



DB10VS Lathe

Instruction Manual



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Table of contents

1 Safety

- 1.1 Safety warnings (warning notes)
 - 1.1.1 Classification of hazards
 - 1.1.2 Other pictograms
- 1.2 Proper use
- 1.3 Possible dangers caused by the machine
- 1.4 Qualification of personnel
 - 1.4.1 Target group
 - 1.4.2 Authorised personnel
 - 1.4.3 Obligations of the operator
 - 1.4.4 Obligations of the user
 - 1.4.5 Additional qualification requirements
- 1.5 User positions
- 1.6 Safety devices
 - 1.6.1 EMERGENCY STOP button
 - 1.6.2 Protective cover
 - 1.6.3 Lathe chuck key
 - 1.6.4 Prohibition, warning and mandatory labels
- 1.7 Safety check
- 1.8 Individual protection gear
- 1.9 Safety during operation
- 1.10 Safety during maintenance
 - 1.10.1 Disconnecting the lathe and making it safe
 - 1.10.2 Using lifting equipment
 - 1.10.3 Mechanical maintenance work
- 1.11 Accident report
- 1.12 Electrical system

2 Technical data

- Power connection
 - Machine data
 - Dimensions
 - Work area
 - Environmental conditions
 - Operating material
- 2.1 Emissions

3 Assembly

- 3.1 Extent of supply**
- 3.2 Transport**
- 3.3 Storage**
- 3.4 Installation and assembly**
 - 3.4.1 Requirements of the installation site**
 - 3.4.2 Load suspension point**
 - 3.4.3 Installation**
 - 3.4.4 Installation drawing D250X750G**
- 3.5 First use**
 - 3.5.1 Clearing and greasing**
 - 3.5.2 Visual inspection**
 - 3.5.3 Run test**
 - 3.5.4 Power connection**
 - 3.5.5 Functional test**
- 3.6 Optional machine accessories**
 - 3.6.1 Mounting instruction chuck flange**
 - 3.6.2 Mounting instruction of collet chuck holder**

4 Design and function

- 4.1 Construction features**
- 4.2 Lathe bed**
- 4.3 Headstock**
- 4.4 Feed gear**
- 4.5 Apron**
- 4.6 Tailstock**

5 Operation

- 5.1 Safety**
- 5.2 Control and indicating elements**
 - 5.2.1 D250X750G**
- 5.3 Control elements**
- 5.4 Toolholder**
 - 5.4.1 Tool height**
 - 5.4.2 Tool angle**
- 5.5 Lathe chuck**
 - 5.5.1 Head spindle seat**
- 5.6 Adjusting the speed**
 - 5.6.1 Protective cover of the headstock**
 - 5.6.2 Changing the speed range**
 - 5.6.3 Speed table D250X750G**

- 5.7 Adjusting the feed
 - 5.7.1 Selector switch
 - 5.7.2 Changing the change gears
 - 5.7.3 Engaging lever
- 5.8 Lathe saddle with cross and top slide
 - 5.8.1 Immobilising the lathe saddle
 - 5.8.2 Turning tapers with the top slide
 - 5.8.3 Cross-adjustment of the tailstock
- 5.9 Tailstock sleeve
- 5.10 Clamping a workpiece into the lathe chuck
 - 5.10.1 Replacing the clamping jaws on the lathe chuck .
- 5.11 General working notes
 - 5.11.1 Fitting a follow rest
 - 5.11.2 Coolant

6 Maintenance




- 6.1 Safety
 - 6.1.1 Preparation
 - 6.1.2 Restarting
- 6.2 Inspection and maintenance
- 6.3 Repair
- 6.4 Exploded view of top slide
 - 6.4.1 Spare parts list of top slide
- 6.5 Exploded view of cross slide
 - 6.5.1 Spare parts list of cross slide
- 6.6 Exploded view of apron
 - 6.6.1 Spare parts list of apron
- 6.7 Exploded view of lathe bed
 - 6.7.1 Spare parts list of lathe bed
- 6.8 Exploded view of feed gear
 - 6.8.1 Spare parts list of feed gear
- 6.9 Exploded view of headstock
 - 6.9.1 Spare parts list of headstock
- 6.10 Exploded view of change gear
 - 6.10.1 Spare parts list of change gear
- 6.11 Wiring diagram DB10G and DB11G

- 7 Anomalies
 - 7.1 Anomalies in the lathe
- 8 Appendix
 - 8.1 Copy right
 - 8.2 Terminology/Glossary
 - 8.3 Product follow-up
- 9 Test Report
- 10 Packing List

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.

European standards must be observed during installation, operation, maintenance and repair of the lathe.

If European standards are not applied in the national legislation of the country of destination, the specific applicable regulations of each country must be observed.




Where necessary, the required measures must be taken to comply with the specific regulation of each country before the lathe is first used.

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



1.1.2 Other pictograms



Warning of automatic start-up!



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 the special check-key provided.

If the lathe is used in any way other than as described above, modified without the authorisation of company or operated with different process data, then it 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 authorised by company will also render the guarantee 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'

In order to achieve 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 whenever cleaning or maintenance work is being carried out.



WARNING!

THE LATHE MAY ONLY BE USED WITH THE SAFETY DEVICES ACTIVATED.

Disconnect the lathe 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 11

1.4 Qualification of personnel

1.4.1 Target group

This manual is addressed to

- operators,
- users,
- maintenance staff.



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

Determine clearly and unequivocally who will be responsible for the different activities on the machine (use, maintenance and repair).



Vague or unclear assignment of responsibilities constitutes a safety hazard!

Always disconnect the machine plug from the mains. This will prevent it being used by unauthorised 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 Authorised personnel



WARNING!

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

Only authorised personnel may operate the machine!

The only personnel authorised 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 poles
- 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 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!

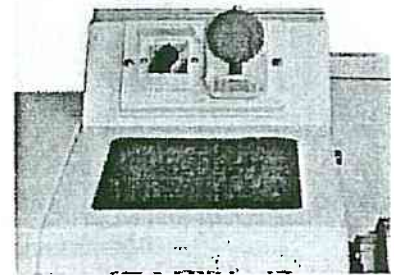
If you bypass, remove or override a safety device in any other way, you are endangering yourself and other personnel working with the machine. The possible consequences are

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

The lathe includes the following safety devices:

- Self-latching, lockable EMERGENCY STOP button
- Screwed-down protective cover on the headstock
- Special key for the lathe chuck

1.6.1 EMERGENCY STOP button



EMERGENCY STOP button

1.6.2 Protective cover

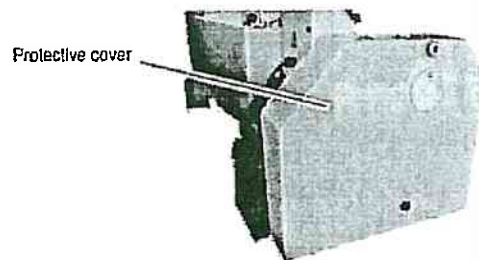


The headstock of the lathe is fitted with a screwed-down protective cover.



WARNING!

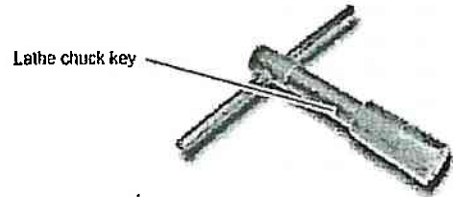
Remove the protective cover only after the mains plug of the lathe has been pulled.



Protective cover of the lathe

1.6.3 Lathe chuck key

The lathe is equipped with a special key for chucks. Once the lathe chuck key has been released, it is pushed out of the lathe chuck by a spring.



CAUTION!

Only operate the lathe using this key.

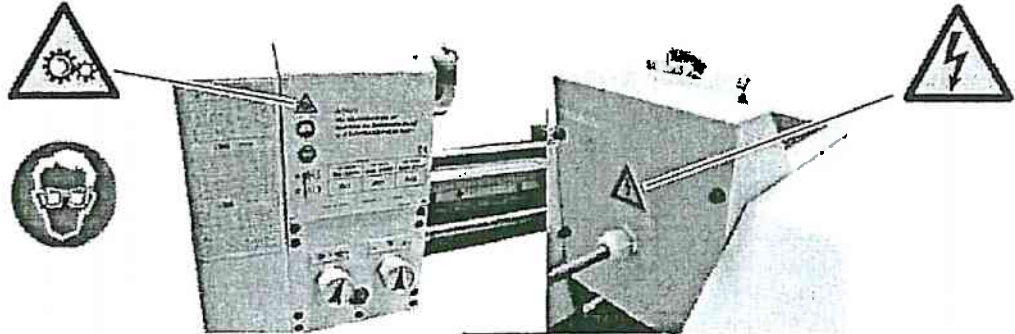
Lathe chuck key

1.6.4 Prohibition, warning and mandatory labels



INFORMATION

All warning labels must be legible. Check them regularly.



DB10G Lathe/DB11G Lathe

1.7 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

Check that prohibition, warning and information labels and the markings on the lathe

- can be identified (if not, clean them)
- are complete



INFORMATION

Use the following table for organising the checks.

General check		
Equipment	Check	OK
Protective cover, chaw juck cover	Fitted, firmly bolted and not damaged	
Labels, markings	Installed and legible	
Date:	Checked by (signature):	

Run test		
Equipment	Check	OK
EMERGENCY STOP button	When the EMERGENCY STOP button is activated, the lathe should be switched off.	
Lathe chuck key	Once the chuck key has been released, it should be automatically pressed out of the lathe chuck.	
Date:	Checked by (signature):	

1.8 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.

1.9

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 practises:

- Make sure your work does not endanger anyone.
- Clamp the workpiece tightly before activating the lathe.
- For clamping workpieces, only use the special chuck key supplied.
- Mind 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 at 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.

1.10 Safety during maintenance

Inform operating staff in good time of any repair and maintenance work.

Report all safety-relevant changes or performance details of the lathe. Document all changes, have the operating manual changed accordingly and train the machine operators.

1.10.1 Disconnecting the lathe and making it safe



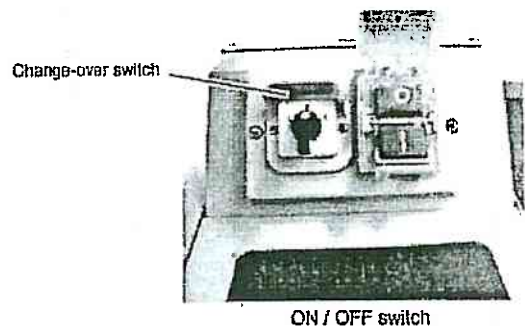
Pull the mains plug before beginning any maintenance or repair work. All machine components and hazardous voltages and movements must have been disconnected.

Place a warning sign on the machine.



WARNING!

Before reconnecting the machine, make sure that the change-over switch on the lathe is in the "0" position.



1.10.2 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!

1.10.3 Mechanical maintenance work

Remove all protection and safety devices before beginning maintenance work and re-install 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!

1.11 Accident report

Inform your superiors and Optimum Maschinen GmbH immediately in the event of accidents, possible sources of danger and any actions which almost led to an accident (near misses).

These near misses can have many possible causes.

The sooner they are notified, the faster the causes can be eliminated.



INFORMATION

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

1.12 Electrical system

Have the machine and/or the electric equipment checked regularly, and at least every six months. Eliminate immediately all defects such as loose connections, defective wires etc.

A second person must be present during work on live components, to disconnect the power in the event of an emergency. Disconnect the lathe immediately if there are any anomalies in the power supply!

2 Technical data

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

Power connection	DB10G Lathe	DB11G Lathe
Total connection rate	1200W/240V/50Hz	1200W/240V/50Hz
Degree of protection	IP 54	IP 54

Machine data	DB10G Lathe	DB11G Lathe
Height of centres [mm]	125 (5")	140 (5.5")
Max. turning diameter [mm]	250 (10")	280 (11")
Distance between centres [mm]	550 (21.5")	700 (27.5")
Spindle speed [rpm]	50-2500	50-2500
Spindle taper	MK4	MK4
Spindle hole [mm]	26 (1.02")	26 (1.02")
Bed width [mm]	135 (5.3")	180 (7")
Travel of top slide [mm]	75 (3")	80 (3")
Travel of cross slide [mm]	155 (6.1")	165 (6.5")
Tailstock taper	MK2	MK2
Tailstock sleeve travel [mm]	65 (2.5")	105 (4")
Longitudinal feed [mm/rev]	0.07 - 0.1 - 0.2	0.07 - 0.1 - 0.2
Pitch - Metric	0.2 - 3.5	0.2 - 3.5
Pitch - In inches	8 - 56	8 - 56

Dimensions	DB10G Lathe	DB11G Lathe
Height [mm]	580 (22.8")	630 (24.8")
Length [mm]	1200 (47.2")	1390 (54.7")
Depth [mm]	560 (22")	700 (27.5")
Total weight [kg]	150	200

Work area	DB10G Lathe	DB11G Lathe
Height [mm]	2,000 (78.7")	2200 (86.6")
Length [mm]	2,200 (86.6")	2600 (102.3")
Depth [mm]	1,900 (74.8")	2200 (86.6")

Environmental conditions	DB10G Lathe / DB11G Lathe
Temperature	5 - 35 °C
Humidity	25 - 80 %

Operating material	DB10G Lathe / DB11G Lathe
Feed gear	Mobilgear 627 or equivalent oil
Bright steel parts and lubricating nipples	Non-corrosive lubricating oil
Change gears	Chain oil (spray box)

2.1 Emissions

The level of noise emitted by the lathe is less than 70 dB(A).



