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TRANSLATION OF THE ORIGINAL USER MANUAL

Machine Center

Standard 165 D

Standard 165 TOP

EN

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1. General

1.1 Information for this manual and safety booklet

This manual and safety booklet allow for safe and efficient use of this product. As they are part of the machine they need to be kept close within machine range readily accessible to personnel.

All personnel must have thoroughly read and understood the contents of this manual and safety booklet before machine operation. Safe operation can only be ensured in full compliance with the safety precautions and instructions of this manual and safety booklet.

In addition, local health and safety regulations and general safety precautions apply when using this product.

1.2 Applicable documents

- User manual
- Safety booklet
- User manual for 2-axis Digital Readout

1.3 Packing list

3-axis Digital Readout i200 feat. LCD display
3-jaw chuck DK 11-160 mm D4
Independent chuck 200 mm / D4, acc. DIN 55029
Steady rest - opening dia. max. 60 mm
Follow rest - opening dia. max. 60 mm
Face plate 250 mm
4-way tool post holder (Standard 165 D)
Quick change tool post holder feat. 4 inserts (Standard 165 TOP)
Shaft fixture
Protective device for 4-way post holder
Safety clutch
Micrometre longitudinal stop
Coolant device
Extractable chip tray
Motor with magnetic brake/ CE-conformity
Foot pedal feat. break function/ CE-conformity
Splash guard
Thread dial
LED machine lamp
Morse taper drill sleeve
Change gears
2 dead centers
Stand
Tools

1.4 Optional accessories Standard 165 D – Standard 165 TOP (recommended)

4-jaw chuck DK 12 – 160 mm/D4, accord. to DIN 55029  Art. Nr. 21-0832	4- jaw chuck DK 12 – 200 mm/ D4, accord. to 55029  Art. Nr. 21-0833F	Soft solid jaws DSJ – DK 11-160  Art. Nr. 21-0853	Soft solid jaws DSJ – DK 12-160  Art. Nr. 21-0866
Soft solid jaws DSJ – DK 12 – 200  Art. Nr. 21-0867	Flange 160 mm for chuck DIN 55029, D1-4  Art. Nr. 21-4053	Flange FL 200 mm, DIN 55029, D1-4  Art. Nr. 21-4055	Economy live center Type PC – MT 3  Art. Nr. 22-1002
Live center feat. 7 interchangeable tips SMA – MT3  Art. Nr. 22-1041	Ball nose live center MT 3 – 100 mm  Art. Nr. 22-1055	Multi-purpose turning tool set, 12 mm, 5 pcs.  Art. Nr. 44-2021	Multi-purpose turning tool set, 12 mm, 9 pcs.  Art. Nr. 44-3084
Quick change set Multifix, size E  Art. Nr. 23-1001	Collet Chuck 5C, D1-4  Art. Nr. 22-1095	Collet chuck set 5C, 3 – 26 mm, 24 pcs.  Art. Nr. 22-1097	Collet chuck ER 25 – D100  Art. Nr. 22-1084
Collet chuck set ER 25 2 – 16 mm, 15 pcs.  Art. Nr. 26-1022	6-station revolving tailstock turret Mt3  Art. Nr. 22-1071	Inserts for tailstock turret MT 3  Art. Nr. 22-1076	12 pcs. metric size center drills  Art. Nr. 41-1070
Machine mount MS 80  Art. Nr. 53-2000	Universal coolant fluid RK 12, 5 litre container  Art. Nr. 54-1206	**Bigger range**  **www.bernardo.at**	

2. Intendend use

The Standard 165 D – Standard 165 TOP leadscrew and feed rod lathe is suitable for turning, boring and milling (cutting) of metals and plastics as well as for thread cutting operations.

Do not use this machine for the following materials

- Elastic plastic (e.g. Rubber)
- Inflammable materials (e.g. Magnesium)

Type of usage: semi-professional

The Standard 165 D – Standard 165 TOP precision lathe is designed for an average use of 3 hours per day / 50% operating time. This equals to a maximum of 300 hours per year.

Part of the intended use is to follow the instructions of this manual as well as the safety booklet.

Any variations to the intended use of this machine are considered as improper use.

2.1 Surrounding physical conditions

The physical conditions in which this machine is used determines the safety of operation and life span of the machine components.

Guidelines for these conditions are

- Surroundings : free from vibrations, sudden force and shocks
- Temperature: minimum +5°C, maximum 35°C
- Ambient humidity: 30% – 70% relative humidity (non-condensing)

3. Technical Data

	Standard 165 D	Standard 165 TOP
Distance between centers	1000 mm	1000 mm
Center height	175 mm	175 mm
Swing over bed	350 mm	350 mm
Swing over gap*	450 mm	450 mm
Swing over cross slide	190 mm	190 mm
Bed width	180 mm	180 mm
Spindle bore	40 mm	40 mm
Spindle taper	DIN 55029, D1–4	DIN 55029, D1–4
Speed range, stepless	(8) 70 – 2000 rpm	(8) 70 – 2000 rpm
Longitudinal feed range	(40) 0,053 – 1,29 mm/rev	(40) 0,053 – 1,29 mm/rev
Cross feed range	(40) 0,013 – 0,31 mm/rev	(40) 0,013 – 0,31 mm/rev
Metric thread	(32) 0,4 – 7 mm	(32) 0,4 – 7 mm
Inch thread	(36) 4 – 60 Gg/1"	(36) 4 – 60 Gg/1"
Travel of tailstock sleeve	110 mm	110 mm
Taper of tailstock sleeve	MT 3	MT 3
Motor power output S1 100%	1,5 kW (400 V)	1,5 kW (400 V)
Motor power input S6 40%	2,2 kW (400 V)	2,2 kW (400 V)
Machine dimensions (w/d/h)	1730 x 700 x 1340	1730 x 700 x 1340
Weight approx.	514 kg	515 kg

* Removeable bed length: 220 mm

4. Transportation

Lifting devices used for transportation, such as a forklift (as well as in machine assembly or disassembly) in- or outside the premises are permitted by licenced and experienced transport personnel only.

