



BD-11GDMA

OPERATING MANUAL LATHE

Original:

GB
Operating Instructions



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Made in PRC /

50000915MCD

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In addition to the safety requirements contained in these operating instructions and your country's applicable regulations, you should observe the generally recognized technical rules concerning the operation of metal machines.

Any other use exceeds authorization.

In the event of unauthorized use of the machine, the manufacturer renounces all liability and the responsibility is transferred exclusively to the operator.

General safety notes

Read and understand the entire instruction manual before attempting assembly or operation.



Keep this operating instruction close by the machine, protected from dirt and humidity, and pass it over to the new owner if you part with the tool.

No changes to the machine may be made.

Daily inspect the function and existence of the safety appliances before you start the machine. Do not attempt operation in this case, protect the machine by unplugging the power cord.

Before operating the machine, remove tie, rings, watches, other jewellery, and roll up sleeves above the elbows. Remove all loose clothing and confine long hair.

Wear safety shoes; never wear leisure shoes or sandals.

Always wear the approved working outfit:

- safety goggles
- ear protection



Do not wear gloves while operating this machine.



Install the machine so that there is sufficient space for safe operation and workpiece handling.

Keep work area well lighted.

The machine is designed to operate in closed rooms and must be bolted stable on firm and levelled table surface or on the supplied cabinet stand.

Make sure that the power cord does not impede work and cause people to trip.

Keep the floor around the machine clean and free of scrap material, oil and grease.

Stay alert!

Give your work undivided attention.

Use common sense. Do not operate the machine when you are tired.

Keep an ergonomic body position.

Maintain a balanced stance at all times.

Do not operate the machine under the influence of drugs, alcohol or any medication. Be aware that medication can change your behaviour.



Never reach into the machine while it is operating or running down.



Keep children and visitors a safe distance from the work area.

Never leave a running machine unattended. Before you leave the workplace switch off the machine.

Do not operate the electric tool near inflammable liquids or gases.

Observe the fire fighting and fire alert options, for example the fire extinguisher operation and place.

Do not use the machine in a dump environment and do not expose it to rain.

Before machining, remove any nails and other foreign bodies from the workpiece.

Work only with well sharpened tools.

Machine only stock which rests securely on the table.

Always close the chuck cover before you start the machine.

Specifications regarding the maximum or minimum size of the workpiece must be observed.

Do not remove chips and workpiece parts until the machine is at a standstill.

Do not stand on the machine.

Connection and repair work on the electrical installation may be carried out by a qualified electrician only.



Have a damaged or worn power cord replaced immediately.

Make all machine adjustments or maintenance with the machine unplugged from the power source.



Do not over extrude material from the back of spindle bore while machine running.



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GB - ENGLISH

Operating Instructions

Dear Customer,

Many thanks for the confidence you have shown in us with the purchase of your new JET-machine. This manual has been prepared for the owner and operators of a **JET BD-11GDMAOperatingManualLathe** promote safety during installation, operation and maintenance procedures. Please read and understand the information contained in these operating instructions and the accompanying documents. To obtain maximum life and efficiency from your machine, and to use the machine safely, read this manual thoroughly and follow instructions carefully.

Warranty

The Seller guarantees that the supplied product is free from material defects and manufacturing faults. This warranty does not cover any defects which are caused, either directly or indirectly, by incorrect use, carelessness, accidental damage, repair, inadequate maintenance or cleaning and normal wear and tear.

Guarantee and/or warranty claims must be made within twelve months from the date of purchase (date of invoice). Any further claims shall be excluded.

This warranty includes all guarantee obligations of the Seller and replaces all previous declarations and agreements concerning warranties.

The warranty period is valid for eight hours of daily use. If this is exceeded, the warranty period shall be reduced in proportion to the excess use, but to no less than three months.




Returning rejected goods requires the prior express consent of the Seller and is at the Buyer's risk and expense.

Further warranty details can be found in the General Terms and Conditions (GTC). The GTC can be viewed at www.jettools.com or can be sent by post upon request.

The Seller reserves the right to make changes to the product and accessories at any time.

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 JPW Machine 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 JPW Machine 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.

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 stuff.

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 unauthor- ised 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



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.

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.

1.6.4 Prohibition, warning and mandatory labels

INFORMATION

All warning labels must be legible. Check them regularly.

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 organizing the checks.

General check		
Equipment	Check	OK
Protective 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 hand brush.
- 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 "o" 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:

b Covers

b Safety indications and warning signs

b 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 JPW (Tool) AG 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.

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. Specifications for lathe part

Model number..... BD-11GDMA
 Stock number.....50000915MCD

Motor and electricals:

Motor type..... Induction motor
 Motor power.....1.1 kW
 Power supply.....230V, PE, 50Hz
 Protection class..... IP 54
 Machine lamp.....Halogen lamp 24V, 35W
 Coolant pump..... 40W

Capacities:

Centre height..... 140mm
 Swing over bed.....280 mm
 Swing over cross slide..... 170 mm
 Distance between Centres.....700 mm

Spindle:

Spindle nose mounting..... A125 - DIN 6350 (ϕ 125mm, ϕ 96mm, ϕ 108-3x ϕ 9/4x ϕ 9)
 Spindle bore..... 26 mm
 Spindle taper..... MT4
 Number of spindle speeds..... 6
 Range of spindle speeds..... 150 ~ 2000 /min

Tailstock:

Tailstock ram travel.....85 mm
 Tailstock taper.....MT2

Tool Slide:

Cross slide travel..... 145 mm
 Top slide travel.....60 mm
 Tool size max..... 12x12mm
 Lead screw pitch..... 3 mm
 Longitudinal feeds..... (6x) 0.07 / 0,1 / 0,14 / 0.2 / 0.28 / 0.40 mm/rev
 Metric threads..... (21x) 0.2~4.0 mm/rev
 Inch threads..... (21x) 8 ~ 56 TPI

Materials:

Machine Bed..... Cast iron, induction hardened and precision ground
 Headstock, tailstock, slides..... Cast iron
 Spindle bearings..... Taper roller bearings, quality level P5

Sound emission in idle ¹..... 73.4 dB (LpA)
 Sound emission during cutting ¹..... 78.3 dB (LpA)

¹ Sound emission measured according to EN ISO 11202, in 1m distance, 1.6m above ground. The specified values are emission levels and are not necessarily to be seen as safe operating levels. As workplace conditions vary, this information is intended to allow the user to make a better estimation of the hazards and risks involved only.

Dimensions and Weights:

Overall dimensions, assembled (W x D x H)..... 1380 x 700 x 1285 mm
 Shipping dimensions (W x D x H) (Seperate packing)..... 1320 X700 X 690mm + 820X680X430mm
 Shipping dimensions (W x D x H) (Whole packing)..... 1400 X 700 X 1470mm
 Net weight (approximate)..... 240 kg
 Shipping weight (approximate)..... 270 kg

L = length; W = width; H= height; D= depth

The specifications in this manual were current at time of publication, but because of our policy of continuous improvement, JET reserves the right to change specifications at any time and without prior notice, without incurring obligations.

Environmental conditions	BD-11G
Temperature	5 - 35 °C
Humidity	25 - 80 %

Operating material	BD-11G
Feed gear	Mobilgear 627 or equivalent oil
Bright steel parts and lubricating	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. Consult JPW (Tool) AG if the lathe and accessories have to be stored for a period of over three months or under different environmental conditions to those given here.

3.4 Installation and assembly

3.4.1 Requirements of the installation site

Organize 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!

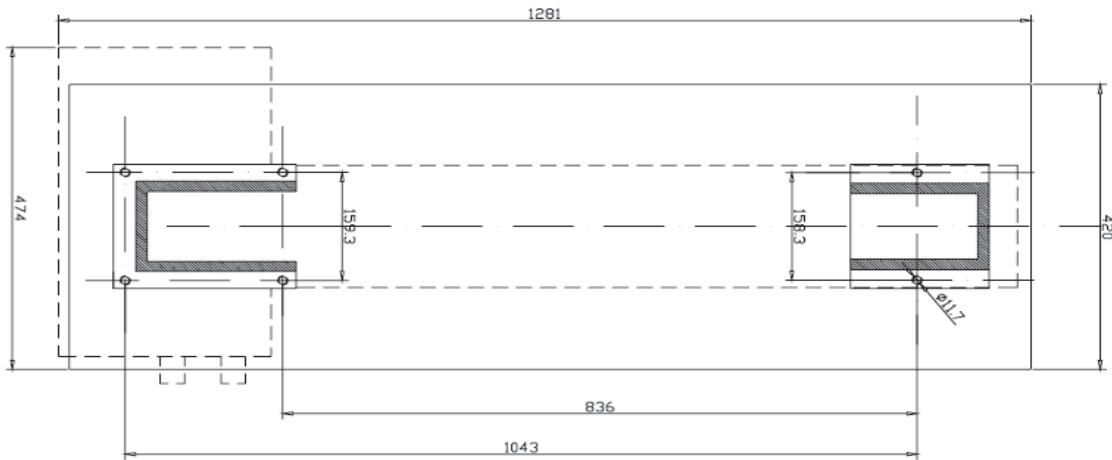
Insufficient rigidity of the foundation leads to the superposition of vibrations between the machine and the foundation (natural frequency of components). Insufficient rigidity of the entire lathe assembly also rapidly causes the lathe to reach critical speeds, with unpleasant vibrations, leading to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

3.4.4 Installation drawing BD-11GDMA for lathe part



ATTENTION!

Tighten the fastening screws on the lathe only until it is firmly secured and cannot move during operation. If the fastening screws are too tight and the foundation is uneven, the bed of the lathe may break.

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.

“Inspection and maintenance“ on page 44

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 45)

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)

- BD-11 lathe

INFORMATION

On lathes of the type "VARIO" the frequency converter (driving regulator) might release the FI protected switch of your electrical supply. In order to avoid malfunction, you either need an FI protected switch sensitive for pulse current or AC/DC sensitive.

In case of a malfunction or release of the FI protected switch, please check the type installed. The following signs indicate if you have one of the FI protected switches described above.

We recommend you to use an FI protected switch sensitive to AC/DC. FI protected switches sensitive to AC/DC (RCCB, type B are adequate for 1 phase and 3phase fed frequency converters (driving regulator).

An FI protected switch type AC (only for alternating current (AC) is not appropriate for frequency converters. FI protected switches type AC are no longer used.

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.

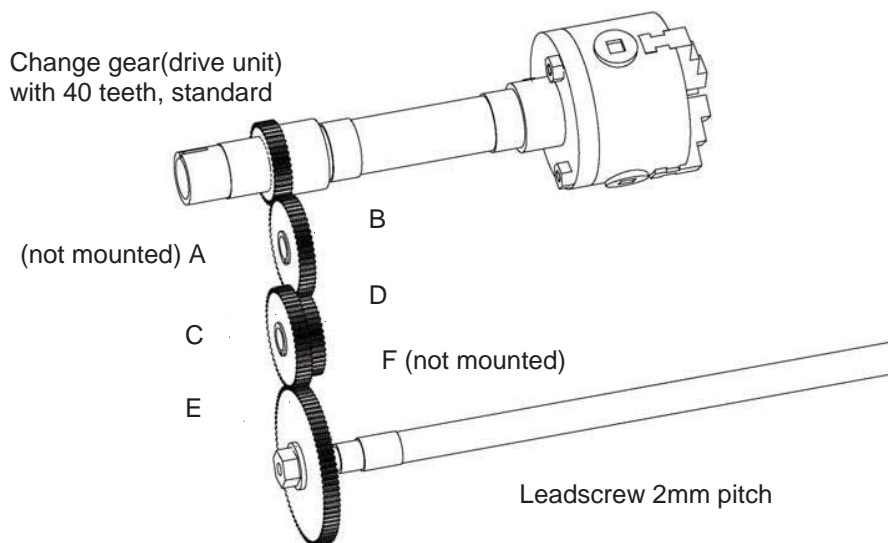


WARNING!