INFORMATION

If the lathe is installed in an area where various machines are in operation, the acoustic influence (immission) on the operator of the lathe may exceed the legally permitted peak value in the workplace.



We recommend the use of soundproofing and ear protection.

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



WARNING!

Machine parts falling off forklift trucks or other transport vehicles could cause very serious or even fatal injuries. Follow the instructions and information on the transport case:

- Centres of gravity
- Suspension points
- Weights
- Means of transport to be used
- Prescribed shipping position



WARNING!

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

Check that the lifting and load suspension gear has sufficient load capacity and that it is in perfect condition. Observe the rules for preventing accidents.

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 intended environmental conditions.

3.4 Installation and assembly

3.4.1 Requirements of the installation site

Organise the work area around the lathe in accordance with local safety regulations.

Operation, maintenance and repair in the work area must not be hindered.



INFORMATION

The mains plug of the lathe must be freely accessible.

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 a spirit 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 (4) through holes.
- If necessary, use anti-vibration elements (model S1) for your machine substructure.



INFORMATION

The installation site must be designed in accordance with ergonomic workplace requirements.

The installation drawings described below may differ from the real dimensions (cast parts). The tolerances are in the range of the general tolerances according to DIN 7168 g.

3.5 First use



WARNING!

Personnel and equipment may be endangered if the lathe is first used by inexperienced 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 stove distillate.
- 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 lubricating oil.
- Grease the machine using the lubrication chart.

3.5.2 Visual inspection

Check the oil level in the inspection glass of the feed gear.

3.5.3 Run test

- Check smooth running of all spindles.



INFORMATION

For manufacturing engineering reasons and for reasons of precision of fit, there may be occasional slight stiffness in the spindles. This will disappear after a short time in use.

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

3.5.4 Power connection

Connect the following cables:

- Connect the electric supply cable.
- Check the fuse protection of your power supply against the technical data for the total connection value of the lathe.



ATTENTION!

Please pay attention that all three phases (L1, L2, L3) are connected correctly.

Most engine failure result from incorrect connection, for instance the neutral conductor (N) is being connected to a phase.

This might lead to the following results:

- The engine does get quickly very hot.
- The engine noise increases, i.e. becomes louder.
- The engine has no power.

When the phases are connected wrongly, the guarantee is being null and void.



ATTENTION!

Lathes with frequency converter must not be operated with a CEE plug. Connect the machine permanently to a connection box (see EN 50178 / VDE 5.2.11.1)

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!

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

3.6.1

Mounting instruction chuck flange

Putting on of jaw chuck onto the chuck flange

Clean the flange and spindle nose, put the flange onto the spindle nose screws.

Measure the inner hole of the jaw chuck and turn this value of the chuck flange to a diameter as a H7 fit. Turn once easily over the flat surface of the chuck flange.

Put the jaw chuck onto the flange.

Consider: The jaw chuck must let itself manually and put on with the aid of a rubber-faced hammer (distribute uniformly easy strokes over the front panel).

Clamp clamping bolts alternatingly and uniformly.

The screws may perform no compulsion onto the drilling wall since the chuck body bends itself else or the jaws are locked in position.

Furthermore, radial runouts can occur.

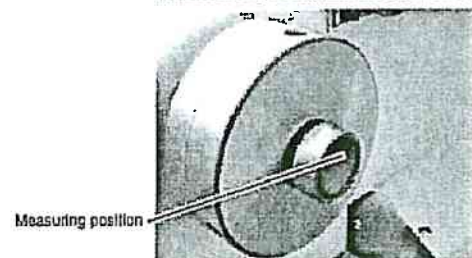
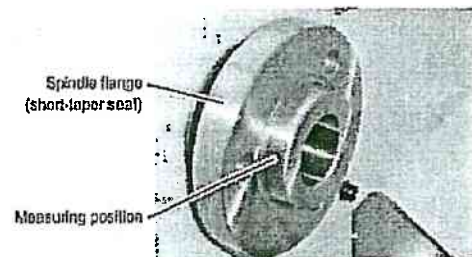
Refinishing on the jaw chuck is inadmissible!

3.6.2

Mounting instruction of collet chuck holder

Proceed as follows.

- Mark out the position of the jaw chuck at the spindle flange before dismantling with an e.g. felt-tipped pen.
- Dismantle the jaw chuck.
- Clean all faces of the spindle nose and of the collet chuck holder extremely thoroughly.
- Dismantle the thread pins of the jaw chuck and screw in the thread pins into the collet chuck holder.
- Measure the run out of the spindle nose. Mark out the greatest positive rash of the dial gauge at the spindle nose with an e.g. felt-tipped pen.
- Attach the collet chuck holder to the spindle flange, tighten the nuts easily. Pull in the nuts stepwise ones and uniformly alternating at least three times in succession (you receive the run out possible for best only this way).
- Measure the run out 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 and assemble after this the collet chuck holder on the highest circularity accuracy position.
- Mark out the position of the highest circularity accuracy of spindle flange with collet chuck holder.



4 Design and function

The machine is a universal lathe. It has been designed and manufactured for straight turning and facing round or regularly formed three-, six- or twelve-square workpieces in metal, plastics or similar materials.

The hollow work spindle enables you to clamp longer workpieces with a diameter of up to 25 mm.

The speed is regulated by repositioning a V-belt on pulleys.

The existing leadscrew enables longitudinal feed and thread-cutting. It is also possible to use the machine for drilling jobs with the help of an (optional) drill chuck clamped in the tailstock.

4.1 Construction features

- Spindle-bearing arrangement with precision ball bearings
- Powerful, maintenance-free motor
- Hardened spindle nose
- High concentricity precision of the work spindle < 0.009 mm
- Oil-bathed rounded gearwheels on feed gear
- Self-latching, lockable EMERGENCY STOP button with undervoltage circuit breaker
- Left- and right-hand motor rotation controlled by a switch
- Induction-hardened, precision-ground prismatic bed made of gray cast iron (HRC 42 - 52)
- Cross and straight turning slide with dovetail slideway and adjusting gibs
- Leadscrew for thread-cutting or feed for straight turning with change gear set
- Adjustable tailstock for taper turning

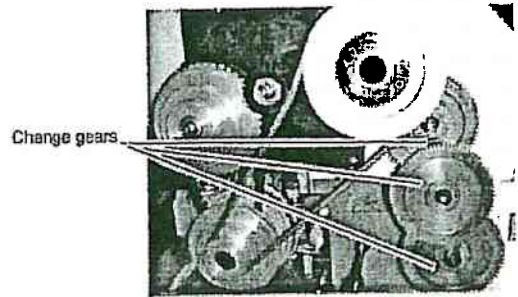
4.2 Lathe bed

The lathe bed integrates the headstock and the driving unit, for attaching the apron and lead-screw and for guiding the lathe saddle and tailstock.

4.3 Headstock

The headstock houses the feed gear and the reducing gear with pulleys. The work spindle transmits the torque during the turning process. The work spindle also receives the workpieces and clamping tools.

The work spindle is driven an electromotor, via pulleys. The replacement of the change gears for other feeds is carried out on the headstock.

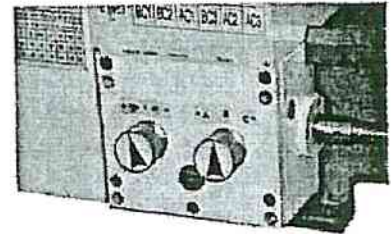


Headstock

4.4 Feed gear

The feed gear is used to select the feeds for straight turning as well as for thread-cutting. In order to achieve certain thread pitches, it is necessary to replace the change gears.

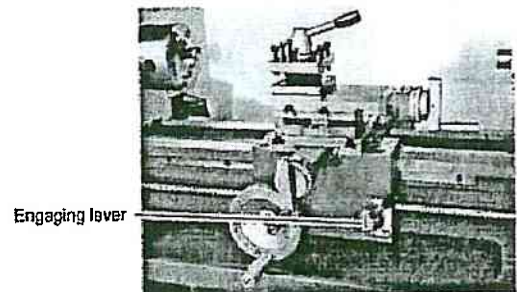
The torque of the work spindle is transmitted to the feed gear and thus to the leadscrew.



Feed gear

4.5 Apron

The apron houses the leadscrew nut with an engaging lever for activating the automatic feed as well as the handwheel for manual feed. The straight turning and cross slide are located on the apron with bed guidance.



Apron

4.6 Tailstock

The tailstock is used for centring and drilling, supporting long shafts, turning between centres as well as turning long, thin tapers.



Tailstock

5 Operation

5.1 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.

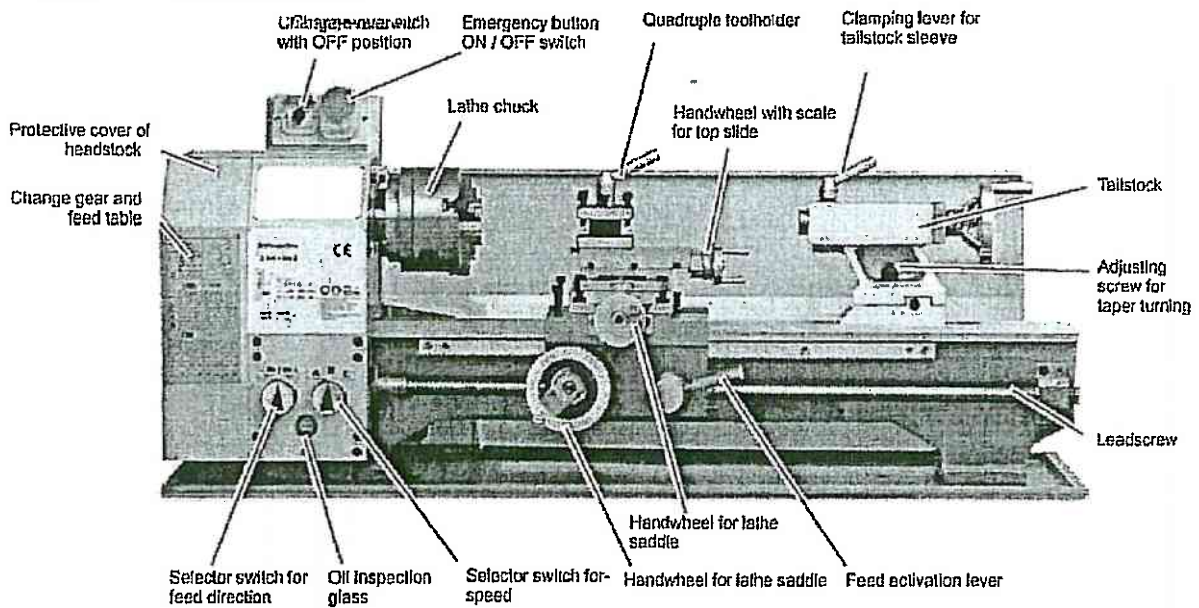


All anomalies should be eliminated immediately. Stop the machine immediately in the event of any abnormality in operation and make sure it cannot be started up accidentally or without authorisation.

Notify the person responsible immediately of any modification.

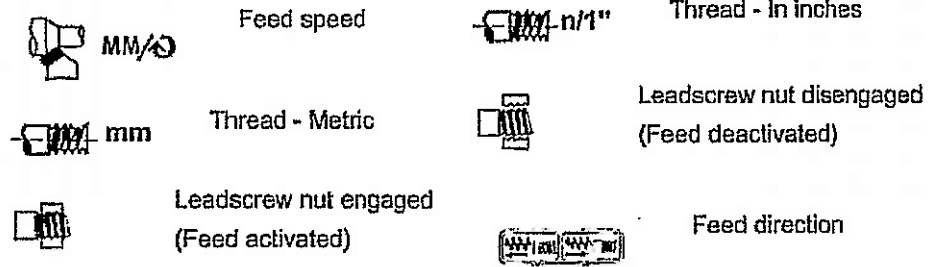
5.2 Control and indicating elements

5.2.1 DB10G / DB11G



DB10G / DB11G

5.3 Control elements

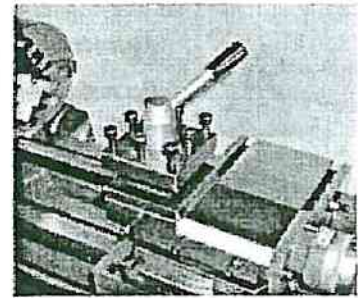


5.4 Toolholder

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.