4.1 Symbols on packaging

Symbols, such as following are located on packaging:

This side up
Arrows point to the top of the packaging. Arrows must always face top to eliminate damage to the contents of the packaging.

Fragile
Shows packaging containing fragile and/ or breakable goods.

Handle the package with care. Do not drop. Protect from sudden impact.

Keep dry
Protect packaging from getting wet

Handle the package with care. Do not drop. Protect from sudden impact.

Centre of gravity
Shows the centre of gravity on packaging. Pay attention when lifting and transporting.

Symbol is not displayed on packaging when the actual centre of gravity is the centre. In lack of clarity contact the manufacturer.

Fix here
Attach lifting devices (chain, lifting rope etc.) only where this symbol is shown.

4.2 Damage in transit

Inspection on delivery

Check the goods immediately after delivery for damages or missing components.

In the event of visible damage before unpacking proceed as follows

1 Reject delivery or accept goods with reservation
2 Make a note about the damage on the delivery docket of the logistics company
3 Make a claim (see safety booklet section 12 for claim periods)

Return of goods

! NOTE

Damage of goods on return shipment!

PWA Ltd is not liable for goods damaged during return to sender. It is the customer's responsibility to return goods in proper packaging and to ensure safe transport.

4.3 Incorrect handling

⚠ WARNING

Property damage caused by incorrect handling!

Incorrect handling during transportation can lead to the event of falling, crashing goods which can cause significant property damage.

- Unload and move goods within premises with caution. Pay attention to the symbols marked on the packaging.
- Use only designated points for lifting.
- Remove packaging only immediately prior to the assembly.

4.4 Lifting devices and attachments

Use suitable lifting devices and attachments.

5. Assembly

5.1 Incorrect assembly and initial start-up

Incorrect assembly and initial start-up can lead to serious injuries and significant property damage.

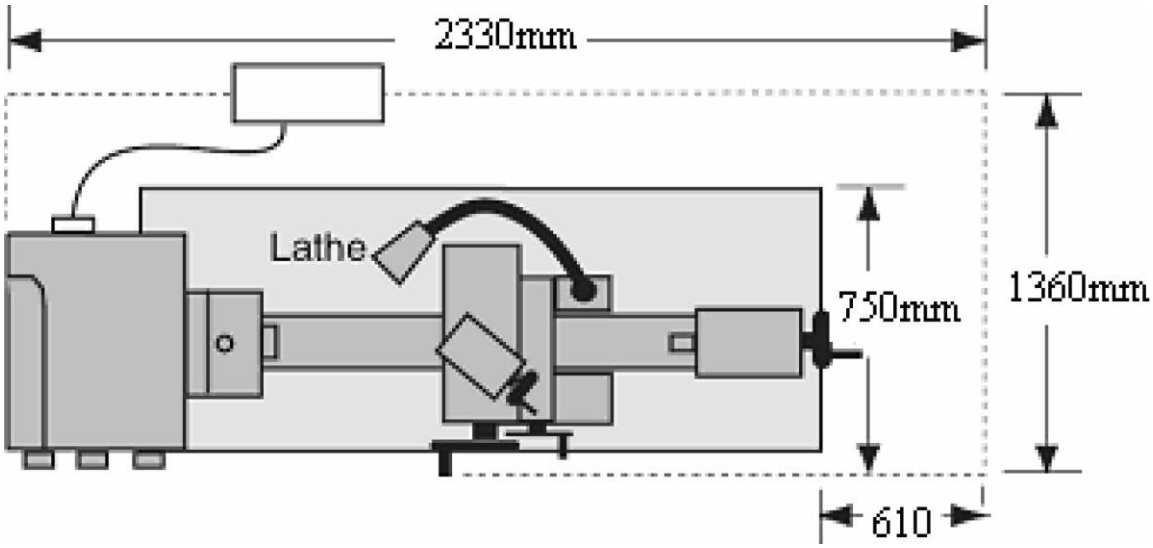
- Allow for generous space prior to commencing assembly.
- Be extra cautious when dealing with exposed, sharp pieces.
- Keep work environment clean and tidy! Loose parts on top of each other or randomly placed parts can lead to accidents.
- Assemble parts accordingly.
- Secure parts to prevent them from dropping or falling over.
- Prior to initial start-up check that
  - Assembly work has been completed in compliance with the instructions of this manual
  - No personnel is within the immediate surroundings

5.2 Selection of installation site

Following aspects should be taken under consideration:

- Machine weight
- Static and dynamic loads
- Space requirements
- Power supply
- Ensure ground is level and strong enough
- Ensure immediate surroundings allow for intended use

5.3 Foundation plan



5.4 Unpacking of machine

1 Remove packaging and ensure for disposal in accordance with legal requirements and local guidelines.
2 Check contents for completeness

5.5 Removal of protective coating

Unvarnished machine parts are covered with a protective coating which must be removed.

⚠ DANGER

Cleaning agents can cause injury when not handled appropriately!