- 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 Change gears

3.6.1 Assembly of gears changing



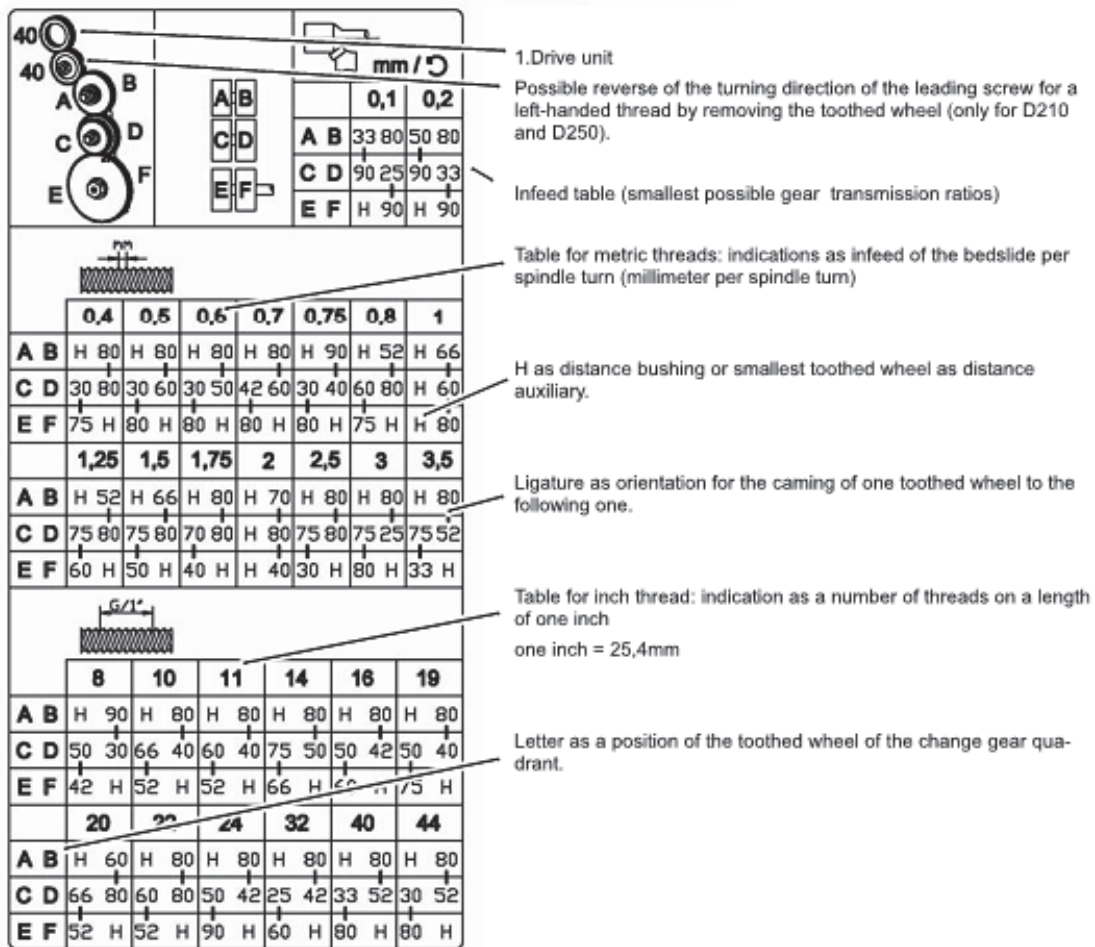
INFORMATION

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

For the lathes D210 and D250, an additional toothed wheel is mounted behind the 1st toothed wheel (drive unit) so that by removing this toothed wheel the turning direction of the leading screw is being changed and that you may machine a left-handed thread. By removing the toothed wheel, the gear transmission ratio is not being changed, the thread pitch remains the same. Therefore, the leading screw of the lathes D210 and D250 have a right-handed thread. As you may see in the following example for a calculation, the size of the toothed wheel B is not important as in the calculation they cancel each other out (reducing a fraction). Therefore you may use a toothed wheel 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 for D210 and D250 which results from the removed toothed wheel.

3.6.2 Table of the gear wheels

The tables are built up in a way that you may later on assemble the required combination to cut a thread without having to look up the details. Ligatures from one figure to the following one represent the coming of one toothed wheel to the following one. The identifier "H" stands for bushing or a small toothed wheel as an auxiliary distance. This smaller toothed wheel as an auxiliary distance must of course not be came in with any other toothed wheel. For the following example the table of D210 and D250 had been selected.



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. With the equipment variant, it is possible to adjust the speeds progressively within the corresponding speed ranges.

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

- Lead screw 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.

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 lead-screw.

4.5 Apron

The apron houses the lead screw 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.

4.6 Tailstock

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

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.

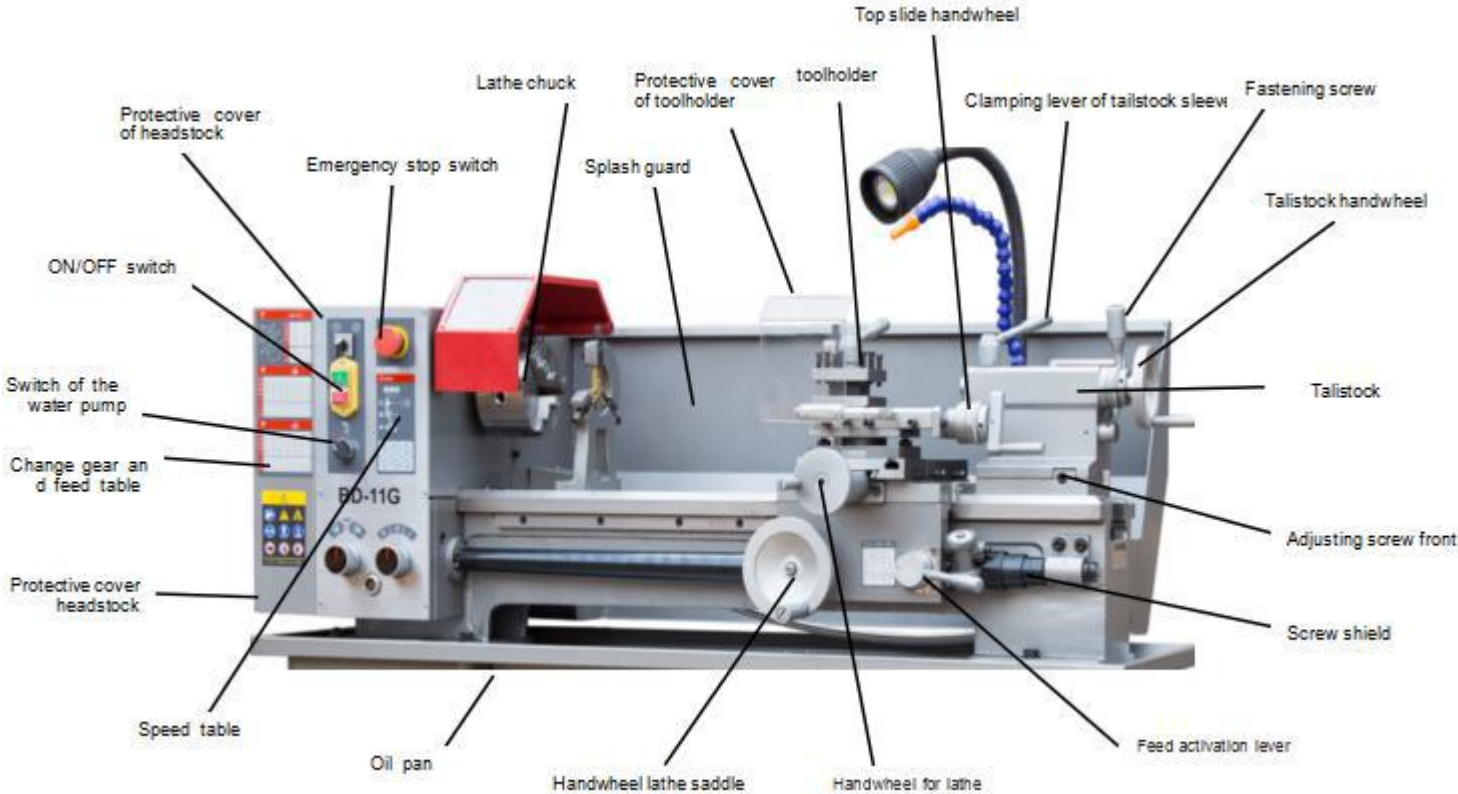


All anomalies should be eliminated immediately. Stop the machine immediately in the event of any abnormality in operation and make sure it cannot be started up accidentally or without authorization.

Notify the person responsible immediately of any modification.

5.2 Control and indicating elements for lathe part

5.2.1 BD-11GDMA for lathe part



5.3 Control elements

Feed speed	Thread metric	Thread inches	Leadscrew nut disengaged	Leadscrew nut engaged	Feed direction

5.4 Toolholder

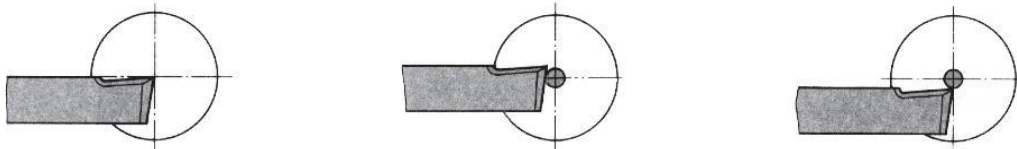
Clamp the turning tool into the toolholder.

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.

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.



5.4.2 Tool angle



ATTENTION!

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



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 cor- rectly, 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.



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.

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 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 potenti- ometer on the control panel of the lathe.

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.

5.6.2 Changing the speed range

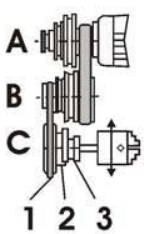
- Loosen the nut on the tension pulley holder and release the tension of the V-belt.
- Lift the V-belt into the corresponding position.
- Depending on the speed selected, the V-belt will have to be lifted directly onto the motor pulley or onto the pulley of the primary transmission. Two V-belts of different lengths have therefore been provided for the BD-11 lathe.
- 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 BD-11



	AC 1	AC 2	AC 3
A	500	1000	2000
B	BC 1	BC 2	BC 3
C	150	300	600

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.



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.
- Swing the quadrant to the right.
- Unscrew the bolt from the lead screw 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.
- 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.

- 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 hand-

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

Use the top slide handwheel to move the corresponding 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.

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.

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.

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.

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.

○ 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 countersinks.

5.10 Clamping a workpiece into the lathe chuck

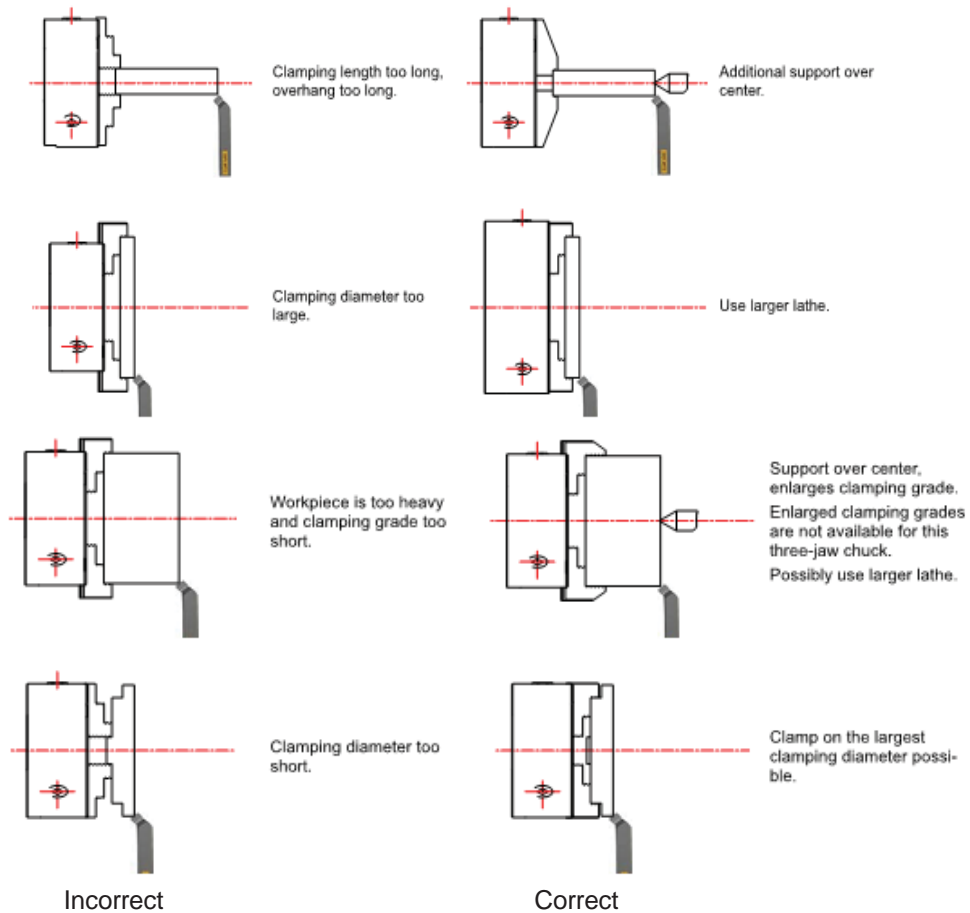
When the workpiece is being clamped unprofessionally, there is a risk of injury as the workpiece may fly off or the jaws may break. The following examples do not show all possible situations of danger.

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!

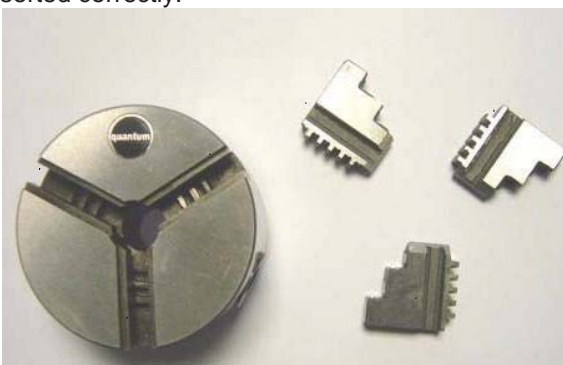
Do not clamp any workpieces that exceed the permitted chucking capacity of the lathe chuck. The clamping force of the chuck is too low if its capacity is exceeded. Also, the jaws may come loose.