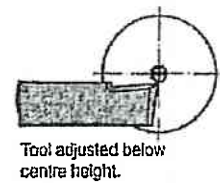
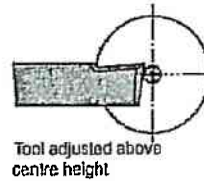
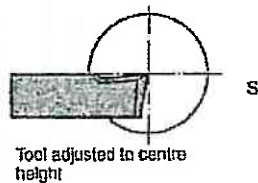
Adjust the height of the tool. Use the tailstock with lathe centre to adjust the tool to the required height. If necessary, use steel spacer shims under the tool to get the required height.



Toolholder

5.4.1 Tool height

For the facing process, the cutting edge of the tool must be exactly aligned with the height of the lathe centre to obtain a shoulder-free face. The facing process is a turning operation in which the turning tool feeds perpendicular to the axis of rotation of the workpiece in order to produce a flat surface. The different methods are transversal facing, transversal slicing and longitudinal facing.



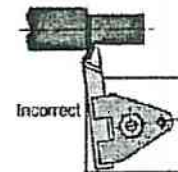
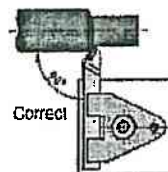
Height of the tool

5.4.2 Tool angle



ATTENTION!

The tool must be clamped with its axis perpendicular to the axis of the workpiece. If it is clamped at an angle, the tool may be sucked into the workpiece.



Tool clamped perpendicular to the axis of the workpiece

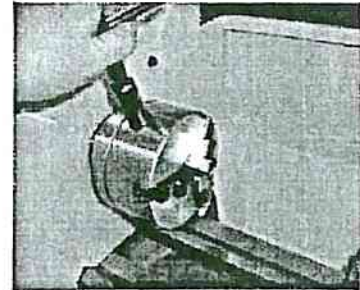
Tool clamped at an angle with respect to the feed direction

Graphic: Angle of the tool

5.5 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 is moved correctly, but not so tight that it is damaged or deformed.

→ Clamp the workpiece into the lathe chuck with the aid of the chuck key provided.



Lathe chuck



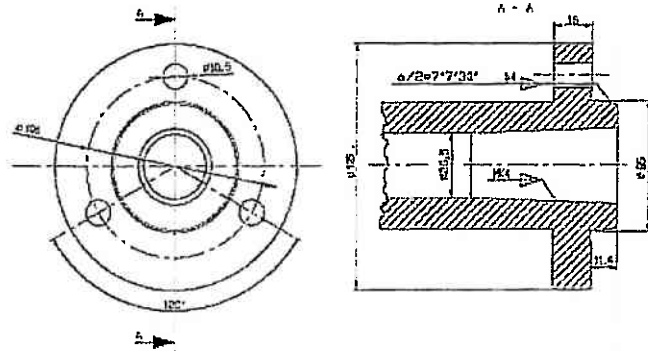
WARNING!

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 exceeded. Also, the jaws might work loose.

5.5.1 Head spindle seat

The head spindle seat is designed as a short-taper seat. For the installation of a quantum four jaw chuck a chuck flange is necessary.

☞ "Optional machine accessories" on page 25



Head spindle seat



ATTENTION!

When disassembling the machine a workpiece holder might fall on the engine bed and might damage the guide rail. Put a wooden board or another appropriate part on the engine bed in order to prevent damages.

- Unscrew the 3 nuts on the flange for the lathe chuck to remove the workpiece holder (in this case, the three-jaw chuck).
- Take the workpiece holder off.
- If necessary, loosen the workpiece holder by hitting it gently with a plastic-tipped hammer or a rubber mallet.

5.6 Adjusting the speed

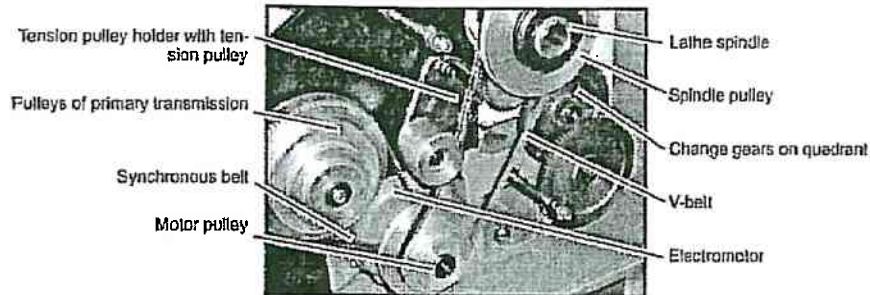
Adjust the speed by changing the position of the V-belt on the pulleys.

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.



WARNING!

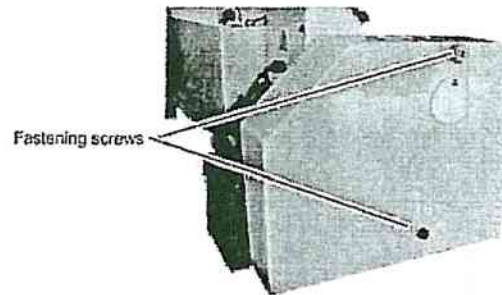
Unplug the shockproof plug of the lathe before opening the protective cover.



5.6.1 Protective cover of the headstock

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

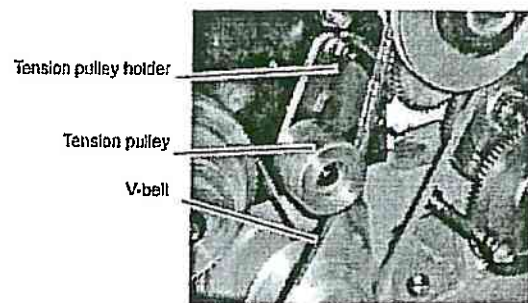
- Unplug the shockproof plug from the mains.
- Unscrew the two fastening screws.
- Remove the protective cover.



Protective cover of the headstock

5.6.2 Changing the speed range

- Loosen the nut on the tension pulley holder and release the tension of the V-belt.
- Lift the V-belt into the corresponding position.



Tension pulley

- 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.

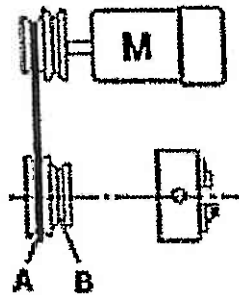
- The correct tension of the synchronous belt has been reached when you can still bend it approximately 3 mm with your index finger.



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.

5.6.3 Speed table

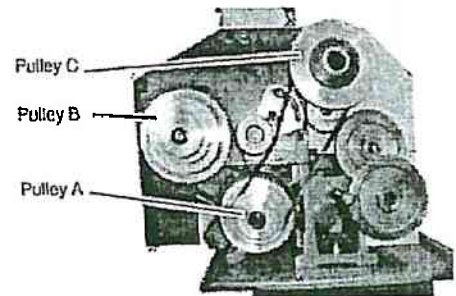


spindle speed r/min

A	B
50-1250	100-2500

Example

With the belt running from Pulley A to Pulley C on the Diameter-3 pulley, you will obtain a speed of 2,000 rpm.



INFORMATION

In the V-belt position AC3, the physical limits of the drive are being achieved at 2500 min⁻¹ by mechanical frictional resistance. It is impossible to have an effective controlling variable of 225% in the V-belt position AC 3. The full range of controlling variables from 15% to 225% are only available for the V-belt position AC 1.

This setting is intended to prevent the workpiece from getting loose by too high centrifugal force of the clamping jaws on the drill chuck.

5.7 Adjusting the feed

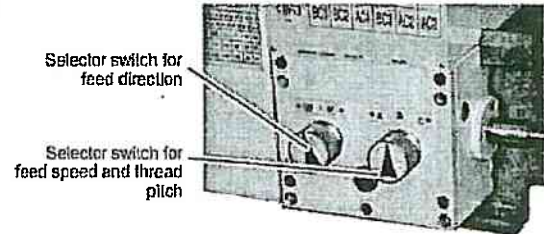
5.7.1 Selector switch

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.



Selector switches



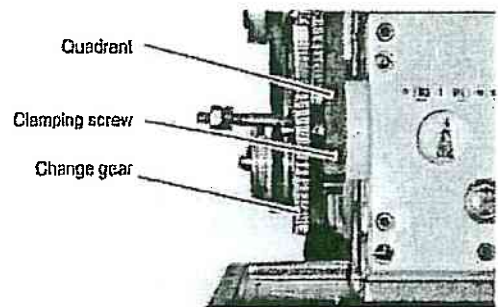
INFORMATION

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 the installed gear set.

5.7.2 Changing the change gears

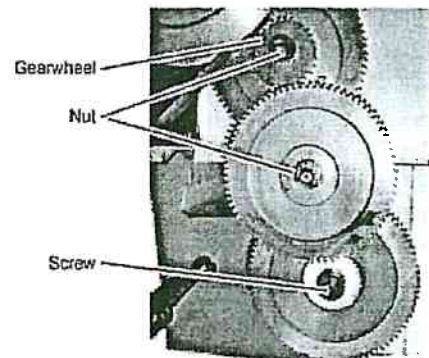
The change gears for the feed are mounted on a quadrant.

- Unplug the shockproof plug from the mains.
- Loosen the locking screw on the quadrant.



Side view of the change gears

- Swing the quadrant to the right.
- Unscrew the bolt from the leadscrew or the nuts from the quadrant bolts in order to remove the change gears from the front.
- Install the gear couples using the feed or change gear table and screw the gearwheels onto the quadrant again.



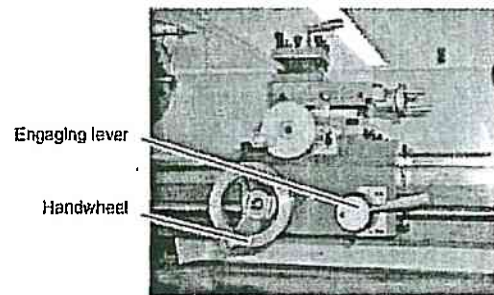
Front view of the change gears

- Swing the quadrant to the left until the gearwheels 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.

5.7.3 Engaging lever

○ The automatic longitudinal feed and the feed for thread-cutting are activated and deactivated using the engaging lever. The feed is transmitted via the leadscrew nut.

→ Push the engaging lever downwards. The leadscrew nut is engaged and the automatic longitudinal feed is activated.



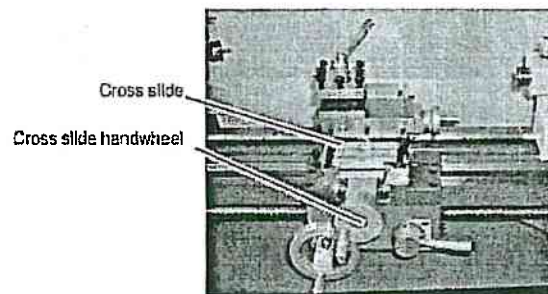
Apron

→ Move the handwheel slightly to lock the engaging lever in place.

5.8 Lathe saddle with cross and top slide

The handwheel is used to manually traverse the lathe saddle.

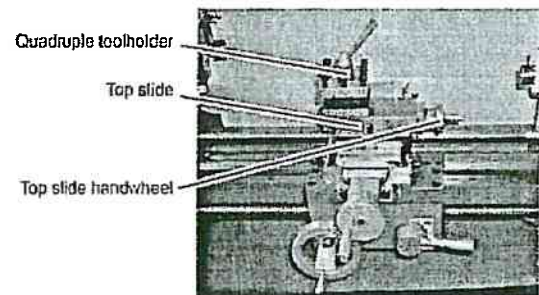
The cross slide can be advanced and returned by turning the cross slide handwheel.



Cross slide

The top slide (tool slide) supports the quadruple toolholder.

Use the top slide handwheel to move the corresponding slide.

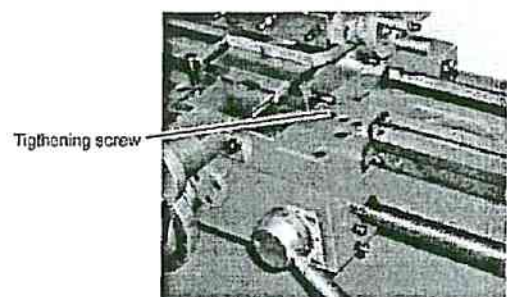


Top slide

5.8.1 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.

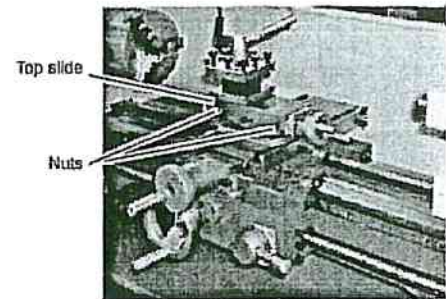


Lathe saddle

5.8.2 Turning tapers with the top slide

It is possible to turn short tapers with the top slide.

- Loosen the two nuts on the left and the right of the top slide.
- Swivel the top slide.
- Clamp the top slide again.

