
33-2	Washer	2	DIN 125-1 4 mm	
34	Countersunk screw	2	DIN EN ISO 7046-1 H M5 x 8	
35	Shaft	1		0342500135
36	Splinter shield	1		0342500136
37	Hexagonal case	1		0342500137
38-1	Socket head screw	2	GB 70-85 - M3 x 8	
38-2	Nut	1	ISO 4035 M3	
39-1	Socket head screw	2	GB 70-85 - M3 x 8	
39-2	Washer	2	DIN 125-1 3 mm	
40	Oiler	11	6 mm	0342500140
42	Socket head screw	2	GB 70-85 - M5 x 10	
43	Cross slide	1		0342500143
44		2	ISO 8752 - 5 x 26	
45	Set screw	5	M5x40	0342500145
46	Hexagon nut	4	ISO 4035 - M5	
48	Pressure border cross slide	1		0342500148
49	Spindle nut	1	inch	0342500149-inch
50	Spindle cross slide	1	inch	0342500150-inch
52	Dove tail guidance cross slide	1		0342500152
54	Cleaner	1		0342500154
55	Holder for cleaner	1		0342500155
56	Washer	1		0342500156
57	Pressure border bed slide	1		0342500157
58	Cross slot flat head thread cut screw	4	GB 6560-86 - M3x8	
59	Key	1		0342500159
61	Socket head screw	1	GB 70-85 - M5 x 10	
62	Saddle spindle cross slide	1		0342500162
64	Socket head screw	3	GB 70-85 - M8 x 20	
65	Scales ring cross slide	1	inch	0342500165-inch
66	Handwheel cross slide	1		0342500166
67	Oiler	1	10 mm	0342500167
68	Socket	1		0342500168
69	Axially grooved ball bearing	2	51101	0342500169
70	Case	1		0342500170
71	Appron	1		0342500171
72	Handwheel bed slide	1		0342500172
73	Handle handwheel bed slide	1		0342500173
74	Fixing bolt handle handwheel	1		0342500174

D240				
Pos.	Description	Qty.	Size	Item no.
75-1	Toothed wheel	1		03425001751
75-2	Toothed shaft	1		03425001752
79	Threaded pin with tap	2	ISO 7435 - M4 x 12	
80	Toothed shaft	1		0342500180
81	Key	1	DIN 6885 - A 4 x 4 x 12	
82	Socket head screw	6	GB 70-85 - M4 x 8	
83	Washer	1	ISO 7090 - 8 - 140 HV	
84	Hexagon nut	1	DIN 6924 - M8	
85	Socket head screw	4	GB 70-85 - M8 x 35	
86	Scales ring handwheel bed slide	1	inch	0342500186-inch
87	Flange	1		0342500187
89	Disc for lever longitutional feed	1		0342500189
90	Movement disk	1		0342500190
91	Cylindrical pin	2	ISO 2338 - 5 h8 x 12	
92	Lock nut	1		0342500192
93	Pressure border lock nut	1		0342500193
95	Threaded pin with tap	1	ISO 7435 - M4 x 20	
96	Hexagon nut	4	ISO 4032 - M5	
97	Shaft movement disk	1		0342500197
98	Cylindrical pin	1	ISO 2338 - 3 h8 x 18	
99	Threaded pin with tap	1	ISO 7435 - M4 x 12	
99	Socket	1		0342500199
100	Set screw	3	M5 x 40	03425001100
101	Threaded pin	1	ISO 4027 - M4 x 8	
102	Flange	1		03425001102
104	Spring piece	1		03425001104
105	Spring pin	2	ISO 8752 - 4 x 16 - A	
106	Key	2	DIN 6885 - A 3 x 3 x 10	
107	Washer	1		03425001107
108	Hexagon nut	1	DIN 6924 - M8	
109	Slot screw	2		03425001109
110	Hexagon nut	2	ISO 4035 - M8	
111	Washer	2	DIN 125-1 - B 8.4	
115	Set screw	5	M5x15	03425001115
116	Hexagon nut	5	ISO 4032 - M5	
117	Socket head screw	7	GB 70-85 - M5 x 16	
118	Guide rail bed slide	1		03425001118
119	Socket head screw	4	GB 70-85 - M5 x 25	
121	Bed slide guidance + clamping part	1		03425001121
122	Bed slide guidance	1		03425001122
124	Bushing	1		03425001124
125	Socket head screw	2	GB 70-85 - M8 x 30	
126	Holder for cleaner	1		03425001126
127	Cleaner	1		03425001127
128	Socket head screw	2	GB 70-85 - M3 x 6	
129	Rest sheet metal engaging lever feed motion	1		03425001129
130	Threaded pin	2	ISO 4028 - M6 x 16	
131	Threaded pin	1	ISO 4026 - M6 x 6	
132	Spring rotary switch	1		03425001132
133	Steel ball	1	5 mm	03425001133
134	Handle engaging lever	1		03425001134
135	Circlip	1	DIN 7993 - A 7	
136	Shaft engaging lever	1		03425001136
137	Spring	1		03425001137
138	Cheese head screw with slot	1	ISO 1207 - M5 x 8	
139	Spring plate	1		03425001139
140	Key	1	DIN 6885 - A 5 x 5 x 10	
141	Socket	1		03425001141
207	Key	1	DIN 6885 - A 5 x 5 x 50	
208	Socket head screw	1	GB 70-85 - M6 x 25	
209	Fixing disc	1		03425001209
228	Hexagon nut	4	ISO 4035 - M8	
229	Threaded pin	4	DIN 835 - M8 x 35	
230	Washer	4	DIN 125-2 - B 8.4	
231-1	Motor	1	115V ~ 60Hz	03420321101M-60Hz
231-2	Motor	1	230V ~ 50Hz	03420321101M