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.



5.11 General working notes

5.11.1 Fitting a follow rest

The lathe BD-11 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.

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.



INFORMATION

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

6. Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repair



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 JPW 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.

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.

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 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	<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 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>
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.
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.
Every month	BD-11	Lubricate	Lubricate all lubricating nipples with machinery oil.

**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

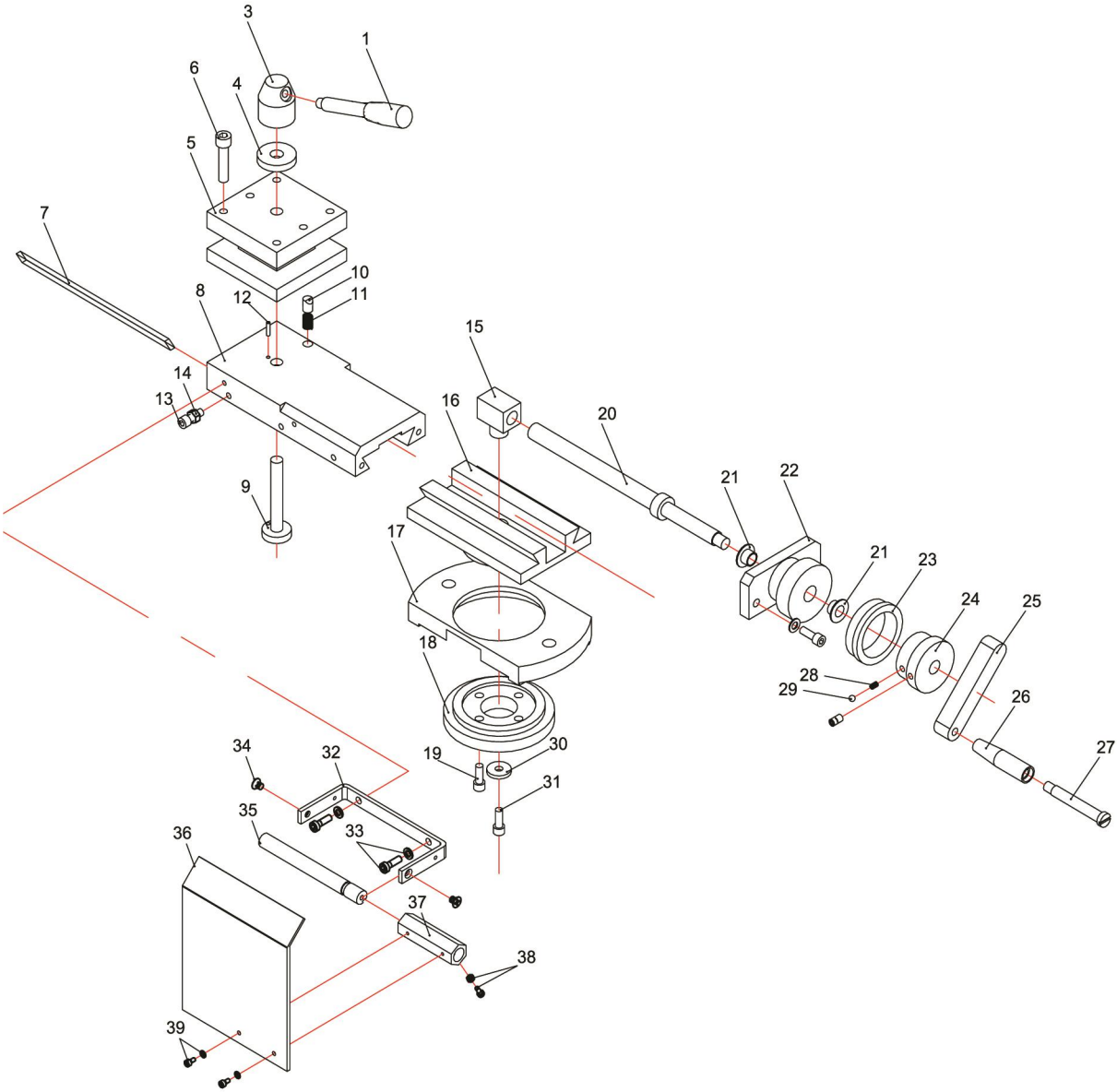
For any repair work, get assistance from an employee of JPW Machine GmbH's technical service or send us the lathe.

If the repairs are carried out by qualified technical staff, they must follow the indications given in this manual. JPW (Tool) AG 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 authorized by JPW (Tool) AG

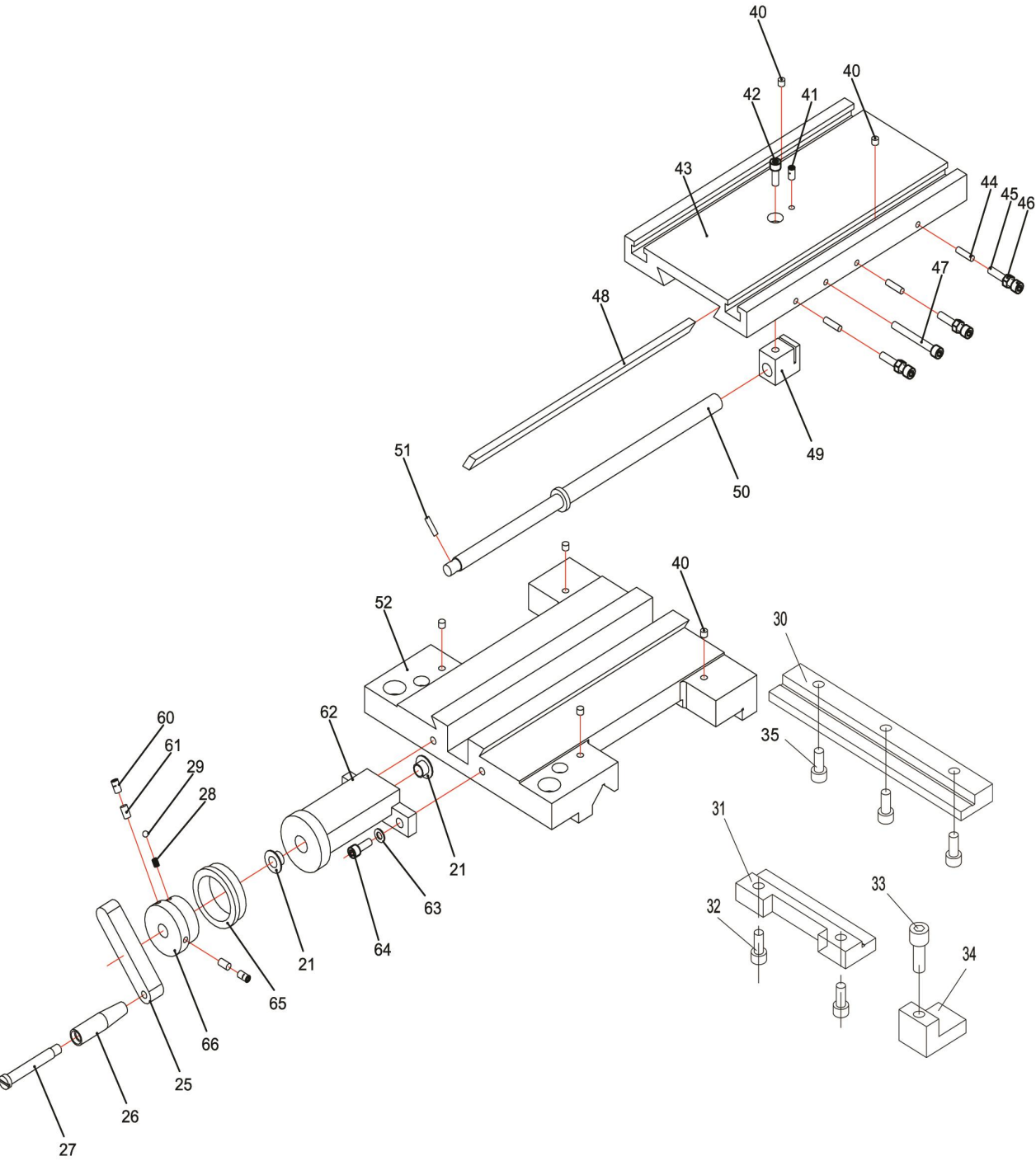
6.4 Exploded view of top slide



6.4.1 Spare part list of top slide

Index NO	Parts NO.	Description	Size	Qty
1	BD11TS-1	Clamping handle		1
3	BD11TS-3	Clamping nut quadruple tool holder		1
4	BD11TS-4	Washer		1
5	BD11TS-6	Quadruple tool holder		1
6	BD11TS-5	Hex socket head screwDIN 912	M8×35	8
7	BD11TS-7	Gib top slide		1
8	BD11TS-8	Top slide		1
9	BD11TS-9	Threaded bolt tool holder		1
10	BD11TS-10	Stop pin		1
11	BD11TS-11	Spring		1
12	BD11TS-12	Fixing pin		1
13	BD11TS-13	Hex socket head screwDIN 912	M6×16	3
14	BD11TS-14	Nut	M6	3
15	BD11TS-15	Spindle nut		1
16	BD11TS-16	Dovetail guideway top slide		1
17	BD11TS-17	Clamp collar		1
18	BD11TS-18	Scale collar		1
19	BD11TS-19	Hex socket head screwDIN 912	M6×16	1
20	BD11TS-20	Spindle		1
21	BD11TS-21	Slide bearing		1
22	BD11TS-22	Bearing pedestal spindle		1
23	BD11TS-23	Scale collar handwheel		1
24	BD11TS-24	Scale guide		1
25	BD11TS-25	Lever		1
26	BD11TS-26	Handle		1
27	BD11TS-27	Clamping bolt		1
28	BD11TS-28	Spring		1
29	BD11TS-29	Steel ball		1
30	BD11TS-30	Pulley		1
31	BD11TS-31	Hex socket head screwDIN 912	M6×25	1
32	BD11TS-32	Attachment handle		1
33	BD11TS-33	Hex socket head screw and washerDIN 912	M5×12	2
34	BD11TS-34	Countersunk screw	M5×6	2
35	BD11TS-35	Shaft		1
36	BD11TS-36	Chip Shield		1
37	BD11TS-37	Hex case		1
38	BD11TS-38	Hex socket head screw and nutDIN 912	M3×8	1
39	BD11TS-39	Hex socket head screw and washerDIN 912	M3×6	2