Cleaning agents are a health hazard and can be extremely harmful with regards to chemical components and temperature.
Serious injuries that may lead to death can be caused.

- Always pay attention to the safety information of the cleaning agents and their components.
- Wear personal safety protection described in the safety leaflet.
- Clean in ventilated areas with sufficient air flow.
  (also see manufacturer's recommendations on cleaning product)

Use:

- Cleaning cloth
- Detergents, cold cleaning agents etc. (see manufacturer's guidelines)
- Protective clothing (see safety precautions of cleaning agents)

Remove protective coating:

1 Wear protective clothing
2 Use cleaning detergents as recommended by manufacturer
3 Apply metal protector or motor oil 20W on the cleaned surfaces

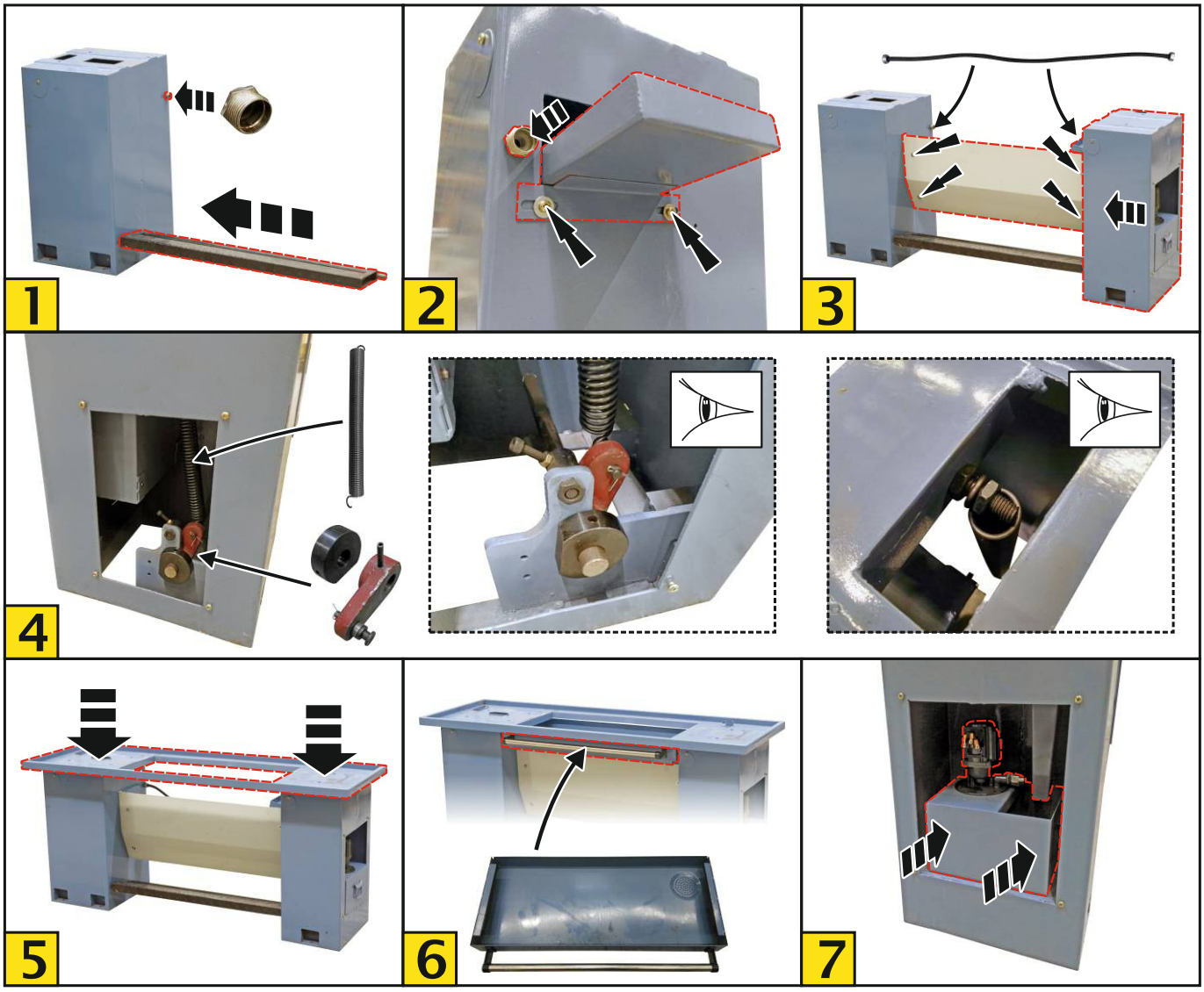