D240				
Pos.	Description	Qty.	Size	Item no.
235	Machine bed	1		03425001235
236-1	Rack left section	1		034250012361
236-2	Rack right section	1		034250012362
237	Countersunk screw	6	ISO 7046-1 - M5 x 12 - 4.8	
238	Lead screw	1	inch	03425001238-inch
239	Connecting piece	1		03425001239
240	Socket head screw	2	GB 70-85 - M6 x 14	
242	Saddle	1		03425001242
243	Cylindrical pin	6	GB 120-86 - 6 x 16	
244	Washer	2	DIN 125 - A 10.5	
245	Groove nut	2	DIN 1804 - M12	
250	Washer	4	DIN 125 - A 8.4	
251	Socket head screw	4	GB 70-85 - M8 x 35	
256	Hexagon nut	3	GB 6170-86 - M10	
257	Pin jaw chuck flange	3		03425001257
258	Washer	3	GB 95-85 - 10	
259	Socket head screw	4	GB 70-85 - M8 x 20	
260	Jaw chuck flange	1		03425001260
261	3 - jaw chuck	1	125 mm	03425001261
262	Key for 3 - jaw chuck	1	10 mm	03425001262
263	Switch housing	1		03425001263-US
265	Cheese head screw	2	ISO 7045 - M4 x 16 - 4.8 - H	
266	Socket head screw	4	GB 70-85 M3 x 8	
267	Sight jaw ckuck protection	1		03425001267
268	Spring pin	1	GB 879-86 5 x 18	
269	Frame jaw ckuck protection	1		03425001269
270	Washer	4	DIN 125-1 A 3.2	
271	Nut	4	DIN EN 24 032 M3	
272	Shaft jaw ckuck protection	1		03425001272
273	Fixing part jaw ckuck protection	1		03425001273
274	Position switch	2	LXW5	03425001274
275	Washer	2	DIN 125 - A 6.4	
276	Socket head screw	6	GB 70-85 - M6 x 10	
277	Strain relief connection cable	1	PG 19	03425001277
278	Threaded pin	1	DIN 915 M5 x 12	
279	Cover switch housing	1		03425001279
295	Deep groove ball thrust bearing, on one side working	2	51102	03425001295
297	Brass shear pin	1		03425001297
298	Cylindrical pin	1	ISO 2338 - 5 m6 x 22	
301	Circlip	2	DIN 471 - 18 x 1.2	
302	Gear wheel	1	24 Z m1.25 15 mm	03425001302
304	Shaft	1		03425001304
305	Circlip	1	DIN 471 - 16 x 1	
306	Gear wheel	1	24 Z m1.25 6 mm	03425001306
307	Key	1	DIN 6885 - A 4 x 4 x 20	
308	Key	1	DIN 6885 - A 4 x 4 x 45	
309	Shaft	1		03425001309
310	Gear wheel combination	1		03425001310
311	Housing feed gear	1		03425001311
312	Oil plug	2		03425001312
314	Socket	1		03425001312
315	Allan screw with point	2	GB 78-85 - M6 x 10	
316	Flange	1		03425001316
319	Entrance shaft	1		03425001319
320	Sliding bearing	1		03425001320
321	Gear wheel	1	32 Z m1.25 6 mm	03425001321
324	toothed shaft	1	16Z m1.25	03425001324
325	Key	2	DIN 6885 - A 4 x 4 x 8	
326	Circlip	2	DIN 471 - 15 x 1	03425001326
327	Gear wheel	1	24 Z m1.25 6 mm	03425001327
328	Grooved ball bearing	2	6202	03425001328
329	Flange	1		03425001329
330	Socket head screw	6	GB 70-85 - M5 x 14	
331	Cover feed gear	1		03425001331
332	Socket head screw	5	GB 70-85 - M6 x 12	
334	Steel ball	2	5 mm	03425001334