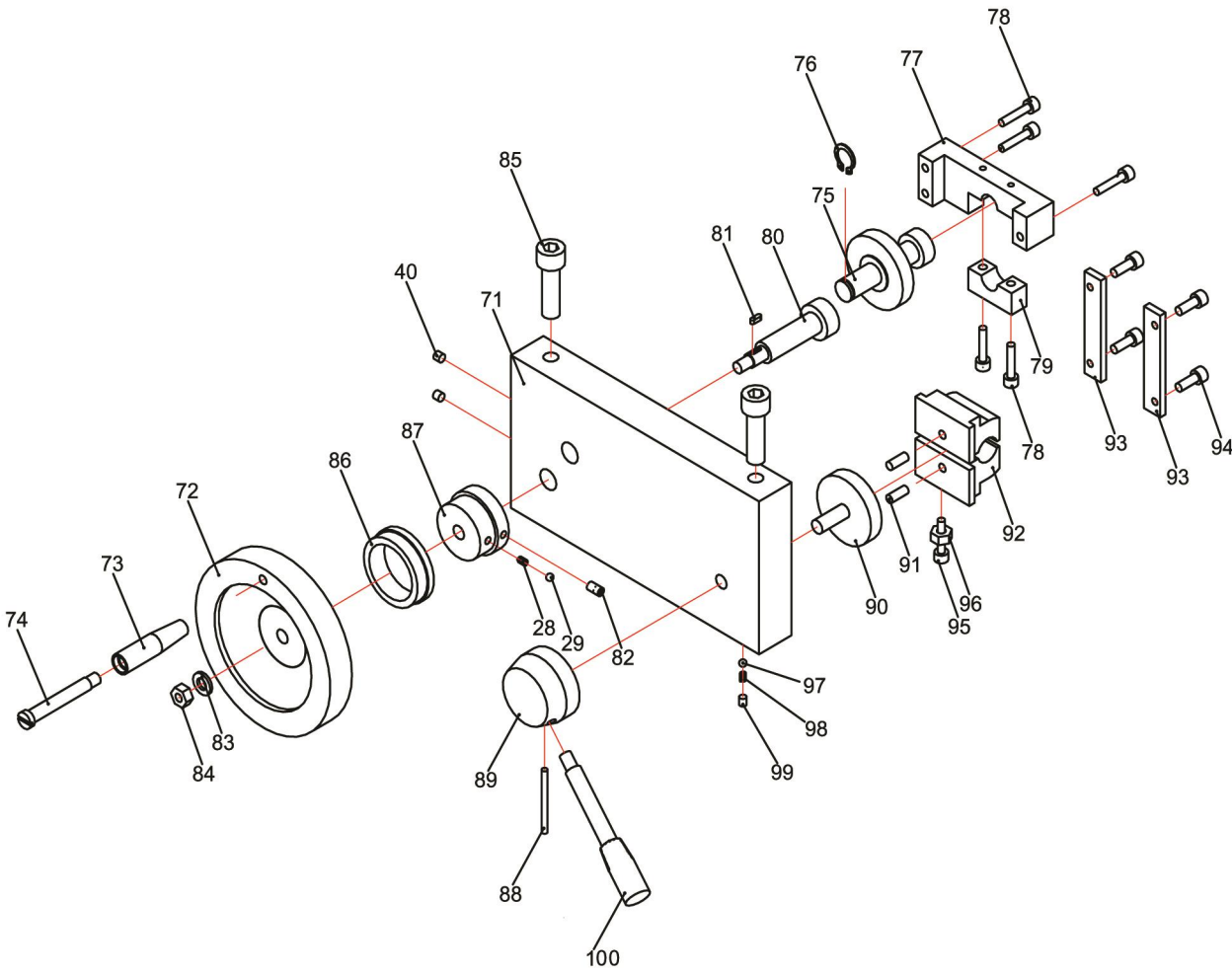
6.5 Exploded view of cross slide



6.5.1 Spare parts list of cross slide

Index NO	Parts NO.	Description	Size	Qty
21	BD11CS-21	Slide bearing		2
25	BD11CS-25	Lever		1
26	BD11CS-26	Handle		1
27	BD11CS-27	Clamping bolt		1
28	BD11CS-28	Spring		1
29	BD11CS-29	Steel ball		1
30	BD11CS-30	Back clamp		1
31	BD11CS-31	Before clamp		1
32	BD11CS-32	Hex socket head screw DIN 912	M8X30	2
33	BD11CS-33	Hex socket head screw DIN 912	M8X40	1
34	BD11CS-34	Brake clamp		1
35	BD11CS-35	Hex socket head screw DIN 912	M8X30	3
40	BD11CS-40	Oil nipple	6mm	6
41	BD11CS-41	Thread pin DIN 914	M6×10	1
42	BD11CS-42	Hex socket head screw DIN 912	M8×10	1
43	BD11CS-43	Cross slide		1
44	BD11CS-44	Brush pin		3
45	BD11CS-45	Hex socket head screw DIN 912	M6×30	1
46	BD11CS-46	Nut	M6	1
47	BD11CS-47	Hex socket head screw DIN 912	M6×30	1
48	BD11CS-48	Gib cross slide		1
49	BD11CS-49	Spindle nut		1
50	BD11CS-50	Spindle		1
51	BD11CS-51	Spring pin DIN 1481	4×16	1
52	BD11CS-52	Dovetail guideway		1
60	BD11CS-60	Thread pin DIN 913	M6×10	3
61	BD11CS-61	Brush pin		3
62	BD11CS-62	Bearing pedestal spindle		1
63	BD11CS-63	Washer DIN 6340	8	2
64	BD11CS-64	Hex socket head screw DIN 912	M8×20	1
65	BD11CS-65	Scale collar		1
66	BD11CS-66	Guide pulley		1

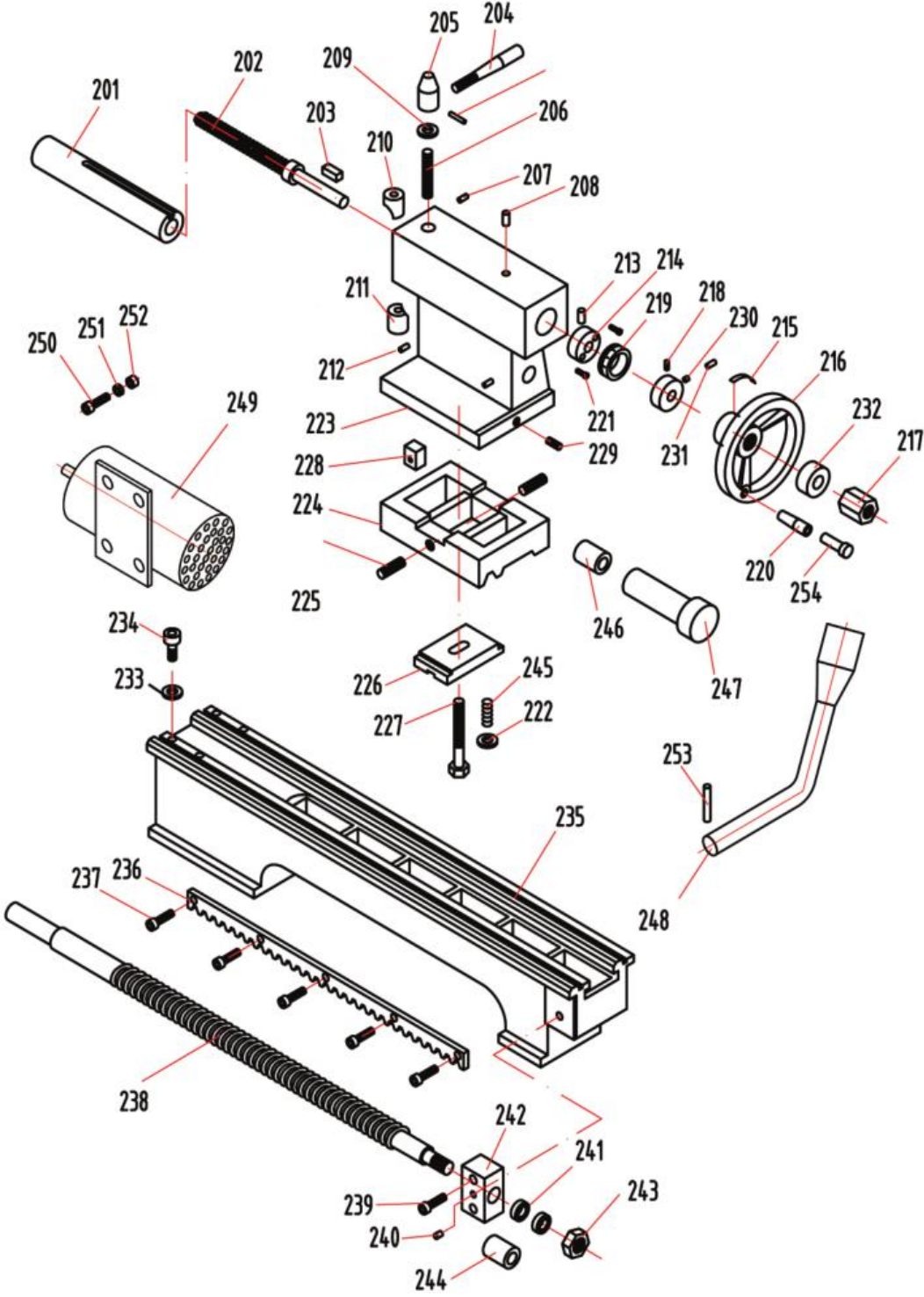
6.6 Exploded view of apron



6.6 Spare parts list of apron

Index NO	Parts NO.	Description	Size	Qty
40	BD11AP-40	Oil nipple	6mm	2
71	BD11AP-71	Apron		1
72	BD11AP-72	Handwheel bed slide		1
73	BD11AP-73	Lever handwheel		1
74	BD11AP-74	Clamping bolt		1
75	BD11AP-75	Toothed wheel combination		1
76	BD11AP-76	Retaining ring		1
77	BD11AP-77	Retaining pedestal		1
78	BD11AP-78	Hex socket head screw DIN 912	M5×25	5
79	BD11AP-79	Thrust bearing		1
80	BD11AP-80	Shaft		1
81	BD11AP-81	Feather key	3X10	1
82	BD11AP-82	Thread pin DIN 915	M6X8	1
83	BD11AP-83	Disc	8	1
84	BD11AP-84	Hex nut	M8	1
85	BD11AP-85	Hex socket head screw DIN 912	M12×40	2
86	BD11AP-86	Scale collar		1
87	BD11AP-87	Guide pulley		1
88	BD11AP-88	Spring pin DIN 1481	4×50	1
89	BD11AP-89	collar		1
90	BD11AP-90	Stroke pulley lock nut		1
91	BD11AP-91	Stroke pivot lock nut		2
92	BD11AP-92	Lock nut		1
93	BD11AP-93	Guide rail lock nut		2
94	BD11AP-94	Hex socket head screw DIN 912	M6×16	4
95	BD11AP-95	Hex socket head screw DIN 912	M5×40	1
96	BD11AP-96	Hex nut	M5	1
97	BD11AP-97	Steel ball		1
98	BD11AP-98	Spring		1
99	BD11AP-99	Thread pin DIN 915	M6×6	1
100	BD11AP-100	Handle	M8	1