5.6 Machine installation

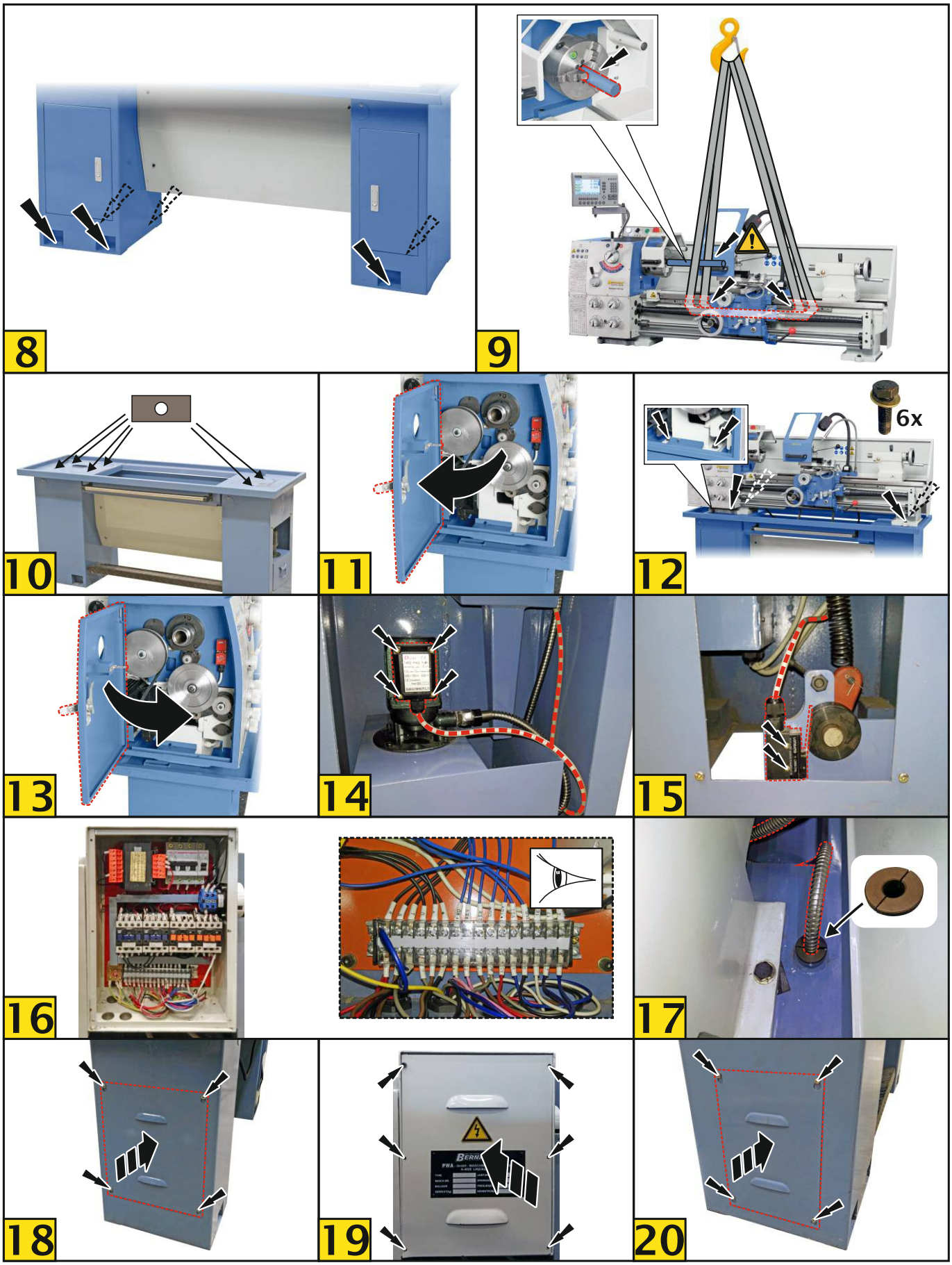
⚠ WARNING

If the machine gets mounted on a stand, first attach the stand to the ground, then mount the machine onto the stand.

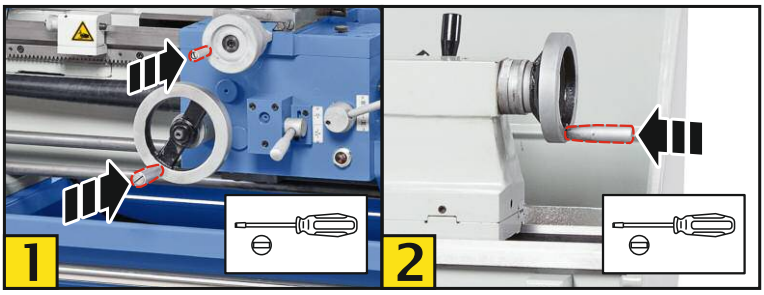
1. Detach the machine from the shipping crate
2. Clamp the carriage
3. Use an appropriate lifting device (rounded belt recommended)
4. Insert a steel rod (35 mm) into the chuck to minimize the risk of tipping during transportation
5. Use a lifting device to lift machine onto site
6. Secure machine to site (use suitable anchoring devices – not included)
   - First, mount stand onto the ground (if stand is used)
   - Next, put chip tray onto the stand
   - Then, mount the machine onto the stand

Use another person (experienced with transportation) to keep the machine in balance during transportation.