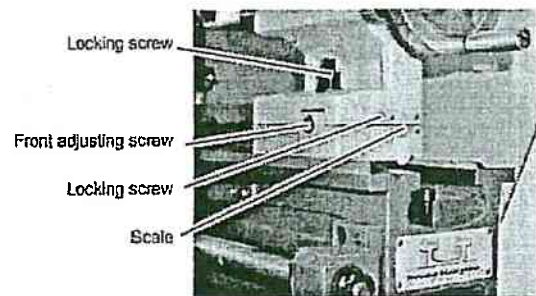


Taper turning

5.8.3 Cross-adjustment of the tailstock

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

- Loosen the locking nut of the tailstock.
- Unscrew the locking screw approximately half a turn.



Cross-adjustment of the tailstock

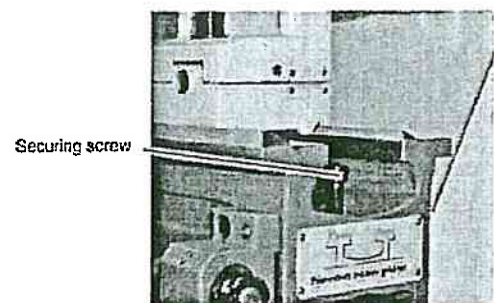
- By alternately loosening and tightening the two (front and rear) adjusting screws, the tailstock is moved out of the central position. The desired cross-adjustment can be read off the scale.
- First retighten the locking screw and then the two (front and rear) adjusting screws.
- Retighten the locking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



ATTENTION!

Check clamping of the tailstock and the sleeve, 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.

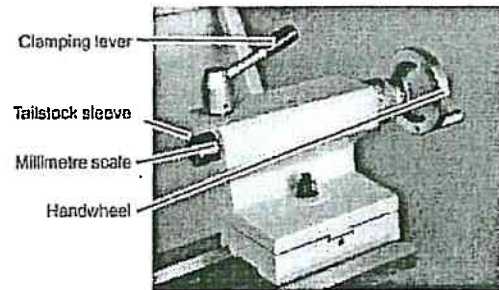


Lathe bed

5.9 Tailstock sleeve

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

- Clamp the required tool in the tailstock sleeve.
- Use the millimetre scale on the sleeve to readjust and/or adjust the tool.
- Clamp the sleeve with clamping lever.



Tailstock

- Use the handwheel to move the sleeve forward and back.

The sleeve of the tailstock can be used to introduce a drill chuck for holding bits and counter-sinks.

5.10 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.

The workpieces are to be clamped safely and tightly on the lathe before starting the operation. The clamping force is to be dimensioned in a way to make sure that the workpiece is securely driven and that there are no dangers or deformations on the workpiece.

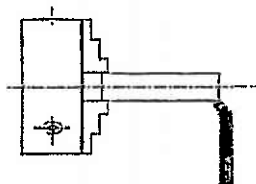


WARNING!

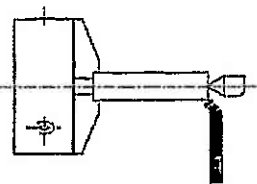
Do not clamp any workpieces that exceed the permitted chucking capacity of the lathe chuck. The clamping force of the chuck is too low if its capacity is exceeded. Also, the jaws may come loose.

incorrect

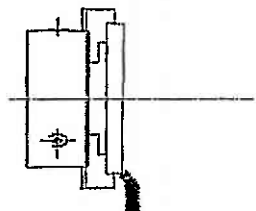
correct



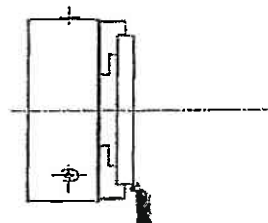
Clamping length too long, overhang too long.



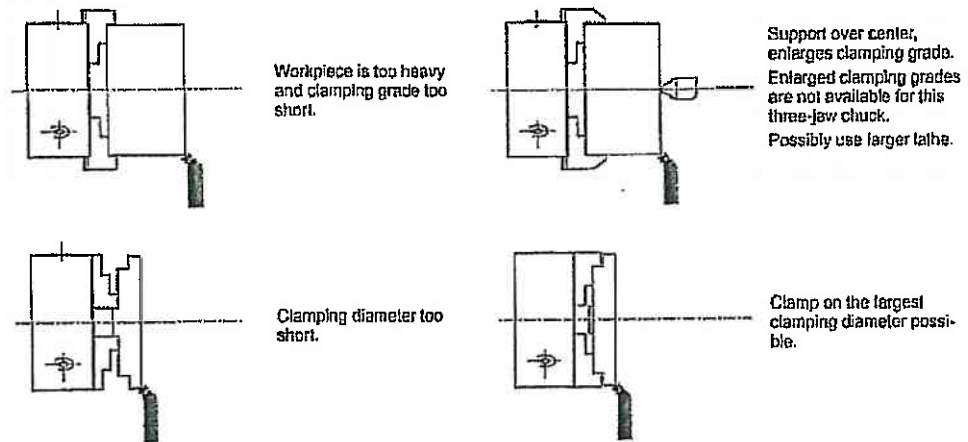
Additional support over center.



Clamping diameter too large.



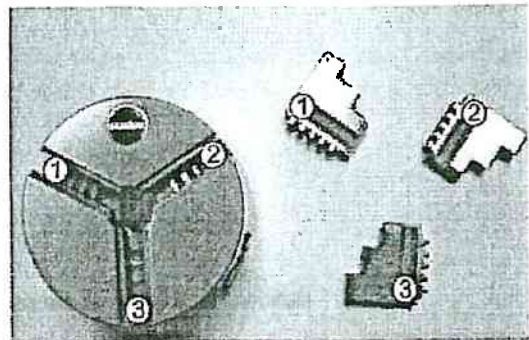
Use larger lathe.



5.10.1 Replacing the clamping jaws on the lathe chuck

The clamping jaws and the three-jaw chuck are equipped with numbers. 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 control if they are inserted correctly.



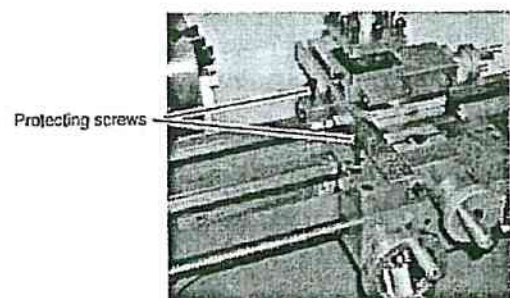
Three-jaw chuck / clamping jaws

5.11 General working notes

5.11.1 Fitting a follow rest

The lathe is prepared for fitting a follow rest.

- Remove the two protecting screws in the lathe saddle.
- Attach the follow rest with the help of thread screws.



Lathe saddle D250X750G

5.11.2 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.

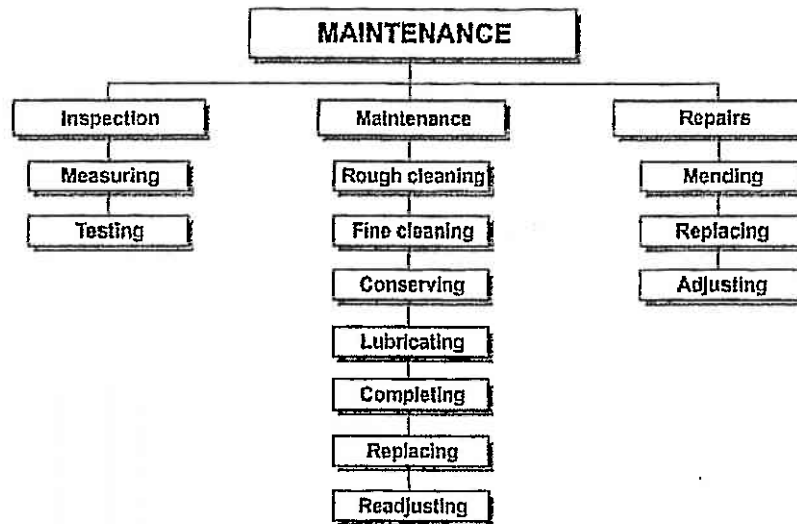
6 Maintenance

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.



Illustr.6-1: 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 spilled 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.

6.1 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.

6.1.1 Preparation



WARNING!

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



Attach a warning label.

6.1.2 Restarting

Before restarting run a safety check.

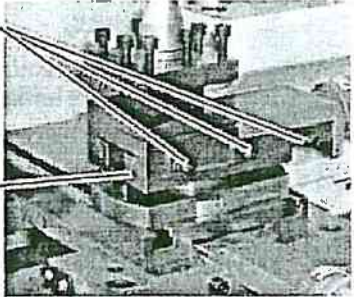


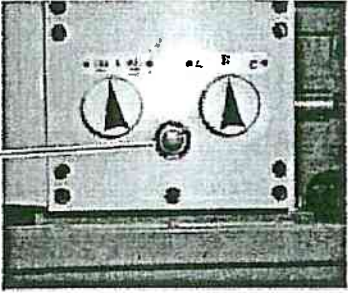
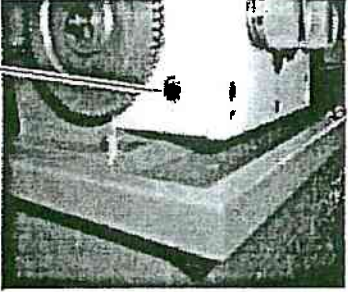
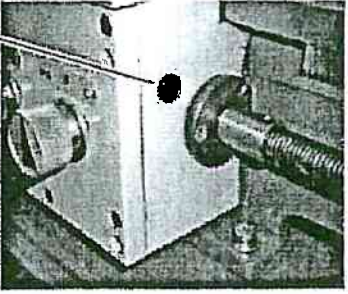
WARNING!

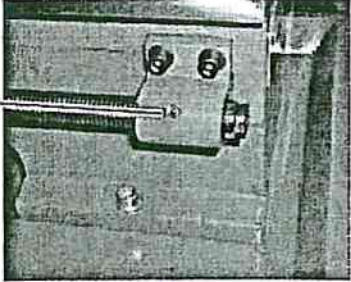
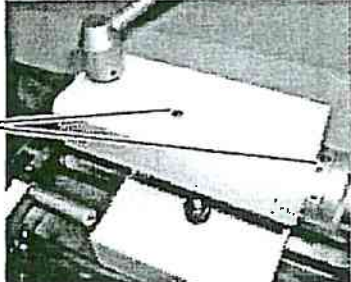
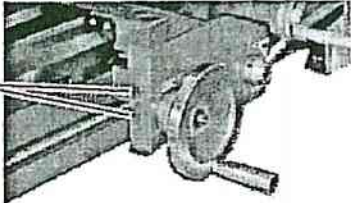
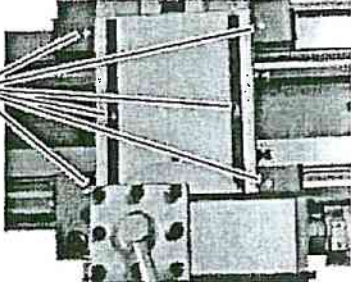
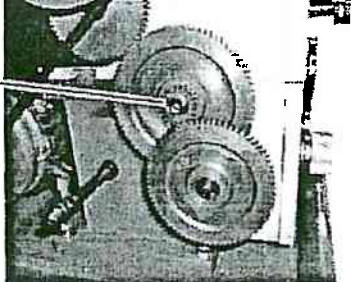
Before connecting the machine you must check that there is no danger for personnel and the lathe is undamaged.

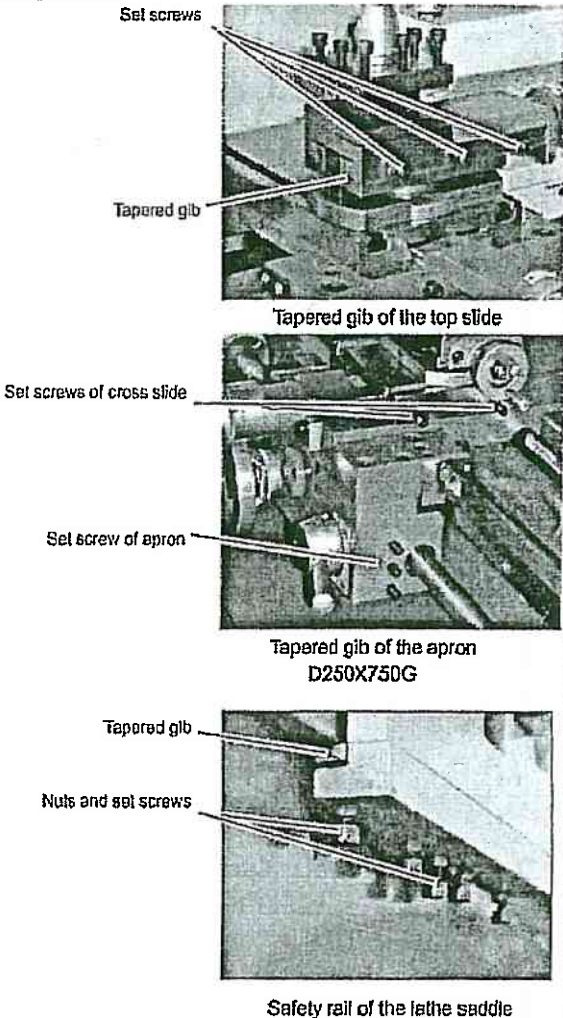
6.2 Inspection and maintenance

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 authorised conditions.