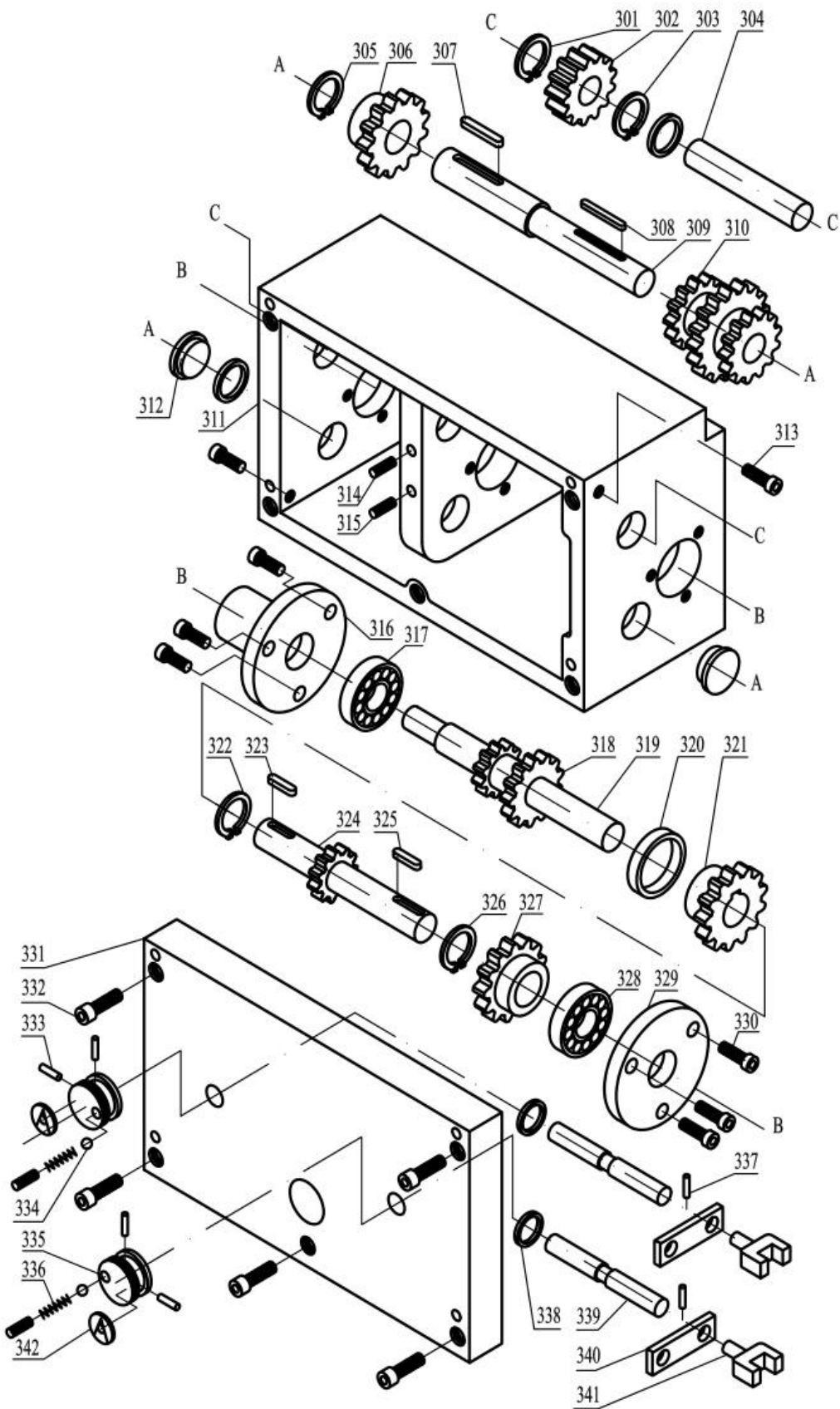
6.7 Exploded view of lathe bed



6.7 Spare parts list of lathe bed

Index NO	Parts NO.	Description	Size	Qty
201	BD11LB-201	Bush		1
202	BD11LB-202	Tailstock spindle		1
203	BD11LB-203	Key DIN 6885 - A 3 x 3 x 10		1
204	BD11LB-204	Clamping handle		1
205	BD11LB-205	Handle seat		1
206	BD11LB-206	Clamping lever		1
207	BD11LB-207	Threaded pin - M5 x 12		1
208	BD11LB-208	Lubricating nipple		1
209	BD11LB-209	Washer		1
210	BD11LB-210	Clamping piece spindle sleeve		1
211	BD11LB-211	Clamping piece spindle sleeve		1
212	BD11LB-212	Threaded pin - M5 x 12		2
213	BD11LB-213	Lubricating nipple		1
214	BD11LB-214	Piece of centering of spindle sleeve		1
215	BD11LB-215	Tailstock marking		1
216	BD11LB-216	Handlewheel		1
217	BD11LB-217	Nut		1
218	BD11LB-218	Spiral spring		1
219	BD11LB-219	Scales ring		1
220	BD11LB-220	Handle		1
221	BD11LB-221	Socket head screw DIN 912-M5X16		2
222	BD11LB-222	Washer DIN 6340-12		1
223	BD11LB-223	Tailstock		1
224	BD11LB-224	Tailstock base		1
225	BD11LB-225	Set Screw M8X45		2
226	BD11LB-226	Clamping plate		1
227	BD11LB-227	Hex cap bolt		1
228	BD11LB-228	Adjustment device		1
229	BD11LB-229	Threaded pin ISO 4028 - M6 x 16		1
230	BD11LB-230	Brass clamping piece		3
231	BD11LB-231	Socket head screw ISO 4028 - M6 x 10		3
232	BD11LB-232	Washer DIN 6340-8		
233	BD11LB-233	Lock washer DIN 6340-10		4
234	BD11LB-234	Hex head cap screw DIN 912-M10X35		4
235	BD11LB-235	Machine bed		1
236	BD11LB-236	Rack		1
237	BD11LB-237	Hex head cap screw DIN 912-M6X16		6
238	BD11LB-238	Lead screw		1
239	BD11LB-239	Hex head cap screw DIN 912-M8X20		2
240	BD11LB-240	Lubricating nipple		1
241	BD11LB-241	Bearing 51102		2
242	BD11LB-242	Bracket		1
243	BD11LB-243	Round nut M12X1.25		2
244	BD11LB-244	Shaft sleeve		1
245	BD11LB-245	Spiral spring		1
246	BD11LB-246	Shaft sleeve		1
247	BD11LB-247	Eccentric sha		1
248	BD11LB-248	Locking handle		1
249	BD11LB-249	Motor	230V	1
250	BD11LB-250	Set Screw		4
251	BD11LB-251	Washer		4
252	BD11LB-252	Nut		4
253	BD11LB-253	Spring pin ISO 8752 - A4 x 24		1
254	BD11LB-254	Handle		1

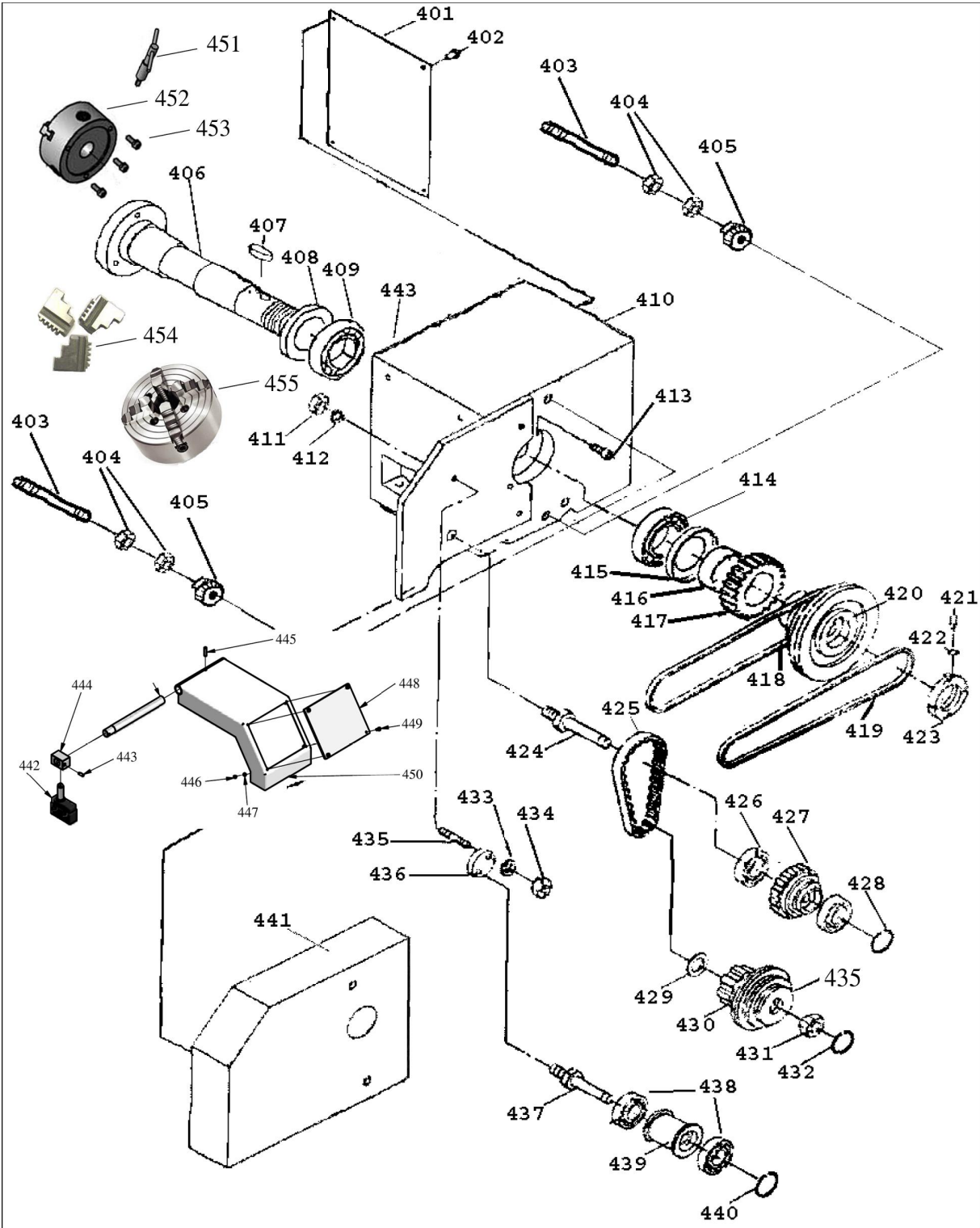
6.8 Exploded view of feed gear



6.8.1 Spare parts list of feed gear

Index NO	Parts NO.	Description	Size	Qty
301	BD11FG-301	Lock washer	Φ12	1
302	BD11FG-302	Gear wheel		1
303	BD11FG-303	Lock washer	Φ12	1
304	BD11FG-304	Shaft C		1
305	BD11FG-305	Lock washer		1
306	BD11FG-306	Gear wheel		1
307	BD11FG-307	Feather key	4×30	1
308	BD11FG-308	Feather key	4×60	1
309	BD11FG-309	Shaft A		1
310	BD11FG-310	Gearwheel combination		1
311	BD11FG-311	Gearwheel box		1
312	BD11FG-312	Set Screw		1
313	BD11FG-313	Set Screw		1
314	BD11FG-314	Screw DIN 912	M6×10	1
315	BD11FG-315	Screw DIN 912	M6×10	1
316	BD11FG-316	Flange		1
317	BD11FG-317	Bearing	180202	1
318	BD11FG-318	Gear wheel		1
319	BD11FG-319	Shaft		1
320	BD11FG-320	Shaft ring		1
321	BD11FG-321	Gear wheel		1
322	BD11FG-322	Lock washer	Φ15	1
323	BD11FG-323	Feather key DIN 6885	4×14	1
324	BD11FG-324	Long-face pinion		1
325	BD11FG-325	Feather key DIN 6885	4×10	1
326	BD11FG-326	Lock washer	Φ15	1
327	BD11FG-327	Gear wheel		1
328	BD11FG-328	Bearing DIN 620	180202	1
329	BD11FG-329	Flange cover of leadscrew		1
330	BD11FG-330	Allen screw	M6×12	3
331	BD11FG-331	Front plate		1
332	BD11FG-332	Steel ball	Φ5	2
333	BD11FG-333	Stud bolt	M6×10	2
334	BD11FG-334	Stud bolt	M6×10	2
335	BD11FG-335	Selector switch		2
336	BD11FG-336	Spring	0.8×45×11	2
337	BD11FG-337	Pin DIN 1481	Φ5×20	2
338	BD11FG-338	O-ring		2
339	BD11FG-339	Shaft		2
340	BD11FG-340	Plate		2
341	BD11FG-341	Gear Fork		2
342	BD11FG-342	Selector switch marking		2