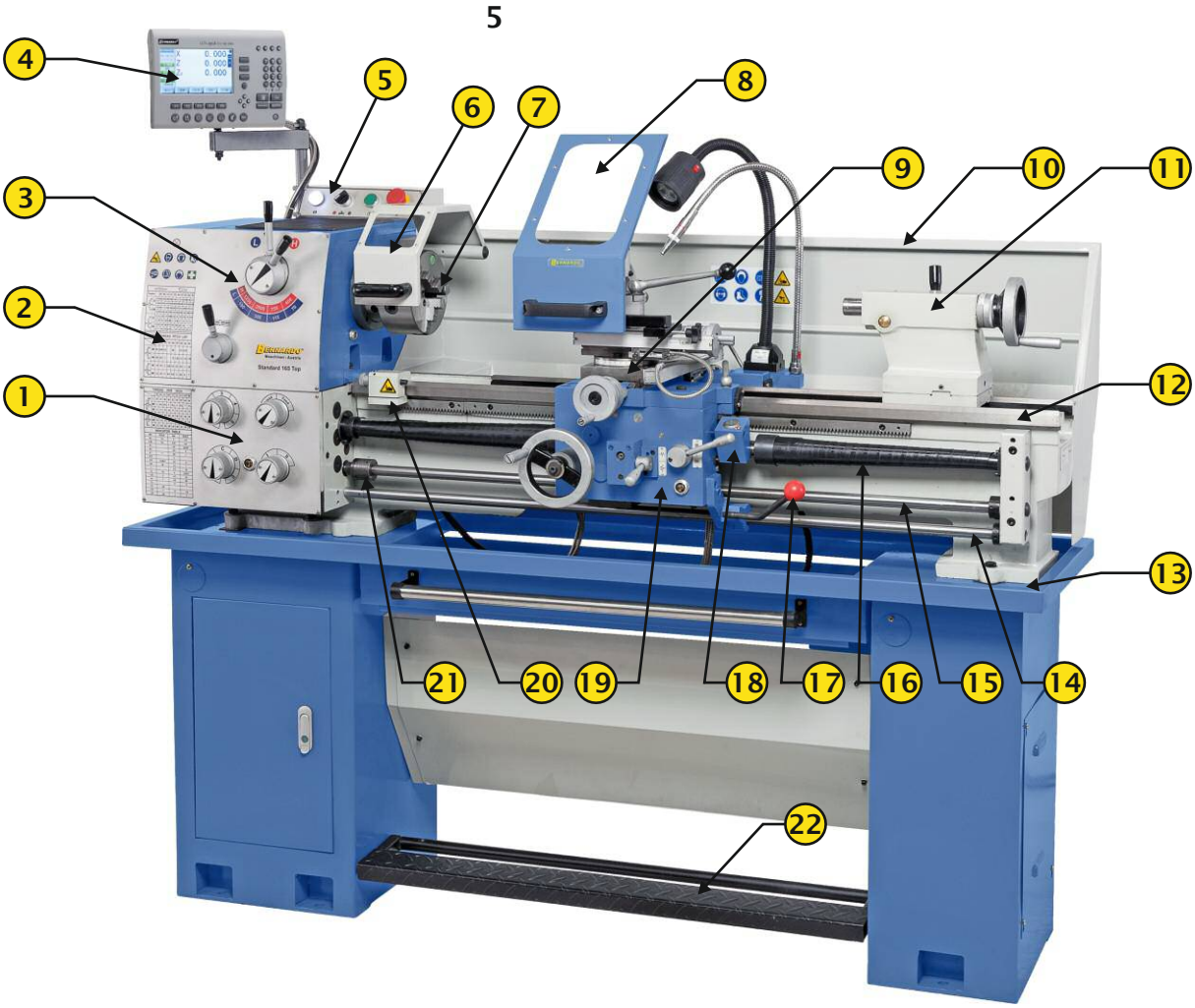


5.7 Mounting of handles



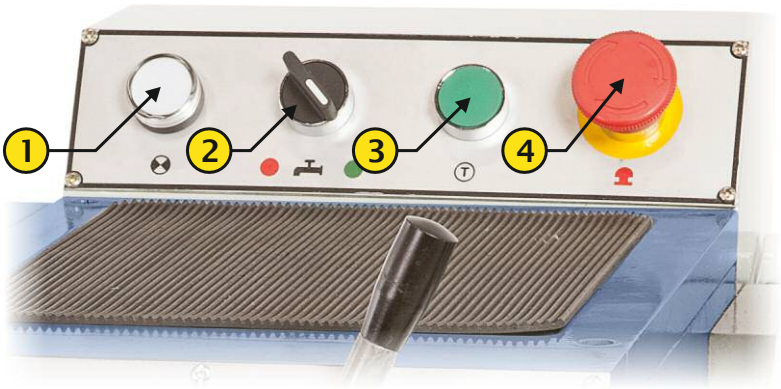
6. Machine Description

6.1 General



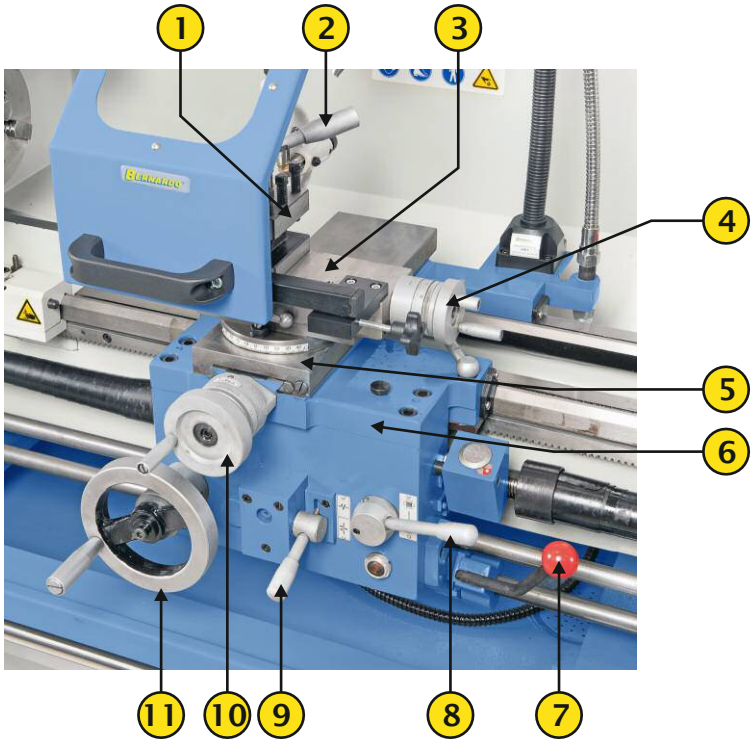
1	Feed unit
2	Gear wheel unit feat. Thread and Feed Chart
3	Headstock
4	2-axis Digital Readout
5	Control panel
6	Chuck guard
7	3-jaw chuck
8	Adjustable chip and splash guard
9	Carriage
10	Chip splashback
11	Tailstock
12	Machine bed
13	Chip tray
14	Spindle switch (spindle drive left/ right)
15	Feed rod (for automatic feed)
16	Leadscrew (for thread cutting) incl. leadscrew cover
17	Gear stick
18	Thread dial
19	Apron
20	Micrometre longitudinal stop
21	Safety clutch – feed rod
22	Foot brake – stops the spindle