Interval	Where?	What?	How?
Start of work after every maintenance and repair operation	Lathe		Safety check
Start of work after every maintenance and repair operation	Lathe	Lubricate	<ul style="list-style-type: none"> → Lubricate all slideways. → Lubricate the change gears and leadscrew slightly with lithium-based grease.
as required	Top slide	Readjust	<p>Excessive clearance in the top slide can be reduced by readjusting the tapered gib.</p> <ul style="list-style-type: none"> → Loosen the counternut. → Turn the set screw slightly clockwise and secure the set screws again using the counternut. <p>INFORMATION</p> <p>A 90° turn of the set screws corresponds to a travel of 0.2 mm. Make any readjustment of the set screws in small steps.</p> <p>Set screws with counternuts</p>  <p>Tapered gib</p> <p>Tapered gib at the top slide</p>

Interval	Where?	What?	How?
Start of work after every maintenance and repair operation	Feed gear	Visual inspection	<ul style="list-style-type: none"> → 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. <div style="text-align: center;">  <p data-bbox="906 613 1029 636">Inspection glass</p> <p data-bbox="1091 770 1367 819">Oil inspection glass of the feed gear</p> </div>
First after 200 hours in service, then after every year		Oil change	<ul style="list-style-type: none"> → 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. <div style="text-align: center;">  <p data-bbox="979 1167 1029 1189">Outlet</p>  <p data-bbox="922 1435 1029 1458">Charging hole</p> <p data-bbox="1098 1720 1230 1742">Gear openings</p> </div>

Interval	Where?	What?	How?
every month	Lathe D250 x750 G	Lubricate	<p>→ Lubricate all lubricating nipples with machinery oil.</p>  <p>Lubricating nipple on lead screw</p>  <p>Lubricating nipple on tailstock</p>  <p>Lubricating nipples on lathe saddle handwheel</p>  <p>Lubricating nipples on lathe saddle and cross slide</p>  <p>Lubricating nipple on change gear primary transmission</p> <p>Lubricating nipples</p>

Interval	Where?	What?	How?
as required	Slideways	Readjust	<p>Excessive clearance in the slideways can be reduced by readjusting tapered gibs.</p> <p>→ Loosen the counternuts.</p> <p>→ Turn the set screw slightly clockwise and secure the set screws again using the counternut.</p> <p>INFORMATION</p> <p>A 90° turn of the set screw corresponds to a travel of approximately 0.2 mm. Make any readjustment of the set screws in short steps. The tapered gib for guiding the leadscrew nut has been factory-set and does not normally need to be readjusted.</p> 



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.

6.3 Repair

For any repair work, get assistance from an employee of Optimum Maschinen GmbH's technical service or send us the lathe.

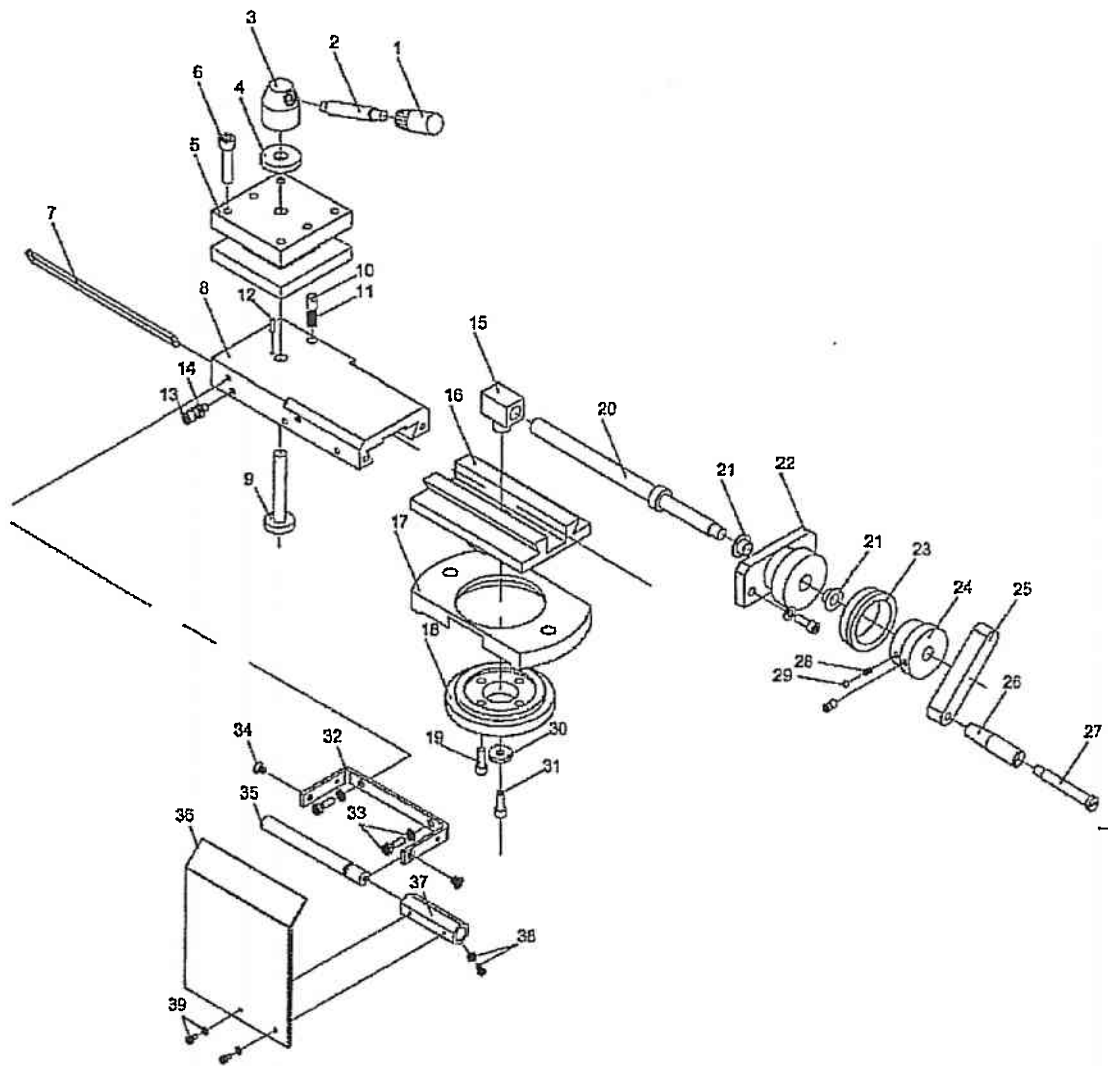
If the repairs are carried out by qualified technical staff, they must follow the indications given in this manual.

Optimum Maschinen GmbH does not take responsibility nor does it guarantee against damage and operating anomalies resulting from failure to observe this operating manual.

For repairs, only use

- faultless and suitable tools
- original spare parts or parts from series expressly authorised by Optimum Maschinen GmbH.

6.4 Exploded view of top slide



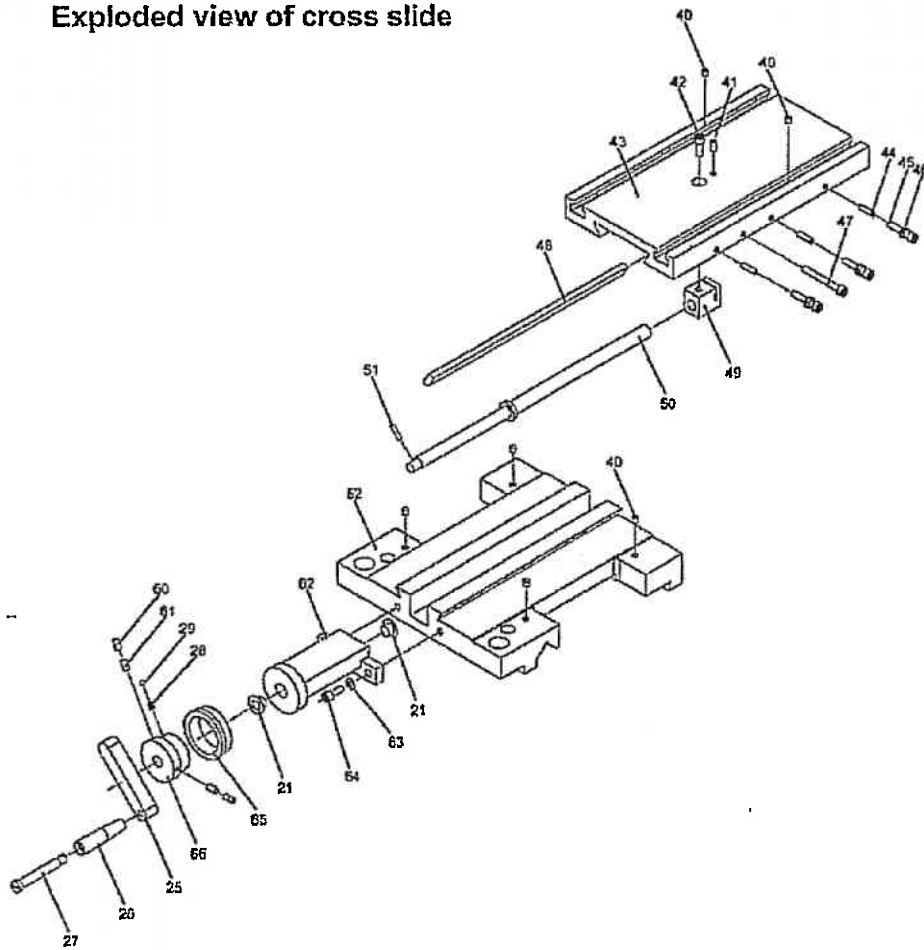
top slide D250

6.4.1 Spare parts list of top slide

Pos.	Name	Qty.	Size
1	Clamping lever	1	M8
2			
3	Clamping nut quadruple tool holder		
4	Washer clamping nut	1	
5	Quadruple tool holder	1	
6	Hexagonal socket head screw	8	M8x35
7	Gib top slide	1	
8	Top slide	1	
9	Threaded bolt quadruple tool holder	1	
10	Stop pin	1	
11	Spring	1	
12	Fixing pin threaded bolt	1	
13	Hexagonal socket head screw	3	M5x16
14	Nut	3	M6
15	Spindle nut top slide	1	
16	Dovetail guideway top slide	1	
17	Clamp collar top slide	1	
18	Scale collar Winkelskala top slide	1	
19	Hexagonal socket head screw	1	M6x16
20	Spindle top slide	1	
21	Slide bearing	1	
22	Bearing pedestal spindle top slide	1	
23	scale collar handwheel top slide	1	
24	Scaleguide	1	
25	Lever handwheel top slide	1	
26	Lever handwheel top slide		
27	Clamping bolt lever handwheel		
28	Spring	1	

Pos.	Name	Qty.	Size
29	Steel ball		
30	Pulley		6
31	Hexagonal socket head screw	1	M5x25
32	Attachment handle	1	
33	Hexagonal socket head screw	2	M5x12
	Washer	2	M5
34	Countersunk screw	2	M5x6
35	Shaft	1	
36	Chip shield	1	
37	Hexagonal case	1	
38	Hexagonal socket head screw	1	M3x8
	Nut	1	M3
39	Hexagonal socket head screw	2	M3x6
	Washer	2	M3
	Chip protection completely	1	