D240				
Pos.	Description	Qty.	Size	Item no.
335	Rotary switch	2		03425001335
336	Spring	2		03425001336
337	Spring pin	2	ISO 8752 - 5 x 16	
338	O-ring	2	DIN 3771 - 7.1 x 1.8 - N - NBR 70	
339	Shaft rotary switch	2		03425001339
340	Adjusting lever	2		03425001340
341	Transmission fork	1		03425001341
342	Marking rotary switch	2		03425001342
343	Cylindrical pin	1	ISO 2338 - 3 h8 x 14	
344	Case	1		03425001344
345	Washer	1		03425001345
346	Backwall cover	1		03425001346
347	Countersunk screw	10	GB 819-85 - M5x8	
348	O-ring	2	DIN 3771 - 15 x 1.8 - N - NBR 70	
349	Socket right	1		03425001349
350	Sliding bearing intermediate shaft	1		03425001350
351	Threaded pin	2	DIN 915 - M5 x 8	
353	Transmission fork	1		03425001353
354	Socket head screw	4	GB 70-85 - M6 x 50	
360	Oil sight glass	1	25 mm	03425001360
361	O-ring	1	DIN 3771 - 20 x 2.65 - N - NBR 70	
403	Threaded pin	2	GB 897-88 - A M10x120	
404	Hexagon nut	7	ISO 4032 - M10	
405	Nut protection cover	1		03425001405
406	Spindle	1		03425001406
407	Key	1	DIN 6885 - A 8 x 7 x 40	
408	Bearing cover in front	1		03425001408
414	Taper roller bearing	2	32009	03425001414
415	Bearing cover in in the back	1		03425001415
416	Spacer	1		03425001416
417	Toothed wheel	1	40 Z, m1,5	03425001417
419	V - belt	1	10 x 750 Li	0391290
420	Spindle V-belt pulley	1		03425001420
421	Socket head screw	4	GB 70-85 - M5 x 10	
423	Shaft nut	1		42303425001
424-1	Shaft	1		034250014241
424-2	Case	1		034250014242
425	Toothed belt	1	230XL 070	0395350
427	Toothed belt disk	1		03425001427
428	Circlip	1	DIN 471 - 12 x 1	
430	Toothed belt disk	1		03425001430
430-2	Flanged washer in front	1		034250014302
430-1	Flanged washer in the back	1		034250014301
431	Motor V-belt pulley	1		03425001431
433	Washer	1	DIN 125 - A 8.4	
434	Hexagon nut	1	ISO 4032 - M8	
435	Clamping piece	1		03425001435
436	Eccentric disk idler	1		03425001436
437	Shaft for idler	1		03425001437
438	Grooved ball bearing	1	6001	03425001438
439	Idler	1		03425001439
440	Circlip	1	DIN 472 - 28 x 1.2	
441	Protection cover headstock	1		03425001441
441-1	Washer	1	DIN 125 - A 5.3	
441-2	Cheese head screw with slot	1	ISO 1207 M 5 x 8	
441-3	Drop cover	1		034250014413
442	Circlip	2	DIN 471 - 12 x 1	
451	Case	1		03425001451
452	Hexagon nut	1	ISO 4032 - M10	
453	Hexagon nut	1	ISO 4032 - M12	
454	Hexagon nut	1	ISO 4035 - M12	
455	Washer	1	DIN 125 - A 13	
470	Baseplate	1		03425001470
472	Washer	3	DIN 125 - A 10.5	
473	Socket head screw	2	GB 70-85 - M10 x 20	
475	Bolt	1		03425001475
476	Disk for toothed belt disk	1		03425001476