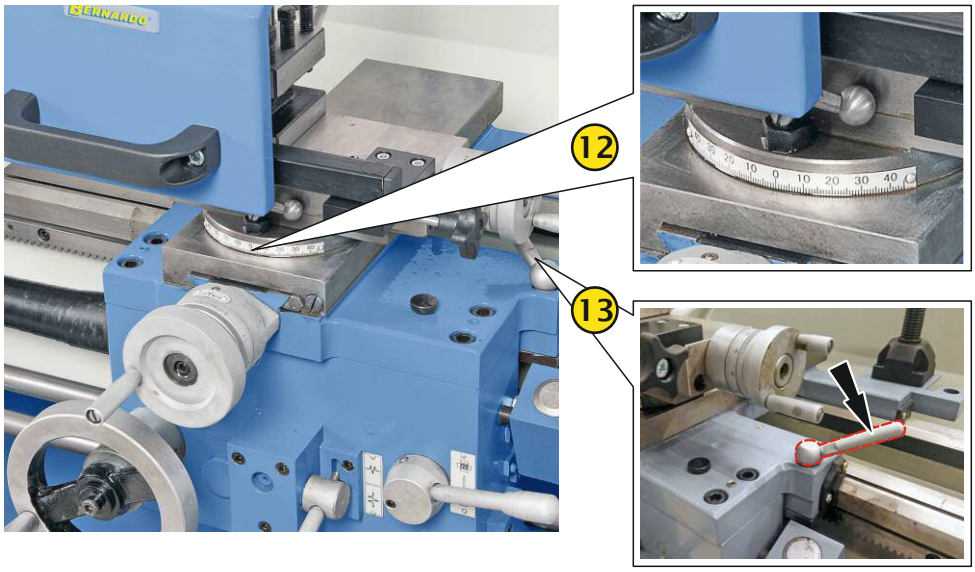
6.2 Control Panel



1 Indicator lamp (control voltage)
2 On/Off-switch for coolant fluid pump
3 Jog button to change gear level
4 Emergency Off-button

6.3 Carriage





1. **4-way tool post holder**
   Allows clamping of tools, e.g. chisels or boring bar.

   INFO! To increase economy the 4-way tool post holder can be replaced with a 40 position tool post & holder set System Multifix (see 1.4)

2. **Clamping lever 4-way tool post holder**
   Secures the 4-way tool post holder in the required position on top slide.

3. **Compound rest**

4. **Crank – manual feed compound rest**
   Moves the compound rest and the turning tools relative to the work piece, even with different angles with a precise depth gauge.
   Nonius hand wheel – **0.02 mm**

5. **Cross slide**

6. **Longitudinal slide**

7. **Gear stick (spindle drive left/ right)**

8. **Half nut ON/OFF (for thread cutting)**
   Clamps the half nut to the leadscrew when thread cutting.

9. **Feed lever – automatic longitudinal or cross feed**
   Allows the operator to turn the feed for longitudinal or cross feed on or off.

10. **Hand wheel – manual cross slide feed**
    Move the cross slide at right angle towards the longitudinal slide direction.
    Nonius hand wheel – **0.05 mm**

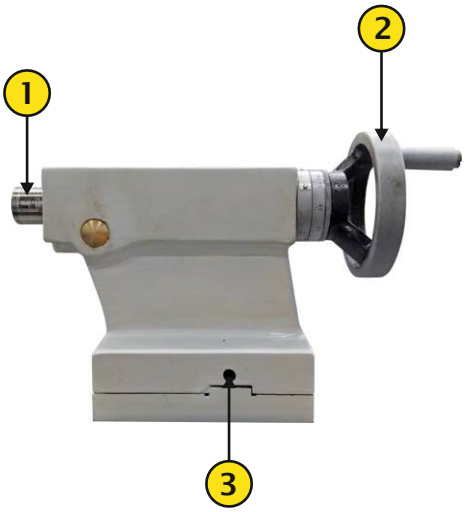
11. **Hand wheel – manual feed longitudinal slide**
    Move the longitudinal slide left or right along the guideways
    Nonius hand wheel – **0.5 mm**

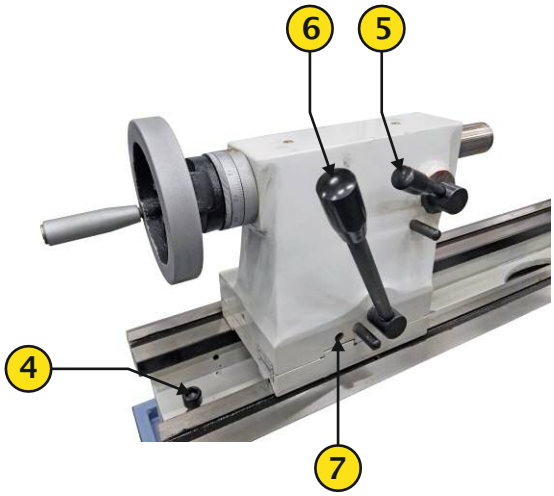
12. **Scale – compound rest**
    The 90° scale (fragment 1) shows the angle of the compound rest in comparison to the cross slide and is split at 0°. The compound rest can be tilted 45° to the right and 45° to the left.