6.5 Exploded view of cross slide

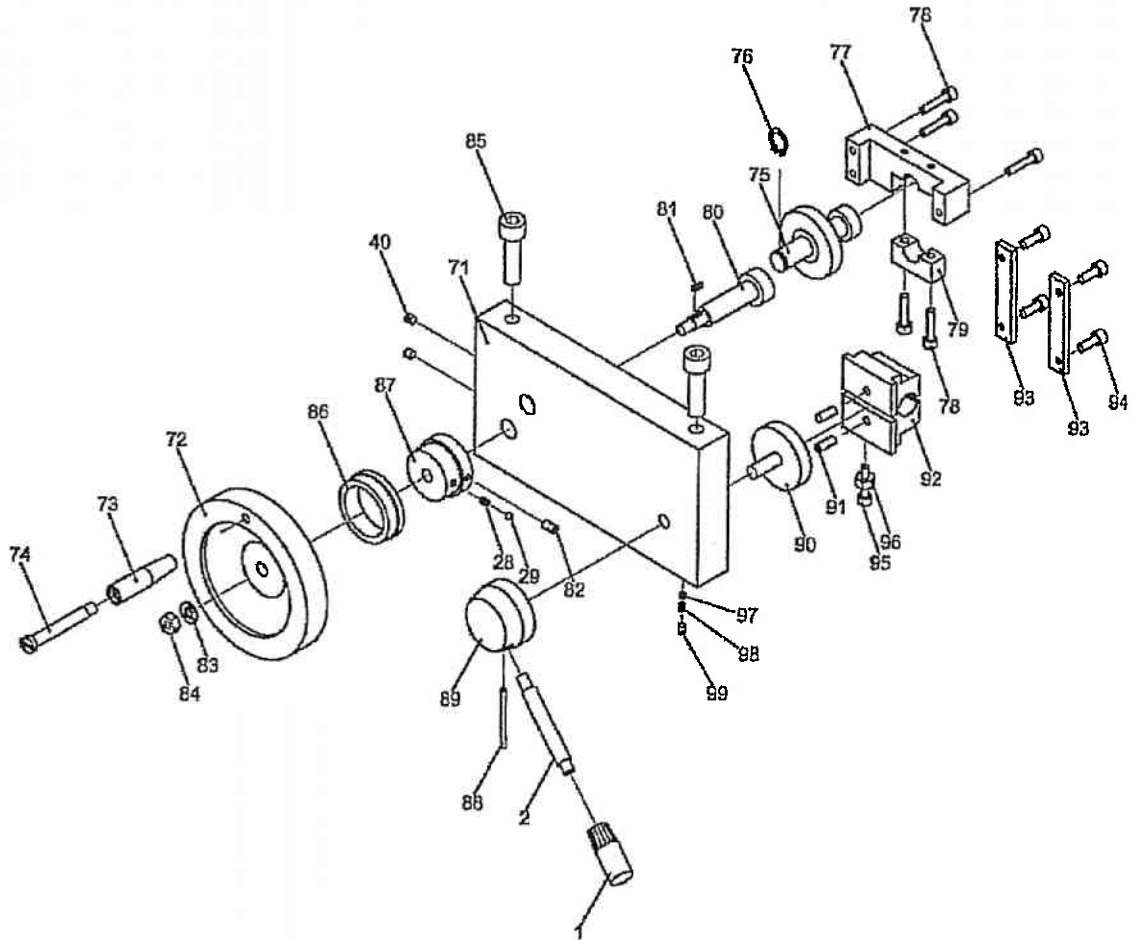


6.5.1 Spare parts list of cross slide

Pos.	Name	Qty.	Size
21	Slide bearing	2	
25	Lever handwheel top slide	1	
26	Lever handwheel cross slide	1	
27	Clamping bolt lever handwheel		
28	Spring	1	
20	Steel bar	1	
40	Oil ripple	6	6mm
41	Thread pin DIN 914	1	M6x10
42	Hexagonal socket head screw DIN 912	1	M8x10
43	Cross slide	1	
44	Brush pin	3	
45	Hexagonal socket head screw DIN 912	1	M6x30
46	Nut	3	A16
47	Hexagonal socket head screw DIN 912	1	M6x30

Pos.	Name	Qty.	Size
48	Gib cross slide		
49	Spindle nut cross slide		
50	Spindel cross slide	1	
51	Spring pin DIN 1481	1	4x16
52	Dovetail guideway cross slide	1	
53	Slide bearing		
60	Thread pin DIN 913	3	M6x10
61	Brush pin	3	
02	Bearing pedestal spindle cross slide	1	
63	Washer DIN 912	2	8
64	Hexagonal socket head screw DIN 912	1	M6x20
65	Scale collar handwheel cross slide	1	
66	Guide pulley scale collar		

6.6 Exploded view of apron



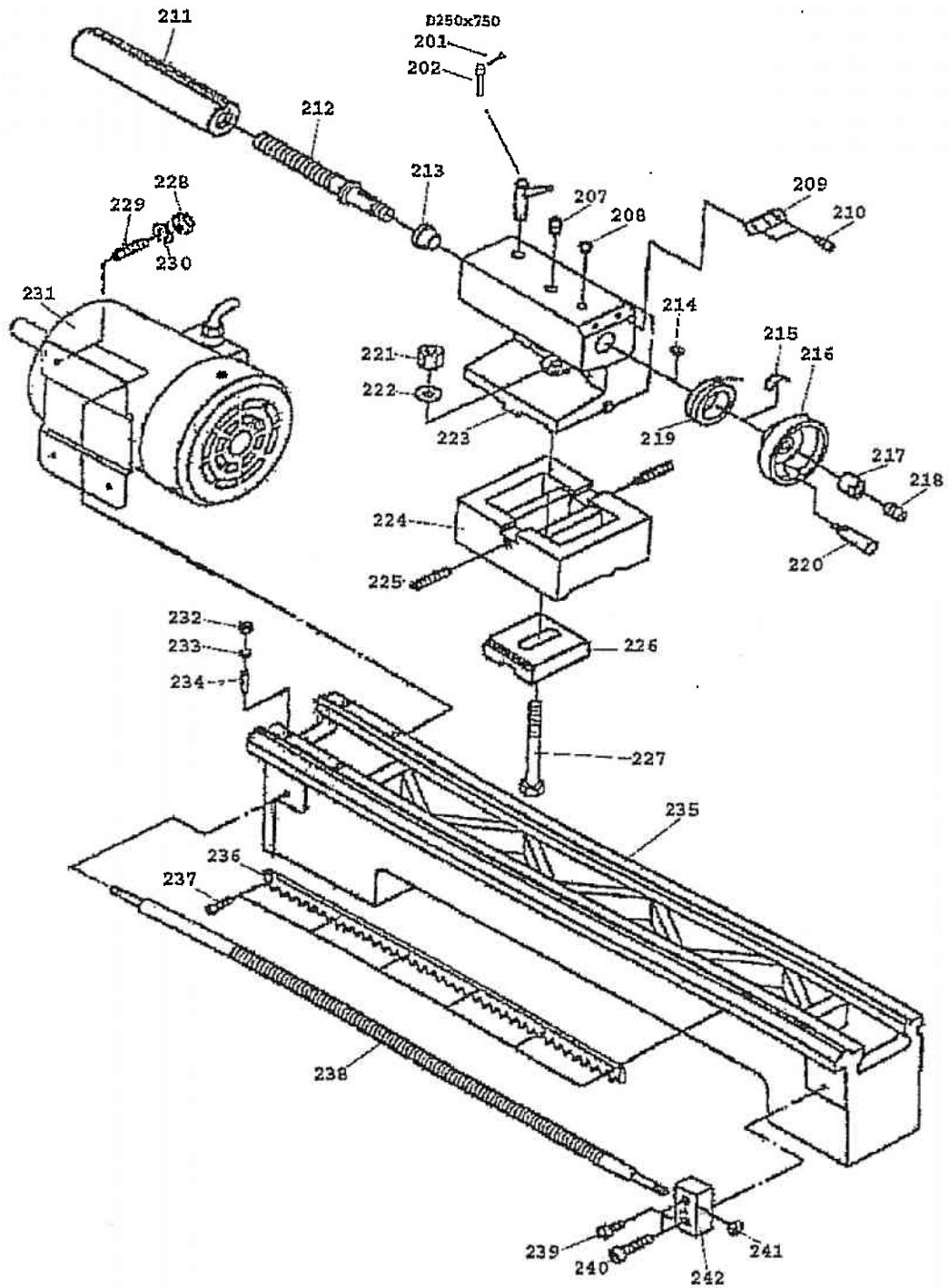
6.6.1 Spare parts list of apron

Pos.	Name	Qty.	Size
1	Bow clamping lever	1	M8
2	Clamping lever		
40	Oil nipple	2	6mm
71	Apron	1	
72	Handwheel bed slide	1	
73	Lever handwheel bed slide		
74	Clamping bolt lever handwheel		
75	Toothed wheel combination	1	
76	Retaining ring	1	DIN 471-14x1
77	Bearing pedestal	1	

Pos.	Name	Qty.	Size
78	Hexagonal socket head screw DIN 912	5	M5x25
79	Thrust bearing	1	
80	Shaft with toothed wheel	1	
81	Feather key	1	DIN 6885-A3x3x9
82	Thread pin DIN 915	1	
83	disc	1	8
84	Hexagon nut self-securing DIN 985	1	M8
85	Hexagonal socket head screw DIN 912	2	M12x40
86	Scale collar handwheel bed slide	1	

Pos.	Name	Qty.	Size
87	Guide pulley scale collar	1	
88	Spring pin DIN 1481	1	4x50
89	Collar for lever feeding	1	
90	Stroke pulley lock nut	1	
91	Stroke pivot lock nut	1	
92	Lock nut	1	
93	Guide rail lock nut	2	
94	Hexagonal socket head screw DIN 912	4	M6x16
95	Hexagonal socket head screw DIN 912	1	M5x40
96	Hexagon nut	1	M5
97	Steel ball	1	
98	Spring		
99	Thread pin DIN 915	1	

6.7 Exploded view of lathe bed



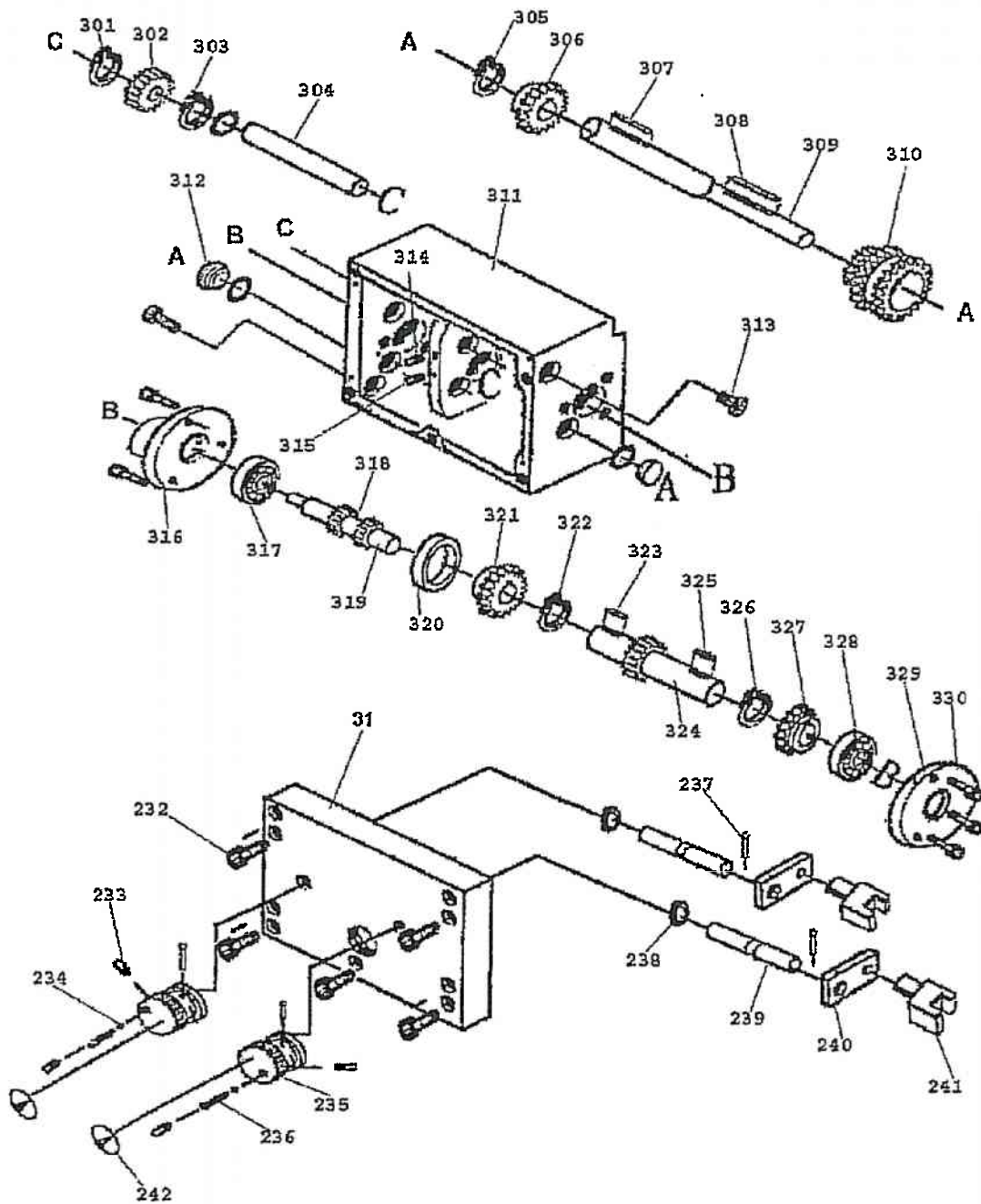
Exploded view of lathe bed

6.7.1 Spare parts list of lathe bed

Pos.	Name	Qty.	Size
1	Lock handle	1	
2			
7			
8	Lubricating nipple		
9	Tailstock marking	1	
10	Rivet		
11	Tailstock sleeve	1	
12	Tailstock spindle	1	
13	Bush	1	
14	Feather key	1	
15	Spring	1	
16	Handwheel	1	
17	Nut	1	
18	Set screw	1	
19	Graduated collar of tailstock	1	
20	Handle	1	
21	Nut	1	
22	Washer	1	
23	Tailstock	1	
24	Tailstock mounting plate	1	
25	Set screw (stud bolt)	2	
26	Clamping plate	1	
27	Hex. head cap screw	1	
28	Nut	4	
29	Set screw	4	
30	Washer	4	
31	Electromotor	1	400 V
			230 V
32	Nut	2	
33	Washer	2	
34	Set screw	2	
35	Machine bed	1	
36	Rack	1	