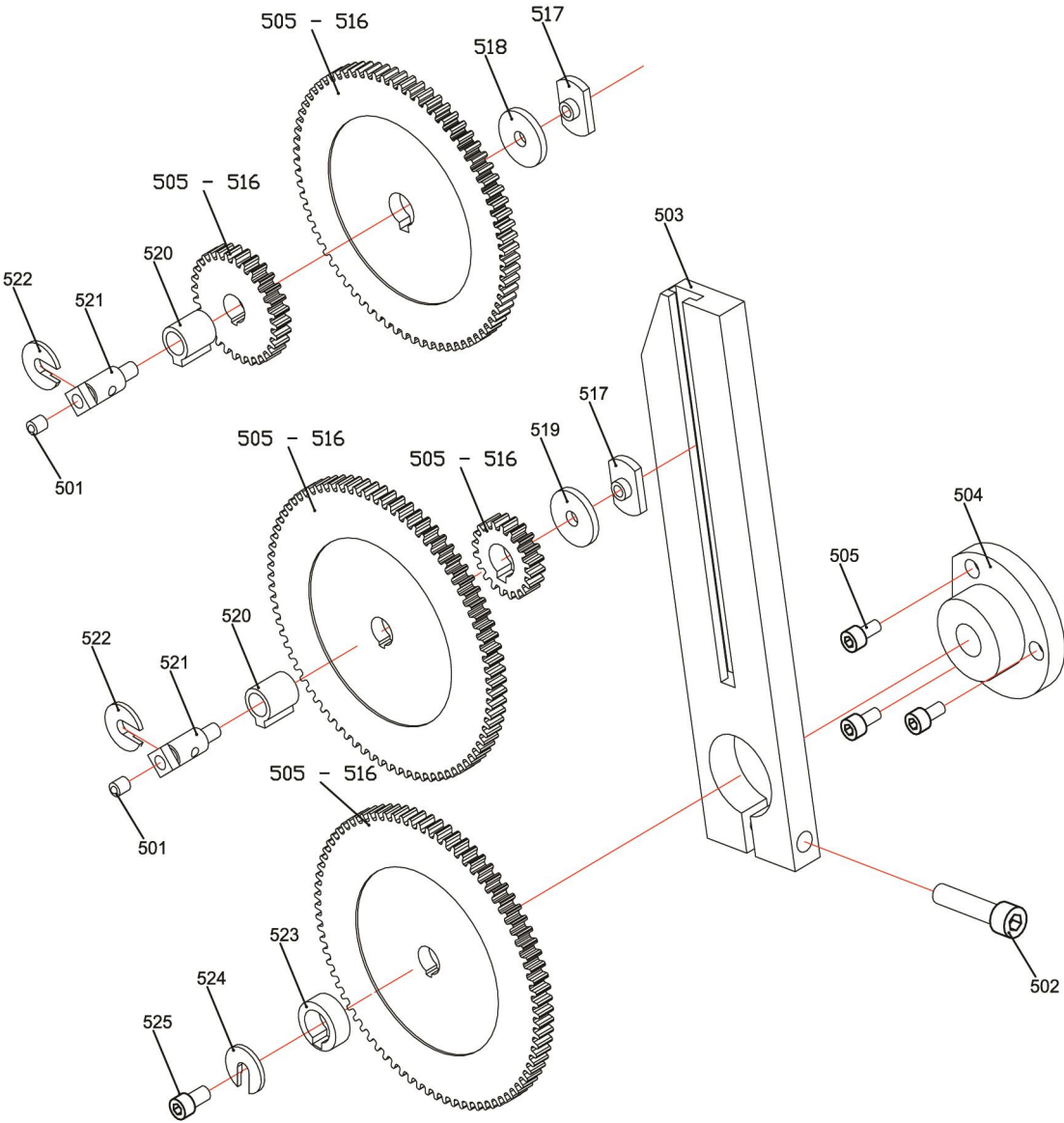
6.9 Exploded view of headstock



6.9.1 Spare parts list of headstock

Pos.	Parts NO.	Name	Size	Qty
401	BD11HS-401	Characteristics plate		1
402	BD11HS-402	Fastening screw	M4×10	4
403	BD11HS-403	Protective cover of thread rod		2
404	BD11HS-404	Nut DIN439	M10	4
405	BD11HS-405	Knurl nut		2
406	BD11HS-406	Work spindle		1
407	BD11HS-407	Feather key DIN 6885	8×45	1
408	BD11HS-408	Ring		1
409	BD11HS-409	Bearing	32009	2
410	BD11HS-410	headstock		1
411	BD11HS-411	Nut DIN439	M10	2
412	BD11HS-412	Washer DIN6340	10	2
413	BD11HS-413	Screw DIN912	M8×25	1
414	BD11HS-414	Bearing	32009	1
415	BD11HS-415	Ring		1
416	BD11HS-416	Bush		
417	BD11HS-417	Gearwheel		1
418	BD11HS-418	Short V-belt	O-710	1
419	BD11HS-419	Long V-belt	O-850	1
420	BD11HS-420	Pulley combination Work spindle		1
421	BD11HS-421	Allen screws	M5×12	2
423	BD11HS-423	Shaft nut (groove nut)		1
424	BD11HS-424	Driven shaft of motor		1
425	BD11HS-425	Synchronous belt	240L075	1
426	BD11HS-426	Bearing	180101	1
427	BD11HS-427	Combination of syn-chronous belt pulley	Φ135,32/84teeth	1
428	BD11HS-428	Screw		1
429	BD11HS-429	Washer		1
430	BD11HS-430	V-belt pulley combination	Φ28,6/18teeth	1
431	BD11HS-431	Washer		1
432	BD11HS-432	Allen screws	M6×20	1
433	BD11HS-433	Washer		1
434	BD11HS-434	Nut DIN439-M8		1
435	BD11HS-435	Allen screws		1
436	BD11HS-436	Eccentric plate of ten-sion pulley		1
437	BD11HS-437	Shaft of tension pulley		1
438	BD11HS-438	Bearing		2
439	BD11HS-439	Tension pulley		1
440	BD11HS-440	Circlip		1
441	BD11HS-441	protective cover of threadstock		1
442	BD11HS-442	Micro switch		1
443	BD11HS-443	Hexagonal cylindrical side screw setDIN912	M5×12	1
444	BD11HS-444	Shaft sleeve		1
445	BD11HS-445	Cylindrical pin	3×20	1
446	BD11HS-446	Nut DIN439	M4	4
447	BD11HS-447	Flat washer	Φ4	4
448	BD11HS-448	Protective glasses		1
449	BD11HS-449	Socket head cap screw DIN912	M4×10	4
450	BD11HS-450	Chuck shield		1
451	BD11HS-451	Key for 3 - jaw chuck	10mm	1
452	BD11HS-452	Three jaw chuck	K11-125	1
453	BD11HS-453	Screw	M8X35	3
454	BD11HS-454	Reverse 3 – jaw(Included in the chuck)		1
455	BD11HS-455	Four jaw chuck	K72-125	1

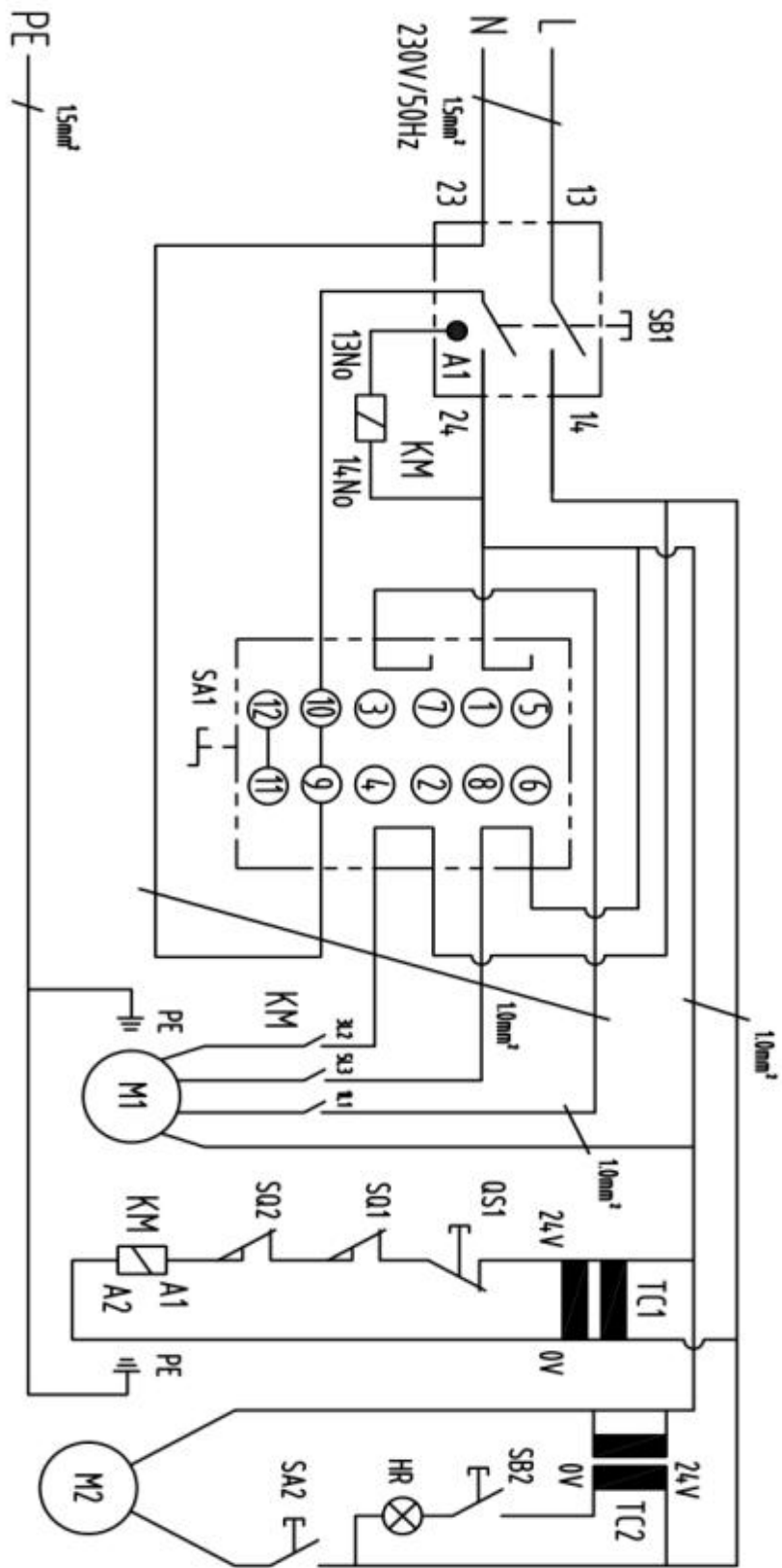
6.10 Exploded view of change gear



6.10 Spare parts list of change gear

Index NO	Parts NO.	Description	Size	Qty
501	CG-501	Oil nipple		2
502	CG-502	Hex socket head screw DIN 912	M8×35	1
503	CG-503	Change gear rail		1
504	CG-504	Bearing Pedestal		1
505	CG-505	Hex socket head screw DIN 912	M5×10	3
506	CG-506	Change gear	85	1
507	CG-507	Change gear	80	1
508	CG-508	Change gear	75	1
509	CG-509	Change gear	65	1
510	CG-510	Change gear	60	2
511	CG-511	Change gear	55	1
512	CG-512	Change gear	52	1
513	CG-513	Change gear	50	1
514	CG-514	Change gear	45	1
515	CG-515	Change gear	30	1
516	CG-516	Change gear	20	1
517	CG-517	Feather key	M5	2
518	CG-518	Spacer	1.5mm	1
519	CG-519	Spacer	3mm	1
520	CG-520	Connection case		2
521	CG-521	Binding screw		2
522	CG-522	Ring fastener		1
523	CG-523	Case change gear		1
524	CG-524	Washer		1
525	CG-525	Hex socket head screw DIN 912	M6×10	1

6.11 Wiring Diagram BD-11GDA (230V) for lathe part



6.12 Spare parts list BD-11GDMA(230V) for lathe part

Pos.	Designation	Model	Quantity	Note
SB1	MAGNETIC CONTACTOR	KJD17GF	1	
SA1	F-O-R SWITCH	ZH-A	1	
KM	CONTACTOR	LC1K0910	1	
TC1	TRANSFORMER	230V/24V/20VA	1	
TC2	TRANSFORMER	230V-24V/20VA	1	Optional
QS1	EMERGENCY STOP	LAY5	1	
SQ1	GEAR GUARD SWITCH	QKS8	1	
SQ2	CHUNK GUARD SWITCH	LXW5-11Q1	1	
SB2	LIGHT SWITCH	KCD1-101	1	Optional
HR	WORK LIGHT	24V	1	Optional
SA2	PUMP SWITCH	LAY5-BE101		Optional
M1	MAIN MOTOR	YLJ90L4-12A	1	
M2	PUMP	DB-12A	1	Optional

BD-11GDMA

MAIN TECHNICAL SPECIFICATION

for drilling and milling parts

SPECIFICATION:

Drilling Capacity	max 16mm
End Mill Capacity	max 20mm
Face Mill Capacity	max 63mm
Spindle Taper	MT 2
Spindle Stroke	42 mm
Head Tilt	±90°
Number of Spindle Speeds	Variable
Ranger of Spindle Speeds	50~2250 RPM
Working Surface of Table	175 mm
Number of T-Slots	2
T-Slot Size	12 mm
Motor	850W

The specifications in this manual are given as general information and are not binding. We reserves the right to effect, at any time and without prior notice, changes or alterations to parts, fitting and accessory equipment deemed necessary for any reason whatsoever.

MILL HEAD OPERATION

Head Elevating handwheel (A, Fig.48),

Located on the right of column. The head can be adjusted up or down to suit height requirements for different workpieces. Turn it clockwise to up head on the column and counter-clockwise to down. **When the head is at the desired height, lock in place with the locks.**

Caution: Have to loosen the locks for the slideways before above operation!

Mill Head locks (B, Fig.49)

Located on the right of column. Turn clockwise to lock the mill head.

Quill Lock Lever (C, Fig. 49)

Located on the left of the mill head. The height of the spindle can be locked with the quill lock lever. Set the desired height with the quill lever and turn the lever down. Turn clockwise to lock the quill, reverse to loosen.

Caution: For best results. All milling operations should be done with the quill/spindle as close to the head assembly as possible. Lock spindle, table and mill head in place before starting milling operations!

Down feed Handles: (D, Fig. 50):

Located on the right side of the head casting. Counter-clockwise movement advances the quill toward the table. Return spring retracts the handles.

The knob (E, Fig. 50) must be loose before the operating the handles. The graduated dials (F, Fig. 03) on the handle base can be indexed or "zeroed" to help make accurate and convenient movements.

Fine Down Feed

Turn counter-clockwise the knob (E, Fig. 50) to engage the fine down feed knob (G, Fig. 03) what located on the front of the head. Turn it according to you want to move downward, Clockwise turn the hand wheel to down feed the spindle, reverse to retract it.



Fig. 48

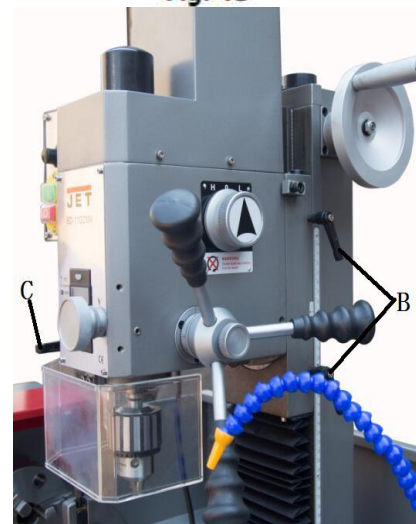


Fig. 49



Fig. 50

Mill Head Rotation

The head is designed to tilt 90° either left or right, enabling it to perform task such as angle drilling or horizontal slotting. Loosen the lock nuts (H, Fig. 51) under the head. Rotate the head to its desired position, using the reference guide (I, Fig.51). Once in place, re-tighten the lock nuts.

Note: make sure to provide support for the head so it doesn't unexpectedly rotate on its own. Always maintain control of the head.

Keep in mind that the head must be dialed in when it's returned to the "zero" position if high levels of accuracy are required. If you are able to use an angle vise to accomplish your milling operation without tilting the mill head, you will save yourself a good amount of set-up time.

High/Low Speed Knob (J, Fig. 52)

Located on the right of the mill head. You can select H/L speed by moving the knob right or left. **Note: Change speed keep machine is at low speed!** See the chart below for spindle speeds:

SPINDLE SPEED $\frac{1}{min}$	
L	H
50-1125	100-2250

Caution: Even at low spindle speeds, metal fragments from the cutting process can be expelled by the mill/drill. Always wear eyewear and protective clothing when operating the machine!