D240				
Pos.	Description	Qty.	Size	Item no.
502	Socket head screw	1	DIN 912 M8 x 35	
503	Change gear train	1		03425001503
504	Saddle change gear train	1		03425001504
505	Socket head screw	3	DIN 912 M5 x 10	
506 - 516	Change gear	2	80 T Module 1.5	03425001-80 T Module 1.5
	Change gear	1	72 T Module 1.5	03425001-72 T Module 1.5
	Change gear	1	71 T Module 1.5	03425001-71 T Module 1.5
	Change gear	1	70 T Module 1.5	03425001-70 T Module 1.5
	Change gear	1	60 T Module 1.5	03425001-60 T Module 1.5
	Change gear	1	50 T Module 1.5	03425001-50 T Module 1.5
	Change gear	1	40 T Module 1.5	03425001-40 T Module 1.5
	Change gear	1	33 T Module 1.5	03425001-33 T Module 1.5
	Change gear	1	30 T Module 1.5	03425001-30 T Module 1.5
	Change gear	1	27 T Module 1.5	03425001-27 T Module 1.5
	Change gear	1	25 T Module 1.5	03425001-25 T Module 1.5
	Change gear	1	24 T Module 1.5	03425001-24 T Module 1.5
	Change gear	1	20 T Module 1.5	03425001-20 T Module 1.5
517	Groove stone change gear	2	M5	03425001517
518	Shim	1	1,5 mm	03425001518
519	Shim	1	3 mm	03425001519
520	Connecting case of change gears	2		03425001520
521	Clamping screw change gear	2		03425001521
522	Attachment ring	1		03425001522
523	Case change gear	1		03425001523
524	Washer	1		03425001524
525	Socket head screw	1	DIN 912 M6 x 10	
600	Motor cover	1		03425001600
601	Splash wall	1	D240	03425001601
602	Cross slot flat head thread cut screws	6	GB 6560-86 - M5x10	
603	Cover plate	1		03425001603
604	Screen + number of revolutions table	1		03425001604-US
605	Socket head screw	10	GB 70-85 - M3 x 5	
606	Cover plate + identification plate	1		03425001606-US
607	Thread cutting table	1		03425001607
607	Thread cutting table D240			03425006607-US
611	Chip pan	1		03425001611
612	Rubber	1		03425001612
615	Switch box for Vario type	1		03425001615
901	Tailstock top part	1		03425001901
902	Clamping piece spindle sleeve down	1		03425001902
903	Clamping piece spindle sleeve top	1		03425001903
904	Piece of centering of spindle sleeve	1		03425001904
905	Spindle sleeve	1	inch	03425001905-inch
906	Spindle	1	inch	03425001906-inch
907	Axially grooved ball bearing	1	51101	03425001907
908	Saddle	1		03425001908
909	Socket head screw	1		03425001909
910	Key	1	DIN 6885 - A 4 x 4 x 14	
911	Scales ring	1	inch	03425001911-inch
912	Hand wheel	1		03425001912
913	Spring plate	1		03425001913
914	Washer	1	ISO 7090 - 8 - 140 HV	
915	Hexagon nut	1	DIN 6924 - M8	
916	Case for handle	1		03425001916
917	Fixing bolt for case	1		03425001917
918	Head clamping lever	1		03425001918
919	Clamping lever	1		03425001919
920	Base plate	1		03425001920
921	Socket head screw	2	GB 70-85 - M8 x 30	
922	Piece of centering of spindle sleeve	1		03425001922
923	Clamping screw	1	M6x15	03425001923
924	Nut	1	M6	03425001924
925	Washer	1	D = 6	03425001925
926	Socket head screw	1	GB 70-85 - M6 x 40	
930	Threaded pin	1	ISO 4028 - M4 x 5	
931	Guide bush	1		03425001931
932	Cover	1		03425001932

D240				
Pos.	Description	Qty.	Size	Item no.
933	Countersunk screw	4	ISO 2009 - M5 x 10	
934	Tightening screw	1		03425001934
935	Spring	1		03425001935
936	Clamping plate	1		03425001936
937	Hexagon nut	1	ISO 4035 - M12	
938	Washer	1		03425001938
939	Rivet	4		03425001939
940	Scale	1		03425001940
941	Eccentric cam	1		03425001941
942	Threaded pin	1	ISO 4028 - M6 x 12	
944	Washer	1		03425001944
945	Clamping lever	1		03425001945
946	Scale	1		03425001946
947	Saddle	1		03425001947
948	Base plate tailstock	1		03425001948
949	Tailstock upper section	1		03425001949
950	Clamping part collar	1		03425001950
951	Socket head screw	4	GB 70-85 - M5 x 14	
952	Head clamping lever	1		03425001952
953	Emergency stop button	1		03425001953
954	Transformer	1	115V / 24V ~ 60Hz	03425001954-115V
955	Magnetic contactor	1		0460025
956	Limit switch	1		0342500121274
957-1	Cover capacitor	1		03425001957
957-2	Cover capacitor	1		034250019581
958-1	Capacitor (230V)	1	25µF	03425001959
958-2	Capacitor (230V)	1	150µF	034250019601
958-3	Capacitor (115V)	1	65µF	034250019583-115V
958-4	Capacitor (115V)	1	400µF	034250019584-115V
960	Circuit breaker	1	20A long delay	03420322748-20A-T
961	Combination switch assembly	1	115V	0342151-115V
962	Cover plate	1		03425001962
963	Terminal block	1		03425001963
964	Strain Relief	1		03425001964
965	Line cable 115V	1	SJT14AWG	03425001965