Pos.	Name	Qty.	Size
37	Allen screw	6	
38	Leadscrew	1	
39	Lubricating nipple	1	
40	Allen screw	1	
41	Groove nut	1	
42	Bearing pedestal	1	

6.8 Exploded view of feed gear

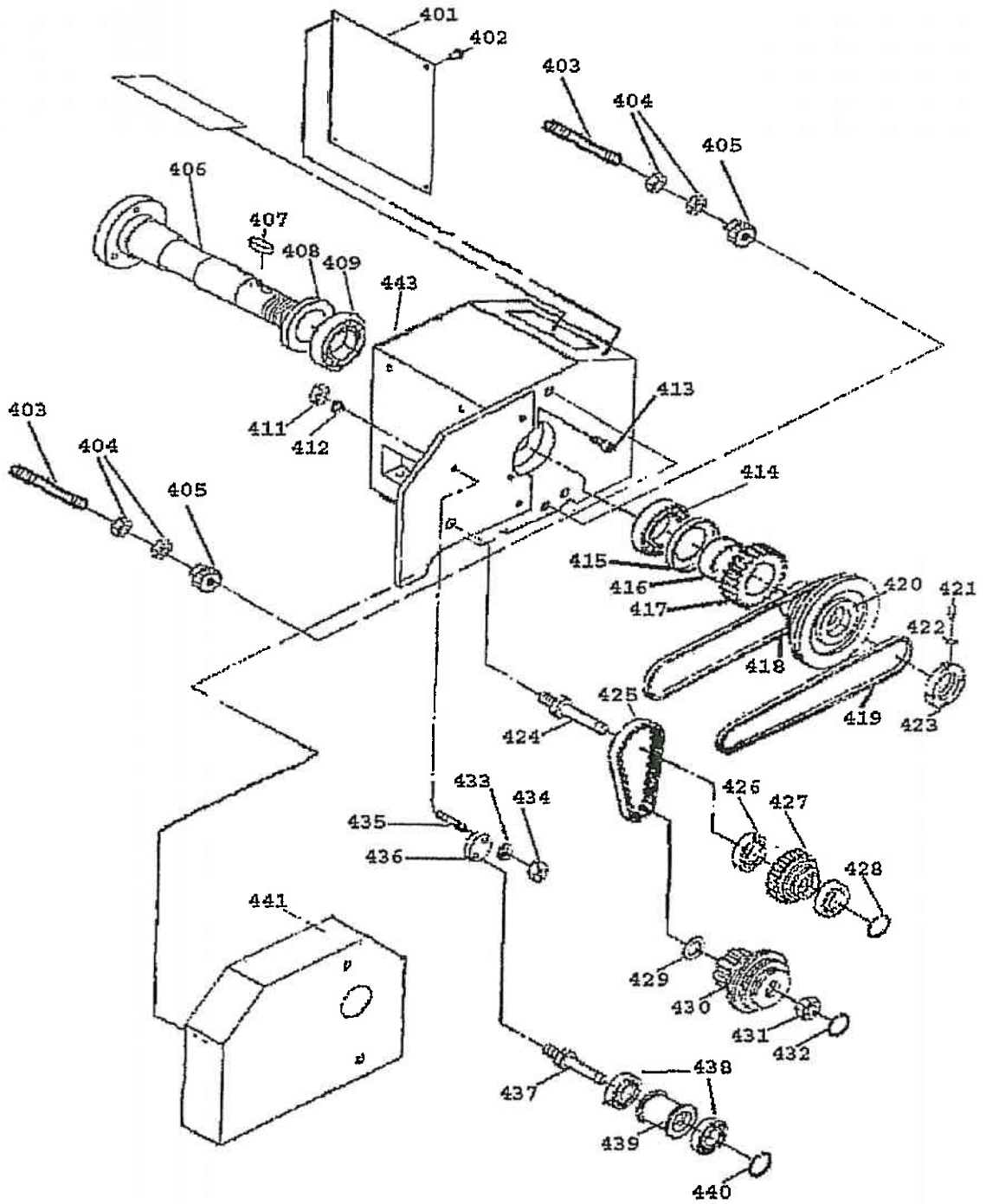


6.8.1 Spare parts list of feed gear

Pos.	Name	Qty.	Size
1	Lock washer	1	Ø12
2	Gearwheel	1	
3	Lock washer	1	Ø12
4	Shaft C	1	
5	O-ring	1	180012 50
6	Gearwheel	1	
7	Feather key	1	4 x 30
8	Feather key	1	4 x 60
9	Shaft A	1	
10	Gearwheel combination	1	
11	Gear wheel box	1	
12	Set screw for outlet	1	ZG 3/8
13	Set screw for charging hole	1	ZG 3/8
14	Screw	1	M 6x10
15	Screw	1	M 6x10
16	Flange	1	
17	Bearing	1	180202
18	Gearwheel	1	
19	Shaft	1	1215
20	Shaft ring	1	
21	Gearwheel	1	
22	Clodip	1	Ø15
23	Feather key	1	4 x 14
24	Long-face pinion	1	
25	Feather key	1	4 x 10
26	Lock washer	1	Ø15
27	Gearwheel	1	
28	Bearing	1	180202
29	Flange cover of leadscrew	1	
30	Allen screw	3	M 6x12
31	Front plate	1	
32	Steel ball	2	Ø5
33	Stud bolt	2	M 6x10
34	Stud bolt	2	M 6x10
35	Selector switch	2	
36	Spring	2	0,8 x 45 x 11
37	Pin	2	Ø5x20
38	O-ring	2	180071 0
39	Shaft	2	

Pos.	Name	Qty.	Size
40	Plate	2	
41	Gear fork	2	
42	Selector switch marking	2	

6.9 Exploded view of headstock



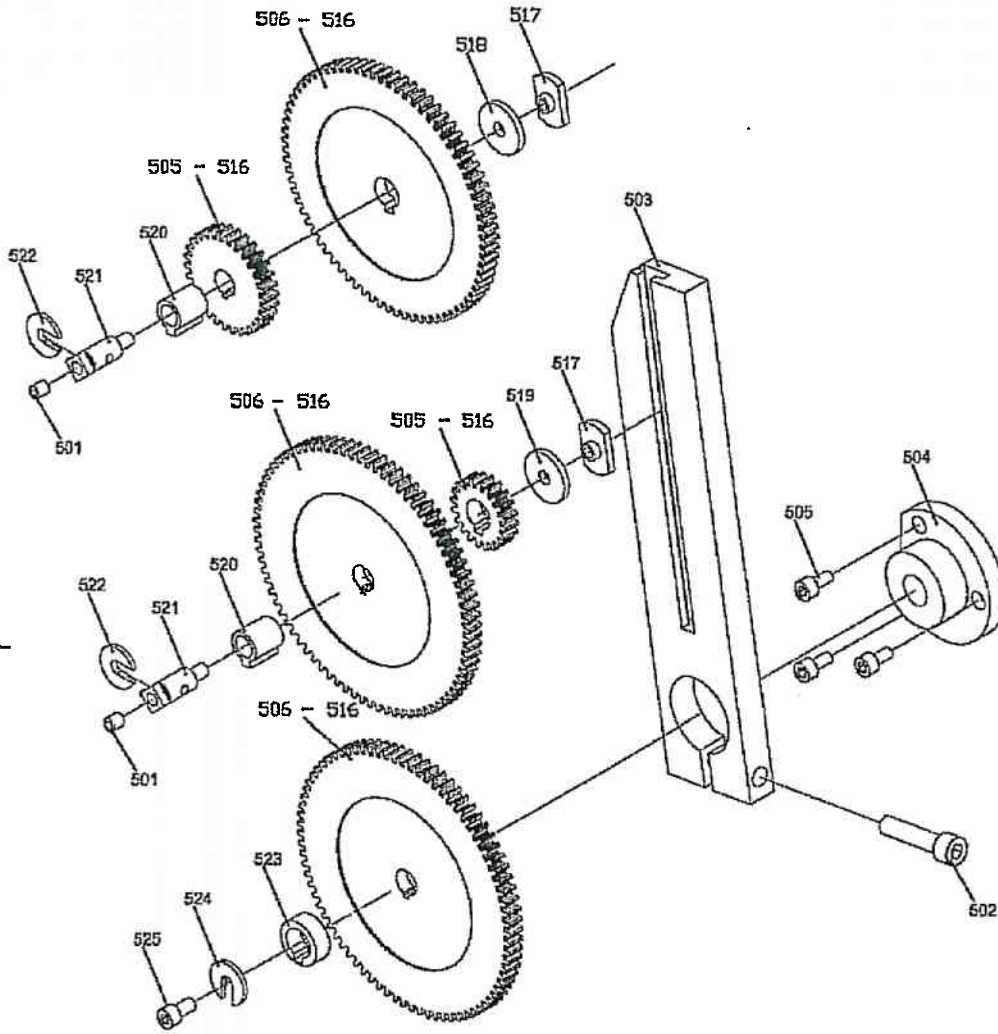
Exploded view of headstock

6.9.1 Spare parts list of headstock

Pos.	Name	Qty.	Size
1	Characteristics plate	1	
2	Fastening screws	4	M4×10
3	Protective cover of threaded rod	2	
4	Nut	4	M10
5	Nut	2	
6	Work spindle	1	
7	Feather key	1	8×45
8	Ring	1	
9	Bearing	2	
10	headstock	1	
11	Nut	2	M10
12	Washer	2	10
13	Screw	1	M8×25
14	Bearing	1	2007109E
15	Ring	1	
16	Bush	1	
17	Gearwheel	1	
18	Short V-belt	1	710
19	Long V-belt	1	838
20	Pulley combination Work spindle	1	
21	Allen screws (securing screws)	2	M5×12
22	Spring washer	2	
23	Shaft nut (groove nut)	1	
24	Driven shaft of motor	1	
25	Synchronous belt	1	Gates 230XL x 15

Pos.	Name	Qty.	Size
26	Bearing	1	16D101
27	Combination of synchronous ball pulley and V-belt pulley	1	∅ 135,32 (+ 0,12 / -0) 84 teeth
28	Screw		
29	Washer	1	
30	V-belt pulley combination Driven shaft of motor	1	∅ 28,6 (+ 0,07 / -0) 18 teeth
31			
32			
33	Washer		
34	Allen screw	1	
36	Eccentric plate of tension pulley	1	
37	Shaft of tension pulley	1	
38	Bearing	2	
39	Tension pulley	1	
40	Circlip	1	
41	Protective cover of headstock	1	