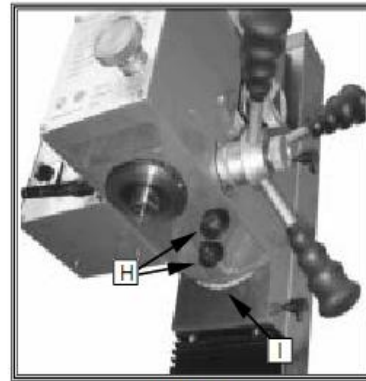


Fig. 51

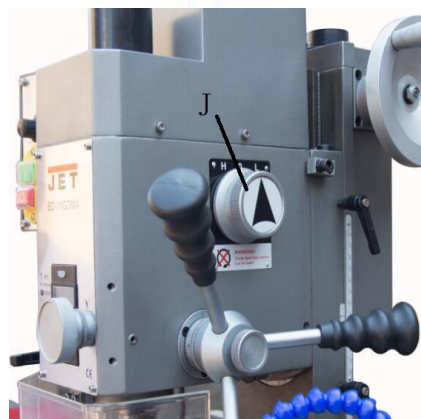


Fig. 52

Electrical Connections

WARNING!
A qualified electrician must make all electrical connections!
Failure to do so may cause serious injury!

Before connecting the machine to the mains, make sure that the electrical values of the mains supply are the same as those for the machine's electrical components. Use the wiring diagram (Fig. 53) for connecting the lathe to the mains supply.

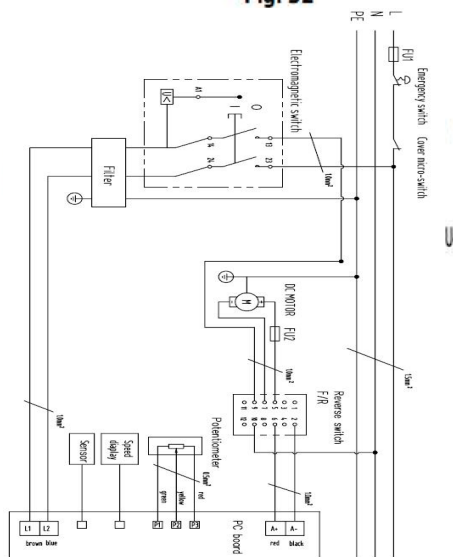


Fig. 53

WARNING!

**Make sure the machine is properly ground!
Failure to do so may cause serious injury and
damage to user!**

DC-Motor - 850W 110V

Make sure that all 2 phase (L, N) are connected.
Defective or incorrect connection will render the
guarantee null and void.

Indicators are:

Motor runs hot immediately (3-4 minutes).

Motor doesn't run silently and has no power.

Magnetic Switch (A, Fig.54) has the function of
emergency stopping and the protective function to the
machine and electric components. Green push button
marked "I" to start the motor, Red push button
marked "O" to switch the motor off.

Speed Control Knob (B, Fig. 54) turn it clockwise to
increase the spindle speed, reverse to decrease. The
knob should be turned to zero each time the machine
is stopped. Always start the machine with the knob
set at zero.

F/R switch (C, Fig. 54) changing the position of switch
will reverse the direction of the motor. F-forward
direction, R- reverse direction.

Fuse Base (D, Fig. 55) located on the back plate of
electrical box. Fuse what rate is 8A is put in the base.
Turn counter-clockwise the button to open and
change the fuse, reverse to retighten.



Fig.54

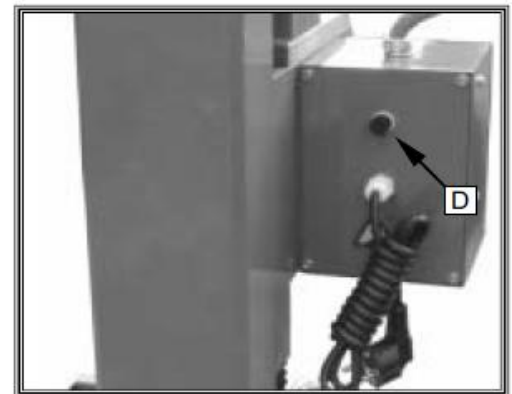


Fig.55

⚠ WARNING!

**This machine is designed and intended for use
by properly trained and experienced personnel
only! If you are not familiar with the proper and
safe use of mill/drills, don't use the machine
until proper training and knowledge have been
obtained!**

Arbor Replacement

1. Disconnect machine from the power source, unplug.
2. Remove the cover of drawbar onto the motor cover (A, Fig. 56).
3. Hold the flat of spindle (B, Fig. 57) to keep it from moving while loosening the drawbar (C, Fig. 58) with the 22-25 spanner in toolbox.
4. Loosen the drawbar approximately three to four full turns.
5. Tap the drawbar head with a rubber mallet to dislodge the arbor.
6. Grasp the arbor with one hand while loosening the drawbar with the other. Continue to loosen the drawbar until the arbor can be withdrawn from the spindle. Wipe out the spindle with a clean dry rag.
7. Wipe down the new arbor with a clean dry rag and place the arbor into the spindle. Thread the drawbar into the arbor. Tighten the drawbar with a spanner while holding the spindle.

WARNING!

Do not loosen the drawbar more than three or four turns before hitting with a rubber mallet. Damage to the drawbar threads may occur!



Fig. 56



Fig. 57



Fig. 58

Gibs Adjustment

After a period of time, movement of the table over the ways will cause normal wear. Adjust the gibs to compensate for this wear.

1. The vertical gib adjustment screw (C, Fig.59) is found onto the column.
2. Loose the screw from small end of taper gibs. Turn the screw from large end of taper gibs slightly clockwise to tighten. Turn the handwheels and check the tension.
3. Re-adjust as required.



Spare parts list BD-11GDMA(230V) for drilling and milling part

Designation	Model	Quantity	Note
Electromagnetic switch	KJD17GF	1	
Reverse Switch F/R	ZH-A	1	
Filter	NF213A6/02 250VAC 6A	1	
Emergency stop	LAY5	1	
Circuit board	JYMC-220A-I 230VAC 6.0ADC	1	
Potentiometer	WX14-12 4K7	1	
Speed display and sensor	JD011 5V	1	
DC Motor	93ZYT005	1	
FU1, FU2	8A	2	
Cover micro-Switch	MS801	1	

Maintenance

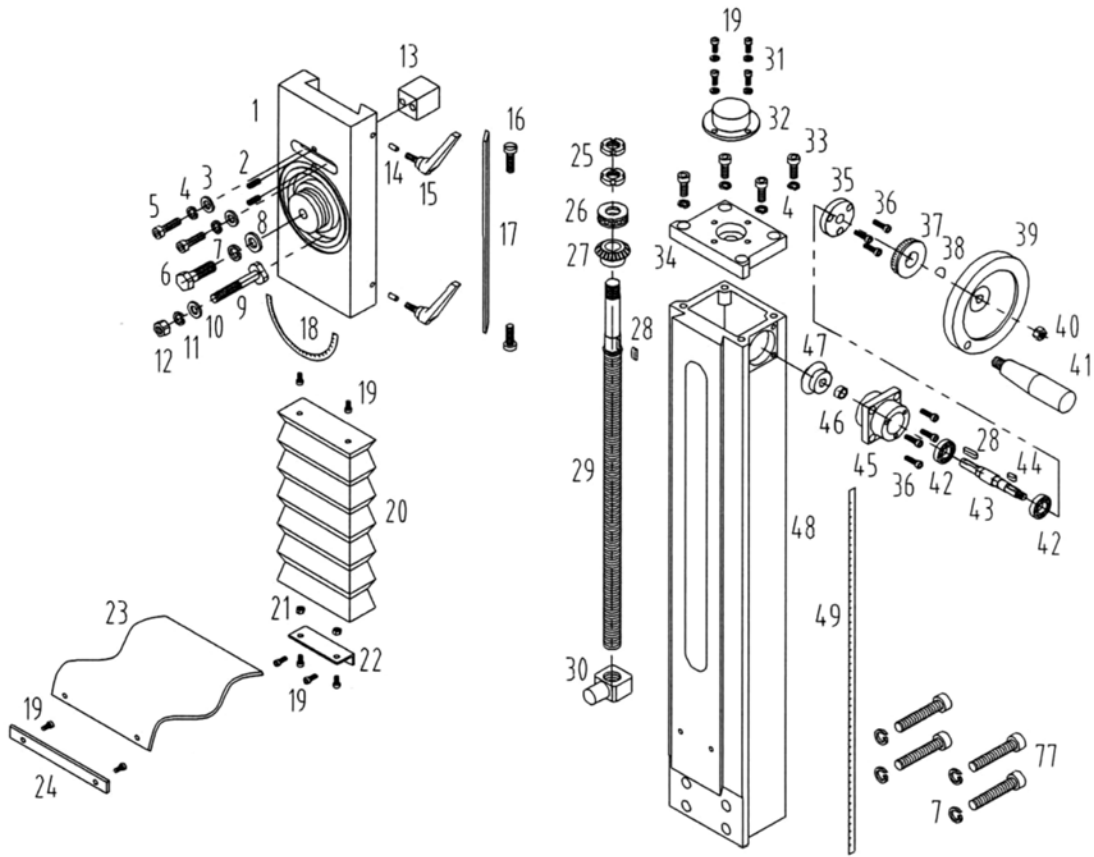
Keep the maintenance of the machine tool during the operation to guarantee the accuracy and service life of the machine.

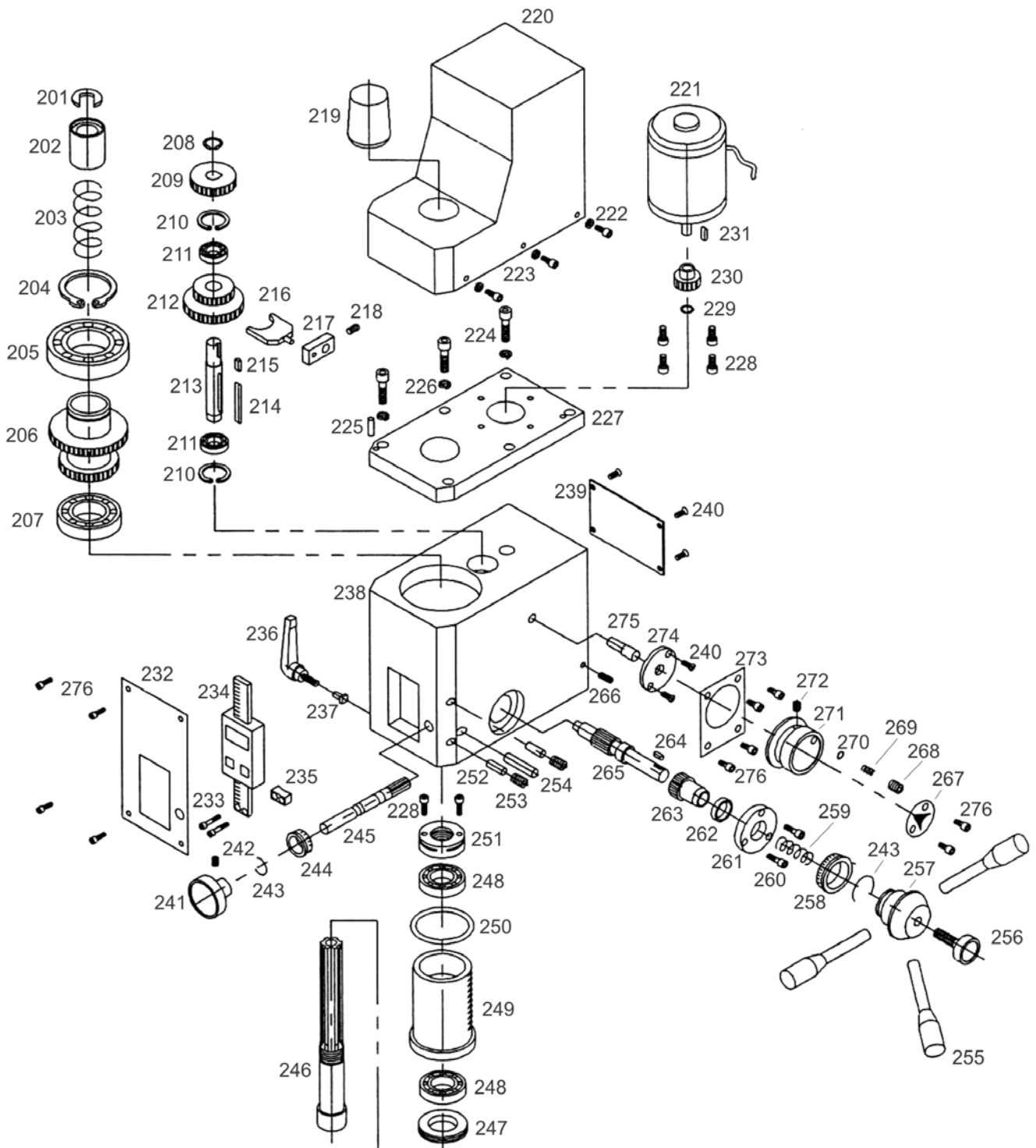
1. In order to retain the machine's precision and functionality, it is essential to treat it with care, keep it clean and grease and lubricate it regularly. Only through good care, you can be sure that the working quality of the machine will remain constant. **Disconnect the machine plug from the mains supply whenever you carry out cleaning, maintenance or repair work!**
2. Lubrication all slideways lightly before every use. The leadscrew must also be lightly lubricated with lithium base grease.
3. During the operation, the chips what falls onto the sliding surface should be cleaned timely, and the inspection should be often made to prevent chips falling into sliding ways. Asphalt felt should be cleaned at certain time. **Do not remove the chips with your bare hands. There is a risk of cuts due to sharp-edged chips.**
4. After the operation every day, eliminate all the chips and clean different part of the machine and apply machine oil to prevent rusting.
5. In order to maintain the machining accuracy, take care of the arbor, drawbar, the surface of the worktable and the guide way and avoid mechanical damage and the wear due to improper guide.
6. If the damage is found, the maintenance should be done immediately.