8 Wiring diagrams

8.1 D240x500

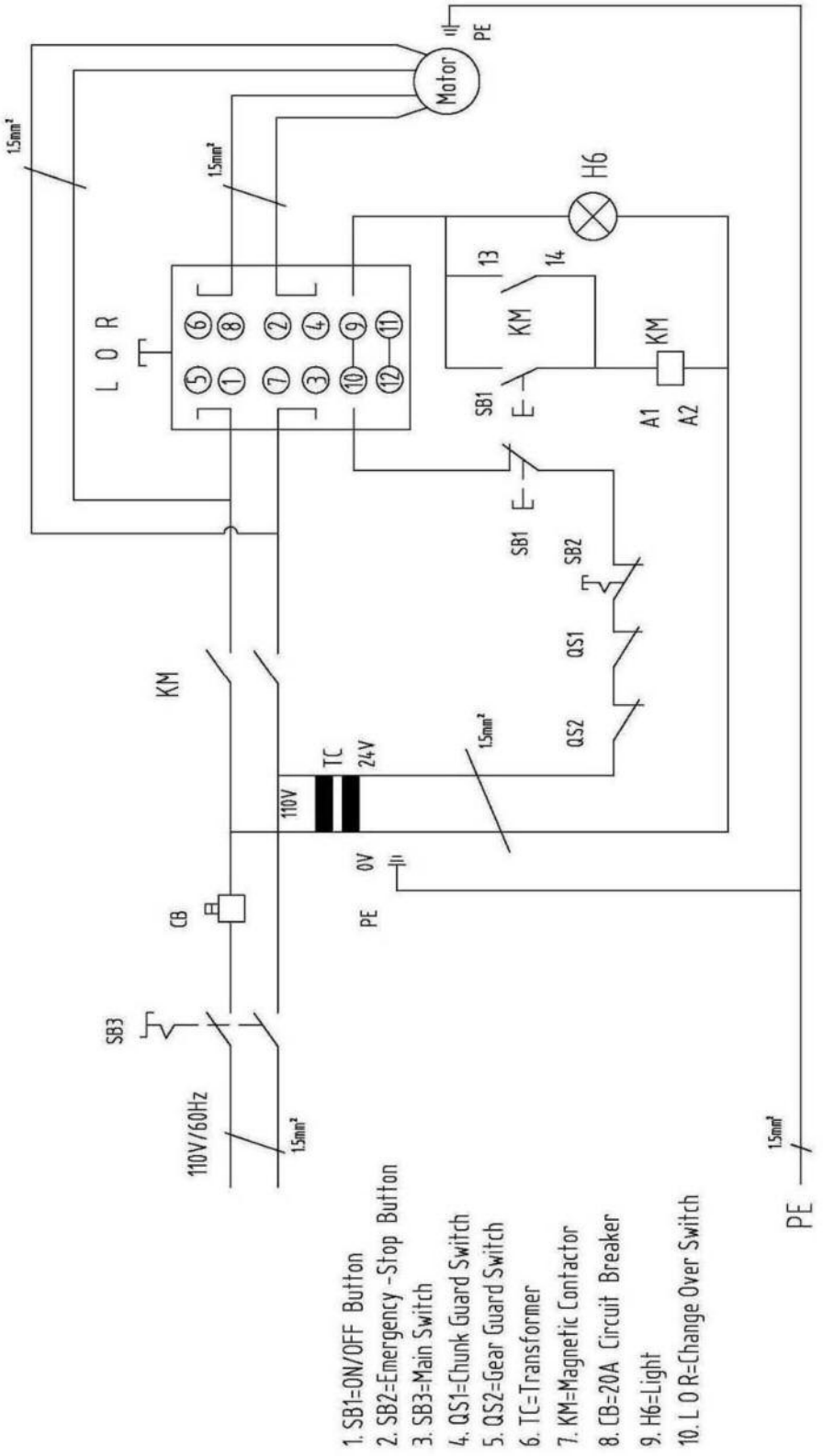

Fig. 8-1: Wiring diagram-D240x500

9 Troubleshooting

9.1 Troubleshooting in the lathe

Problem	Cause / possible effects	Solution
Machine does not switch-on	• Precedence of switch-on not considered. • The position switch of the lathe-chuck guard switches the lathe off. • The position switch of the protective cover on the headstock switches the lathe off. • EMERGENCY-STOP button actuated. • Circuit breaker on the back of the control box tripped.	• ☞ “Power supply“ on page 25 • Check and adjust the position switch of the lathe chuck guard. • Check and adjust the position switch of the protective cover on the headstock. • Release the EMERGENCY-STOP button. • Reset circuit breaker.
Surface of workpiece too rough	• Tool blunt • Tool springs • Feed too high • Radius at the tool tip to little	• Resharpen tool • Clamp tool with less overhang • Reduce feed • Increase radius
Workpiece is becoming coned	• Center 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 • Main bearings have clearance	• Reduce feed • Have the main bearing readjusted
Centre runs hot	• Workpiece has expanded	• Loosen tailstock tip
Tool has a short edge life	• Cutting speed too high • Crossfeed too high • Insufficient cooling	• Reduce cutting speed • Lower crossfeed/smooth finish (allowance not over 0.5 mm) • More coolant
Flank wear too high	• Clearance angle too small (tool "pushes") • Tool tip not adjusted to centre height	• 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 clearance in the spindle bearing arrangement (vibrations)	• Increase wedge angle • Cool uniformly • Have the clearance in the spindle bearing arrangement readjusted
Cut thread is wrong	• Tool is clamped incorrectly or has been started grinding the wrong way • Wrong pitch • Wrong diameter	• Adjust tool to the centre - Grind angle correctly • Adjust the right pitch • In a previous step, turn the workpiece to the correct diameter

10 Appendix

10.1 Copyright

10.2 Terminology/glossary

Term	Explanation
headstock	Housing for spindle driving mechanism.
lead screw nut	Split nut which engages in the lead screw.
lathe chuck	Clamping tool for holding the workpiece.
drill chuck	Device for holding the bit
lathe saddle	Slide on the slideway of the machine bed which feeds parallel to the tool axis.