6.10 Exploded view of change gear



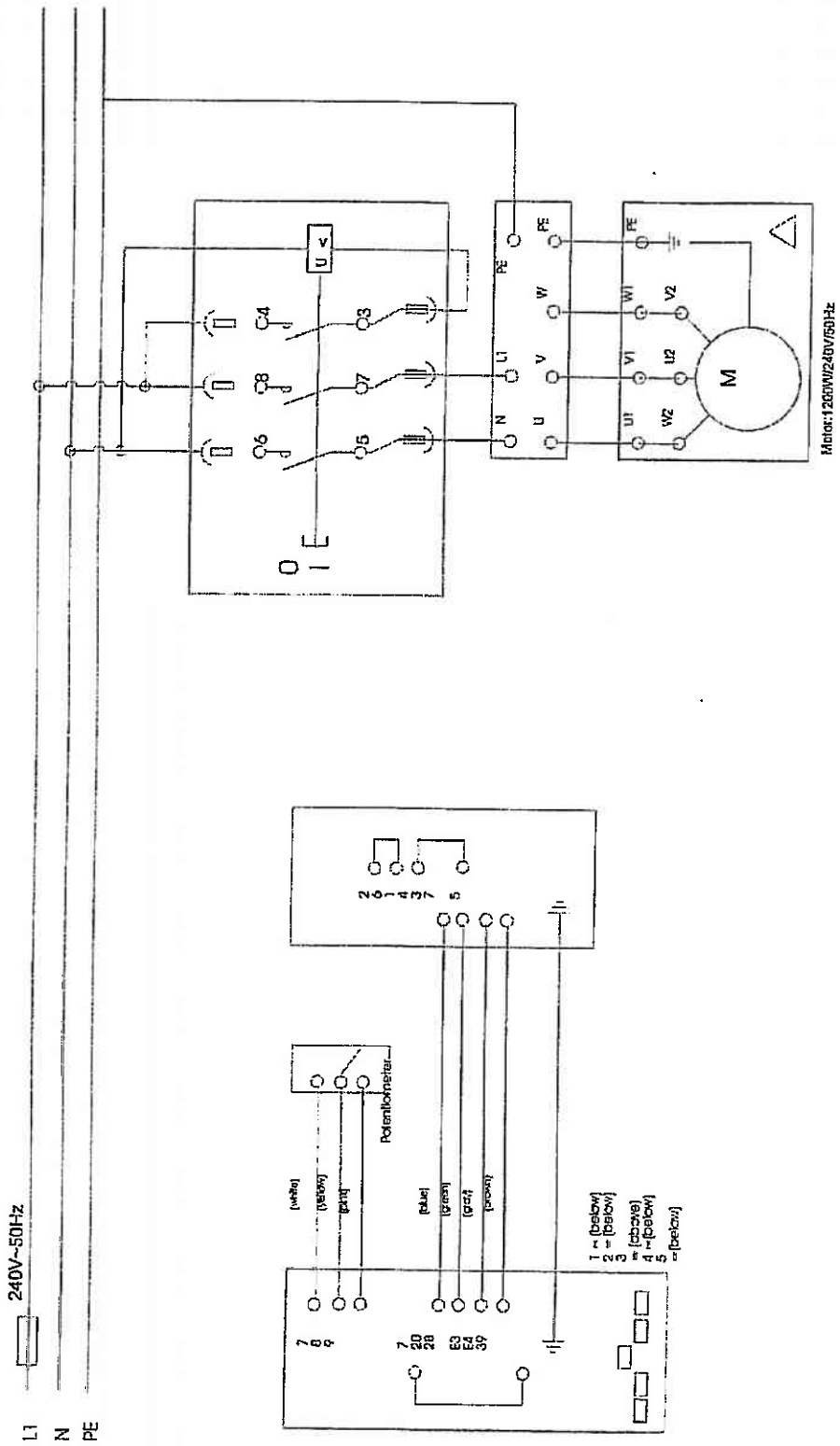
change gear D280

6.10.1 Spare parts list of change gear

Pos.	Name	Qty.	Size
501	Oil nipple	2	
502	Hexagonal socket head screw DIN 912	1	M8 x 35
503	Change gear rail	1	235mm
504	Bearing pedestal change gear rail	1	
		1	
505	Hexagonal socket head screw DIN 912	3	M5 x 10
506 - 516	change gear, t=8mm, Di=14mm		95 teeth, module 1,5
			80 teeth, module 1,5
			75 teeth, module 1,5
			70 teeth, module 1,5
			65 teeth, module 1,5
			60 teeth, module 1,5
			50 teeth, module 1,5
			45 teeth, module 1,5
			30 teeth, module 1,5
			25 teeth, module 1,5
	20 teeth, module 1,5		
517	feather key change gear rail	2	M5
518	Spacer	1	1,5 mm
519	Spacer	1	3 mm
520	Connection case change gears	2	
521	axle shaft	2	
522	locking washer	2	
523	collar spreader	1	
524	Washer	1	
525	Hexagonal socket head screw DIN 912	1	M8 x 10

6.11 Wiring diagram

DB10G/DB11G 240V/50Hz



7 Anomalies

7.1 Anomalies in the lathe

Problem	Cause / possible effects	Solution
Machine does not switch-on	<ul style="list-style-type: none"> • Precedence of switch-on not considered. • Release of the FI protected switch. 	<ul style="list-style-type: none"> • Power connection
Surface of workpiece too rough	<ul style="list-style-type: none"> • Tool blunt • Tool springs • Feed too high • Radius at the tool tip too little 	<ul style="list-style-type: none"> • Resharpen tool • Clamp tool with less overhang • Reduce feed • Increase radius
Workpiece is becoming coned	<ul style="list-style-type: none"> • Centres are not aligned (tailstock has offset) • Top slide not aligned well (cutting with the top slide) 	<ul style="list-style-type: none"> • Adjust tailstock to the centre • Align top slide well
Lathe is chattering	<ul style="list-style-type: none"> • Feed too high • Main bearings have clearance 	<ul style="list-style-type: none"> • Reduce feed • Have the main bearing readjusted
Centre runs hot	<ul style="list-style-type: none"> • Workpiece has expanded 	<ul style="list-style-type: none"> • Loosen tailstock tip
Tool has a short edge life	<ul style="list-style-type: none"> • Cutting speed too high • Crossfeed too high • Insufficient cooling 	<ul style="list-style-type: none"> • Reduce cutting speed • Lower crossfeed/smooth finish (allowance not over 0.5 mm) • More coolant
Flank wear too high	<ul style="list-style-type: none"> • Clearance angle too small (tool "pushes") • Tool tip not adjusted to centre height 	<ul style="list-style-type: none"> • Increase clearance angle • Correct height adjustment of the tool
Cutting edge breaks off	<ul style="list-style-type: none"> • Wedge angle too small (heat build-up) • Grinding crack due to wrong cooling • Excessive clearance in the spindle bearing arrangement (vibrations) 	<ul style="list-style-type: none"> • Increase wedge angle • Cool uniformly • Have the clearance in the spindle bearing arrangement readjusted
Cut thread is wrong	<ul style="list-style-type: none"> • Tool is clamped incorrectly or has been started grinding the wrong way • Wrong pitch • Wrong diameter 	<ul style="list-style-type: none"> • Adjust tool to the centre - Grind angle correctly • Adjust the right pitch • In a previous step, turn the workpiece to the correct diameter

8 Appendix

8.1 Copyright

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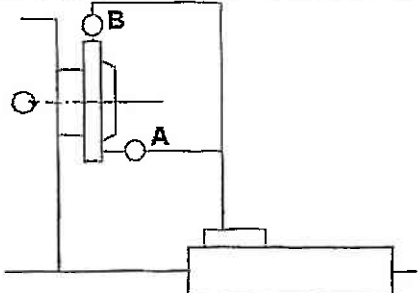
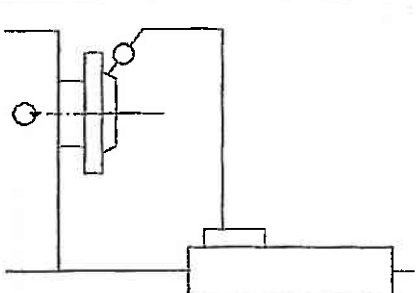
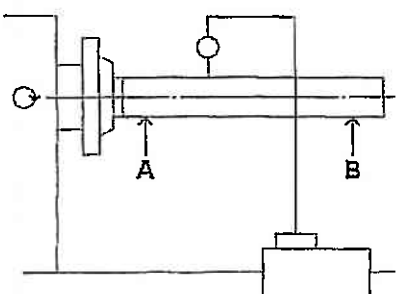
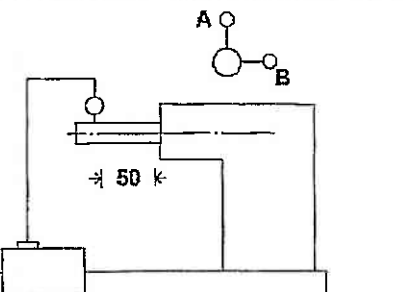
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8.2 Terminology/Glossary

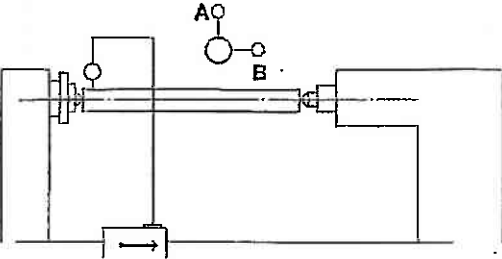
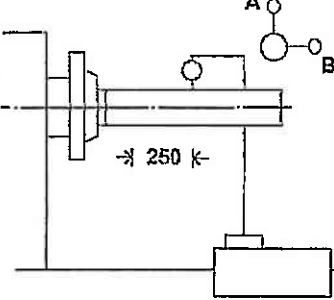
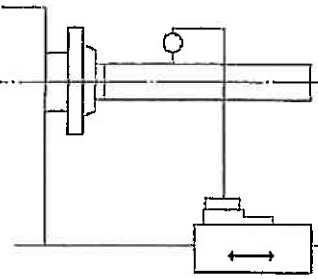
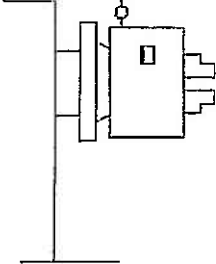
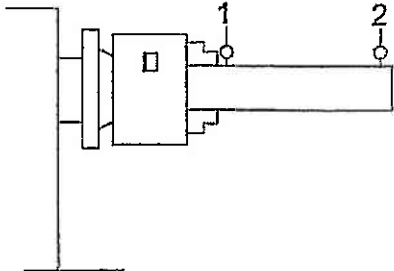
Term	Explanation
Headstock	Housing for the feed gear and the synchronous belt pulleys
Leadscrew nut	Split nut which engages in the leadscrew
Lathe chuck	Clamping tool for holding the workpiece
Drill chuck	Device for holding the bit
Lathe saddle	Slide on the slideway of the machine bed which feeds parallel 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 mandrel	Taper of the bit, the drill chuck or the centre
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 centres

9 Test Report

Model:DB10G/DB11G

No	Object of testing	Drawing	Permissible [mm]	Measured [mm]
1	Run-out of spindle and periodical radial slip of spindle	 <p>The drawing shows a vertical spindle assembly. A horizontal line with a circle at its end (feature A) is positioned on the spindle's surface. Another horizontal line with a circle at its end (feature B) is positioned on the spindle's nose. A vertical line with a circle at its end is also shown. The spindle is mounted on a base.</p>	A: 0,009 B: 0,009	A: 0,005 B: 0,008
2	Run-out of spindle nose	 <p>The drawing shows a vertical spindle assembly. A horizontal line with a circle at its end (feature A) is positioned on the spindle's nose. A vertical line with a circle at its end is also shown. The spindle is mounted on a base.</p>	0,009	0,007
3	Run-out of internal taper of spindle	 <p>The drawing shows a horizontal spindle assembly. A vertical line with a circle at its end (feature A) is positioned on the spindle's surface. Another vertical line with a circle at its end (feature B) is positioned on the spindle's nose. The spindle is mounted on a base.</p>	A: 0,015 B: 0,03	A: 0,01 B: 0,03
4	Parallelism of tailstock guide A = in the vertical plane B = in the horizontal plane	 <p>The drawing shows a horizontal spindle assembly. A vertical line with a circle at its end (feature A) is positioned on the spindle's surface. Another vertical line with a circle at its end (feature B) is positioned on the spindle's nose. A dimension line with arrows and the text '50 k' is shown. The spindle is mounted on a base.</p>	A: 0,025/50 B: 0,015/50	A: 0,01 B: 0,005

Model: DB10G/DB11G

5	<p>Headstock (MT 3) and tailstock (MT 2) centres for same height above reference plane</p>		A: 0,03	A: 0.03
6	<p>Parallelism of spindle axis with carriage movement A = vertical plane B = horizontal plane</p>		A: 0,03/250 B: 0,03/250	A: 0.025 B: 0.03
7	<p>Parallelism of top slide with spindle and carriage movement</p>		0,04/75	0.02
8	<p>Run-out of yaw chuck</p>		0,04	0.03
9	<p>Run-out of yaw chuck Object of testing A: Ø 20mm B: Ø 30mm</p>		A) Ø 20mm 1: 0,04 2: 0,08/100 B) Ø 30mm 1: 0,04 2: 0,08/100	A) 1: 0.02 2: 0.09 B) 1: 0.03 2: 0.05

1 Visual inspection		O.k.	gebessert improved	3. Electrical test		O.k.	improved
a) Damages of lacquer	<input checked="" type="checkbox"/>	<input type="checkbox"/>		a) Connection and function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Rust damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>		b) Function emergency bush button	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
c) Identification plate data correctly, completely	<input checked="" type="checkbox"/>	<input type="checkbox"/>		c) Connection points in the engine terminal box attracted	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
d) Transport damages	<input checked="" type="checkbox"/>	<input type="checkbox"/>		d) Motor clockwise rotation, left hand motion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Completeness		O.k.	beigelegt	4. Mechanical test		O.k.	improved
a) CE sign	<input checked="" type="checkbox"/>	<input type="checkbox"/>		a) Drive belt tension	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) 3-yaw chuck	<input checked="" type="checkbox"/>	<input type="checkbox"/>		b) Top slide taper gib clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
c) Quadruple toolholder	<input checked="" type="checkbox"/>	<input type="checkbox"/>		c) Cross slide taper gib clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
d) Change gear set	<input checked="" type="checkbox"/>	<input type="checkbox"/>		d) Top slide spindle clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
e) 2 fixed center and toolbox	<input checked="" type="checkbox"/>	<input type="checkbox"/>		e) Cross slide spindle clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
f) Acceptance and inspection report	<input checked="" type="checkbox"/>	<input type="checkbox"/>		f) Carriage surfaces cleaned	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
g) Drehfutterschlüssel Chuck Spanner	<input checked="" type="checkbox"/>	<input type="checkbox"/>		g) Spindles cleaned and greased, operation smoothness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
h) Operating manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>		h) Tailstock, function / wedging	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional parts				5. Test run		O.k.	improved
				a) Quiet running	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
				b) Temperature of both spindle bearings, while running with ~ 1000min ⁻¹ after 15 minutes within the range of 50 - 60°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Serial no of the machine	Customer						
	Place						