13. **Clamping screw carriage (clamps the carriage onto machine bed)**
    Allows more stability when face turning of a work piece. The clamping screw secures the longitudinal slide onto the bed guiding of the lathe.

    ATTENTION! Only the marked screw can be used to clamp the tool slide!

6.4 Tailstock





1. **Tailstock quill**
   Allows clamping of drill piece, a dead center (e.g. turning between two centers) etc.

2. **Hand wheel – tailstock quill feed**
   Quill comes out or goes into tailstock.
   Nonius hand wheel – **0.04 mm**

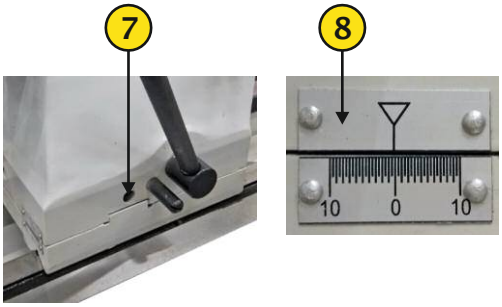
3. **Front adjustment screw for moving the tailstock to the side.**
   For conical turning the tailstock can be offset to the spindle axis with the front and rear adjustment screw.

4. **End screw for tailstock**
   Stops the tailstock from falling off the machine.

5. **Clamping lever for tailstock quill**
   Clamps the tailstock quill into the required position.

6. **Quick clamping lever tailstock (clamps the tailstock on machine bed)**
   Clamps the tailstock into required position along the machine bed.

7. **Rear adjustment screw for moving tailstock to the side.**
   see 3.



8. **Scale for lateral movement of tailstock (taper turning)**
   For taper turning the tailstock can be tilted to the side.
   Nonius scale – **0.5 mm**

6.5 Safety clutch incl. micrometre longitudinal stop

⚠ ATTENTION

The safety clutch is adjusted normally requires no further adjustment. If the clutch requires further adjustment ensure it is not too restricted as this could lead to damages in the apron or feed unit.

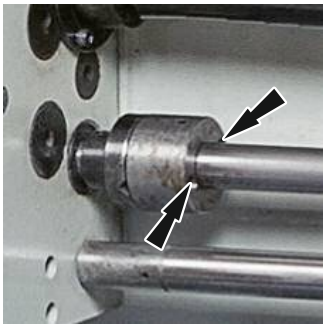
1. **Micrometre longitudinal stop**
   In combination with the safety clutch the stop can be used for longitudinal turning. Eg. For turning operations which require the same lengths. The micro metre longitudinal stop is put into required position and clamped onto the machine bed with the clamping screws (located on the underside).
   The knurled head screw allows for fine adjustment.
   When the longitudinal slide touches the screw of the micrometre stop, the safety clutch of the feed rod is released and the longitudinal slide stops.
   Nonius knurled head screw – **0.035 mm**

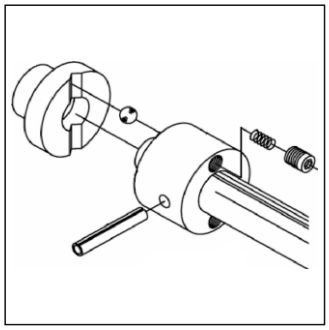
2. **Leadscrew feat. Guard**
   Used for the automatic feed.

3. **Feed rod**
   Wird für den automatischen Vorschub verwendet.

4. **Shift spindle**

5. **Safety clutch**
   Main purpose – overload protection for feed unit and apron.
   The safety clutch can be adjusted with 4 studs.

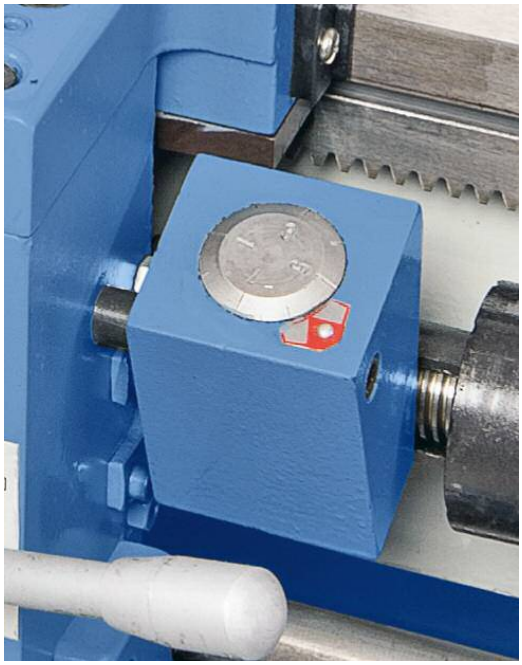




6.6 Thread dial

When cutting a metric thread and one cycle is completed, the half nut should remain tightened when returning. The thread dial allows the operator to separate the carriage from the leadscrew to allow quick returning for the next cycle. Depending on the cut thread and the display on the feed chart, the thread dial shows where the operator must place the half nut to start in the same thread as to not destroy the existing thread. The feed chart is located on the rear of the chip cover.