cross slide	Slide on the lathe saddle which moves transversely to the tool axis.
top slide	Swivelling slide on the cross slide.
taper arbor	Taper of the bit, the drill chuck, the center.
tool	Cutting tool, bit, etc.
workpiece	Piece to be turned or machined.
tailstock	Movable turning aid.
rest	Follow or steady support for turning long workpieces.
lathe dog	Device or clamping aid for driving pieces to be turned between centers.

PALMGREN WARRANTY

C.H. Hanson / Palmgren warrants their products to be free of defects in material or workmanship. This warranty does not cover defects due directly or indirectly to misuse, abuse, normal wear and tear, failure to properly maintain the product, heated, ground or otherwise altered, or used for a purpose other than that for which it was intended.

The warranty does not cover expendable and/or wear part (i.e. v-belts, screws, abrasives, jaws), damage to tools arising from alteration, abuse or use other than their intended purpose, packing and freight. The duration of this warranty is expressly limited to the terms noted below beginning from the date of delivery to the original user.

The Palmgren branded items carry the following warranties on parts:

All vises, clamps, positioning tables, tombstones, jack screws and vise accessories - LIFETIME.

All bench grinders, drill presses, tapping machines, band saws, lathes, milling machines, arbor presses, abrasive finishing machines and work stands - 3 YEARS.

The obligation of C.H. Hanson / Palmgren is limited solely to the repair or replacement, at our option, at its factory or authorized repair agent of any part that should prove inoperable. Purchaser must lubricate and maintain the product under normal operating conditions at all times. Prior to operation become familiar with product and the included materials, i.e. warnings, cautions and manuals.

Failure to follow these instructions will void the warranty.

This warranty is the purchaser's exclusive remedy against C. H. Hanson for any inoperable parts in its product. Under no circumstances is C. H. Hanson liable for any direct, indirect, incidental , special or consequential damages including loss of profits in any way related to the use or inability to use our products. This warranty gives you specific legal rights which may vary from state to state.