Trouble Solution

Problem	Possible Cause	Solution
Too chatters	Gibs too loose on table, column Unused feeds not locked Mill head not locked Quill too loose Tool not on center Improper tool shape, tool dull	Readjust gibs Lock all axes but the one moving Lock mill head Tighten quill lock Center tool reshape, sharpen, or replace tool
Depth of cut is not consistent	Quill moving Setup wrong	Lock quill Make sure setup is parallel to table
Hole is off center or bit wanders	Bit dull Bit not mounted correctly in chuck Chuck loose in spindle Drawbar not secured Bearing loosen or worn Cutting too fast	Use sharp bits Remount tool Remount chuck on arbor Tighten drawbar Tighten or replace bearings Reduce speed
Bit turns erratically or stops	Bit fed into work too fast	Reduce feed rate
Chuck is difficult to tighten or loosen	Chuck sticking Debris in chuck	Apply lubricant Clean chuck
Chuck wobbles	Chuck loose on arbor Drawbar not tight	Clean arbor and remount Clean spindle and replace drawbar
Turn on machine and nothing happens	Machine unplugged Loose electrical connections	Plug in machine Tighten wiring connections

Spare parts drawings





Pos.	Parts NO.	Name	Size	Qty
1	BD11GDMA-1	Connect board		1
2	BD11GDMA-2	Socket head set screw	M6x16	2
3	BD11GDMA-3	Washer		2
4	BD11GDMA-4	Spring washer	8	6
5	BD11GDMA-5	Hexagon head cap	M8x25	2
6	BD11GDMA-6	Hexagon nut	M12x40	1
7	BD11GDMA-7	Spring washer	12	5
8	BD11GDMA-8	Washer	12	1
9	BD11GDMA-9	Screw		1
10	BD11GDMA-10	Washer	10	1
11	BD11GDMA-11	Spring washer	10	1
	BD11GDMA-11			
12	BD11GDMA-12	Hexagon nut	M10	1
13	BD11GDMA-13	Connect collar		1
14	BD11GDMA-14	Brass pin		5
15	BD11GDMA-15	Adjust locating handle	DM6x16	5
16	BD11GDMA-16	Gib screw		1
17	BD11GDMA-17	Column screw		1
18	BD11GDMA-18	Angle plate		1
19	BD11GDMA-19	Hexagon head cap Screw	M5x10	12
20	BD11GDMA-20	Bellows		1
21	BD11GDMA-21	Hexagon nut	M5	2
22	BD11GDMA-22	Bellows bracket		1
23	BD11GDMA-23	Rubber splash guard		1
24	BD11GDMA-24	Plate		1
25	BD11GDMA-25	Nut	M16x1.5	2
26	BD11GDMA-26	Bearing	51203	1
27	BD11GDMA-27	Taper gear		1
28	BD11GDMA-28	Key	4x16	2
29	BD11GDMA-29	Lift lead screw		1
30	BD11GDMA-30	Lift lead screw nut		1
31	BD11GDMA-31	Washer	5	4
32	BD11GDMA-32	Nut collar		1
33	BD11GDMA-33	Hexagon head cap	M8x20	4
34	BD11GDMA-34	Column cover		1
35	BD11GDMA-35	Bearing cover		1
36	BD11GDMA-36	Hexagon head cap	M5x12	7
37	BD11GDMA-37	Lift dial		1
38	BD11GDMA-38	Spring piece		4
39	BD11GDMA-39	Wheel		1
40	BD11GDMA-40	Locking nut		4
41	BD11GDMA-41	Handle	M10x80	1
42	BD11GDMA-42	Bearing	6001-2RZ	2
43	BD11GDMA-43	Lift shaft		1
44	BD11GDMA-44	Key	4x12	1
45	BD11GDMA-45	Lift bearing base		1

46	BD11GDMA-46	Collar		1
47	BD11GDMA-47	Taper gear		1
48	BD11GDMA-48	Column		1
49	BD11GDMA-49	Lift plate		1
50	BD11GDMA-50	Taper pin	A5x25	1
51	BD11GDMA-51	Hexagon head cap	M6x16	10
52	BD11GDMA-52	Table dial support(L)		1
53	BD11GDMA-53	Gasket		2
54	BD11GDMA-54	Cross table	standard table	1
			large table	
56	BD11GDMA-56	Table dial support(R)		1
57	BD11GDMA-57	Handle M8x63	M8x63	3
58	BD11GDMA-58	Wheel		3
59	BD11GDMA-59	Dial		3
60	BD11GDMA-60	Bearing	51200	5
61	BD11GDMA-61	Hexagon head cap Screw	M6x10	2
62	BD11GDMA-62	Stopper		2
63	BD11GDMA-63	Wedgy nut		1
64	BD11GDMA-64	Table plate	standard table	1
			large table	1
65	BD11GDMA-65	Table lead screw	standard table	1
	BD11GDMA-65		large table	
66	BD11GDMA-66	Table lead screw nut		1
67	BD11GDMA-67	Hexagon head cap	M4x20	4
68	BD11GDMA-68	Saddle	standard table	1
			large table	1
69	BD11GDMA-69	Limit plate		1
70	BD11GDMA-70	Gib		1
71	BD11GDMA-71	Lead screw nut		1
72	BD11GDMA-72	Gib	standard table	1
			large table	
73	BD11GDMA-73	Hexagon head cap	M6x25	2
74	BD11GDMA-74	Saddle dial support		1
75	BD11GDMA-75	Lead screw nut		1
76	BD11GDMA-76	Base	standard table	1
			large table	1
77	BD11GDMA-77	Hexagon head cap	M12x90	4

Pos.	Parts NO.	Name	Size	Qty
201	BD11GDMA-201	Position washer		1
202	BD11GDMA-202	Spring sleeve		1
203	BD11GDMA-203	Spring	2.5x28x110-3	1
204	BD11GDMA-204	Retainer ring	45	1
205	BD11GDMA-205	Bearing	6209-2RZ	1
206	BD11GDMA-206	Gear	(Z60/Z80)	1
207	BD11GDMA-207	Bearing	7007 AC	1
208	BD11GDMA-208	Retainer ring	15	1
209	BD11GDMA-209	Gear	(Z46)	1
210	BD11GDMA-210	Retainer ring	32	2
211	BD11GDMA-211	Bearing	6002-2RZ	2
212	BD11GDMA-212	Gear	Z42/Z62)	1
213	BD11GDMA-213	Transmission shaft		1
214	BD11GDMA-214	Key	5x50	1
215	BD11GDMA-215	Key	C5x12	1
216	BD11GDMA-216	Fork		1
217	BD11GDMA-217	Fork arm		1
218	BD11GDMA-218	Screw	M5x8	1
219	BD11GDMA-219	Cover		1
220	BD11GDMA-220	Motor cover		1
221	BD11GDMA-221	Motor	83ZYT005	1
222	BD11GDMA-222	Hexagon head cap	M4x8	6
223	BD11GDMA-223	Washer	4	6
224	BD11GDMA-224	Hexagon head cap Screw	M6x14	6
225	BD11GDMA-225	Pin	A5x25	2
226	BD11GDMA-226	Washer	6	6
227	BD11GDMA-227	Fixed cover		1
228	BD11GDMA-228	Hexagon head cap	M5x12	6
229	BD11GDMA-229	C-retainer ring	10	1
230	BD11GDMA-230	Motor gear	(Z25)	1
231	BD11GDMA-231	Key	C4x16	1
232	BD11GDMA-232	Main plate		1
233	BD11GDMA-233	Hexagon head cap	M3x16	2
234	BD11GDMA-234	Digital slide guage		1
235	BD11GDMA-235	Base		1
236	BD11GDMA-236	Adjust locking handle	DM8x20	1
237	BD11GDMA-237	Oriented pin		1
238	BD11GDMA-238	Headstock		1
239	BD11GDMA-239	Cover		1
240	BD11GDMA-240	Cross recessed head	M4x8	6
241	BD11GDMA-241	Micro feed knob		1
242	BD11GDMA-242	Socket head set screw		1
243	BD11GDMA-243	Spring piece		2
244	BD11GDMA-244	Micro feed dial		1
245	BD11GDMA-245	Worm shaft		1
246	BD11GDMA-246	Spindle		1
247	BD11GDMA-247	Nut		1
248	BD11GDMA-248	Bearing	7005AC/P5	2
249	BD11GDMA-249	Collar		1
250	BD11GDMA-250	O-ring	58x2.65	1

251	BD11GDMA-251	Clamp nut		1
252	BD11GDMA-252	Pin	B4x20	4
253	BD11GDMA-253	Socket head set screw	M5x12	4
254	BD11GDMA-254	Pin with thread	A6x30	1
255	BD11GDMA-255	Handle		3
256	BD11GDMA-256	Locking knob		1
257	BD11GDMA-257	Feed handle disc		1
258	BD11GDMA-258	Feed dial		1
259	BD11GDMA-259	Compression Spring	1.2x12x25-3	1
260	BD11GDMA-260	Hexagon head cap	M4x10	3
261	BD11GDMA-261	Cover		1
262	BD11GDMA-262	Adjust collar		1
263	BD11GDMA-263	Helical gear		1
264	BD11GDMA-264	Key	4x12	1
265	BD11GDMA-265	Up-down gear shaft		1
266	BD11GDMA-266	Socket head set screw	M6x20	1
267	BD11GDMA-267	Plate		1
268	BD11GDMA-268	Socket head set screw	M8x8	1
269	BD11GDMA-269	Compression Spring	0.8x5x25-3	1
270	BD11GDMA-270	Steel ball	6,5	1
271	BD11GDMA-271	Locating knob	12x50	1
272	BD11GDMA-272	Socket head set screw	M5x16	1
273	BD11GDMA-273	Shifting plate		1
274	BD11GDMA-274	Locating base		1
275	BD11GDMA-275	Shifting shaft		1
276	BD11GDMA-276	Hexagon head cap	M3x6	10

BD-11GDMA standard accessories part			
Part NO.	Name	Specification	Quantity
1	oil gun		1
2	hexagon wrench	3/4/5/6/8	5
3	double end spanner	8-10/12-14/17-19	3
4	chuck spanner		1
5	steady center	MT2	1
6	follow center	MT4	1
7	reverse chuck 3 jaws	Φ125mm	3
8	painting can		2
9	handle		2
10	change gears	45/50/60/60/65/70T	8
11	synchronized counter puuley	240L075(on lathe)	1
12	V-belt	0-710	1
13	V-belt	0-850	1
14	T allen key	6mm	1
15	gross screwdriver	3"	1
16	straight screwdriver	3"	1
17	threading dial gear	30T	1
18	quadruple tool holder spanner	8mm	1
19	drill chuck	1-13mm	1
20	Fixed spanner	25mm	1
21	Fuse	8A	2
22	T-bolt	M10*30	2





Environmental protection

Protect the environment.

Your appliance contains valuable materials which can be recovered or recycled. Please leave it at a specialized institution.



This symbol indicates separate collection for electrical and electronic equipment required under the WEEE Directive (Directive 2012/19/EC) and is effective only within the European Union.

Umweltschutz

Schützen Sie die Umwelt!

Ihr Gerät enthält mehrere unterschiedliche, wiederverwertbare Werkstoffe.
Bitte entsorgen Sie es nur an einer spezialisierten Entsorgungsstelle.



Dieses Symbol verweist auf die getrennte Sammlung von Elektro- und Elektronikgeräten, gemäß Forderung der WEEE-Richtlinie (2012/19/EU). Diese Richtlinie ist nur innerhalb der Europäischen Union wirksam.

Protection de l'environnement

Protégez l'environnement !

Votre appareil comprend plusieurs matières premières différentes et recyclables. Pour éliminer l'appareil usagé, veuillez l'apporter dans un centre spécialisé de recyclage des appareils électriques.



Ce symbole indique une collecte séparée des équipements électriques et électroniques conformément à la directive DEEE (2012/19/UE). Cette directive n'est efficace que dans l'Union européenne.