In order to use the thread dial it must be linked to the leadscrew.
(Gear wheel of thread dial must be synchronized with the leadscrew)



INDICATOR TABLE					
T	mm	SCALE	T	mm	SCALE
0	0.5	/	15	0.45	1
	0.6	/		0.9	1
	0.75	/		1.25	1
	1	/		1.8	1
	1.5	/		2.25	1
	3	/		2.5	1
16	0.4	1-8	14	4.5	1
	0.8	1,3,5,7		5	1
	1.2	1-8		0.7	1,5
	1.6	1,5		1.4	1,5
	2	1-8		1.75	1,5
	2.4	1,3,5,7		2.8	1
	3.2	1		3.5	1,5
	4	1,3,5,7		7	1,5
	4.8	1,5			
	6	1-8			

7. Initial start-up

⚠ DANGER

Compliance to the following is of high importance

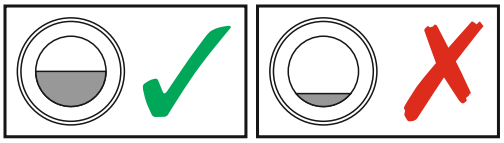
- Always turn the machine off by pressing the designated button. Never switch off the machine by pulling out the plug or by turning off a limit switch!
- Only certified electricians are authorized to deal with faults.
- Never make changes to the electrical parts of the machine.

⚠ DANGER

Connection to the power supply by an electrician must be in compliance with electric installation regulations and guidelines.

Correct power supply voltage! Specifications on the serial plate must comply with the voltage of the power supply.

1 Check oil level (see 9.3)



2 Connect to power source

8. Operation

⚠ DANGER

Turn off the main switch before carrying out any adjustments and make sure machine cannot be started.

⚠ DANGER

Prior to processing make sure that every moveable part, in which the work piece is secured in, is clamped.

⚠ ATTENTION

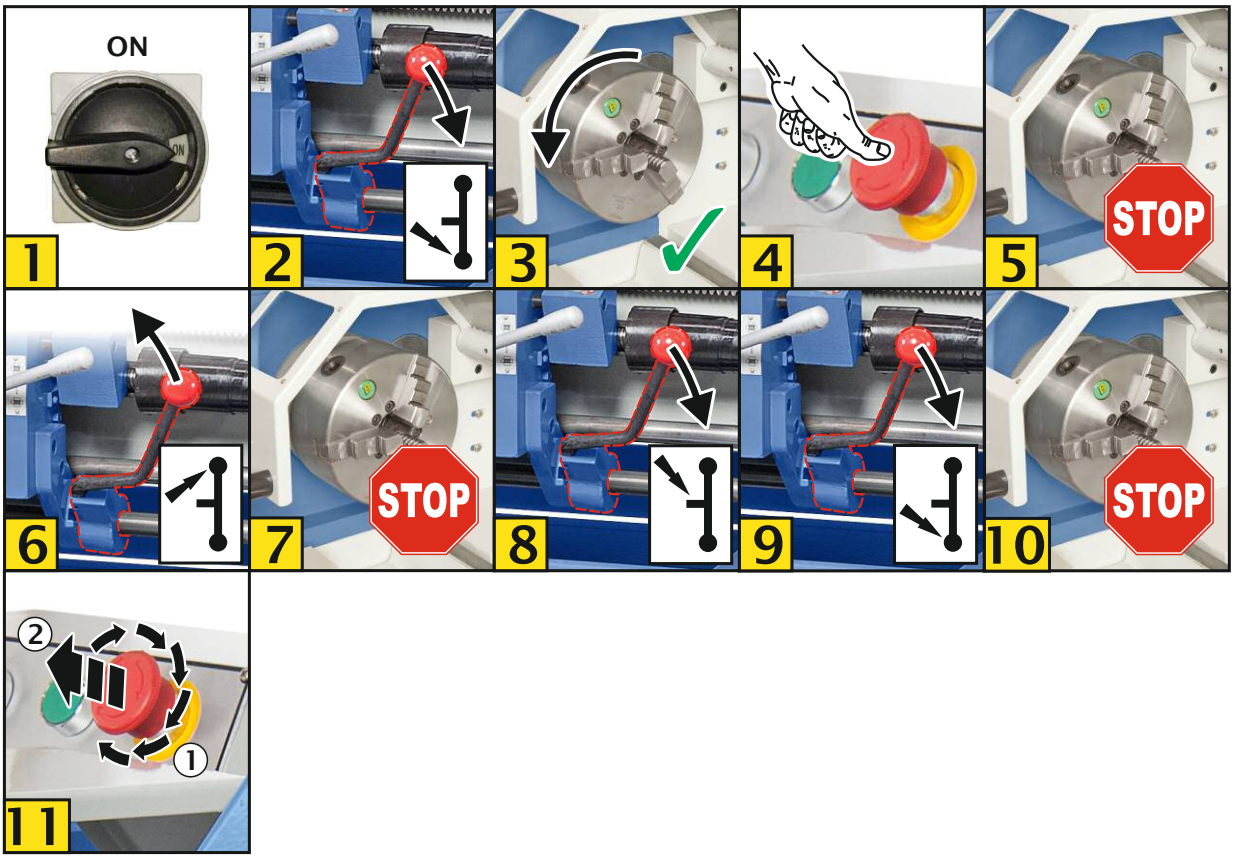
During operation the sound pressure level can exceed 85 dB (A) depending on work piece andor material.
We advise to wear suitable ear protection!

⚠ WARNING

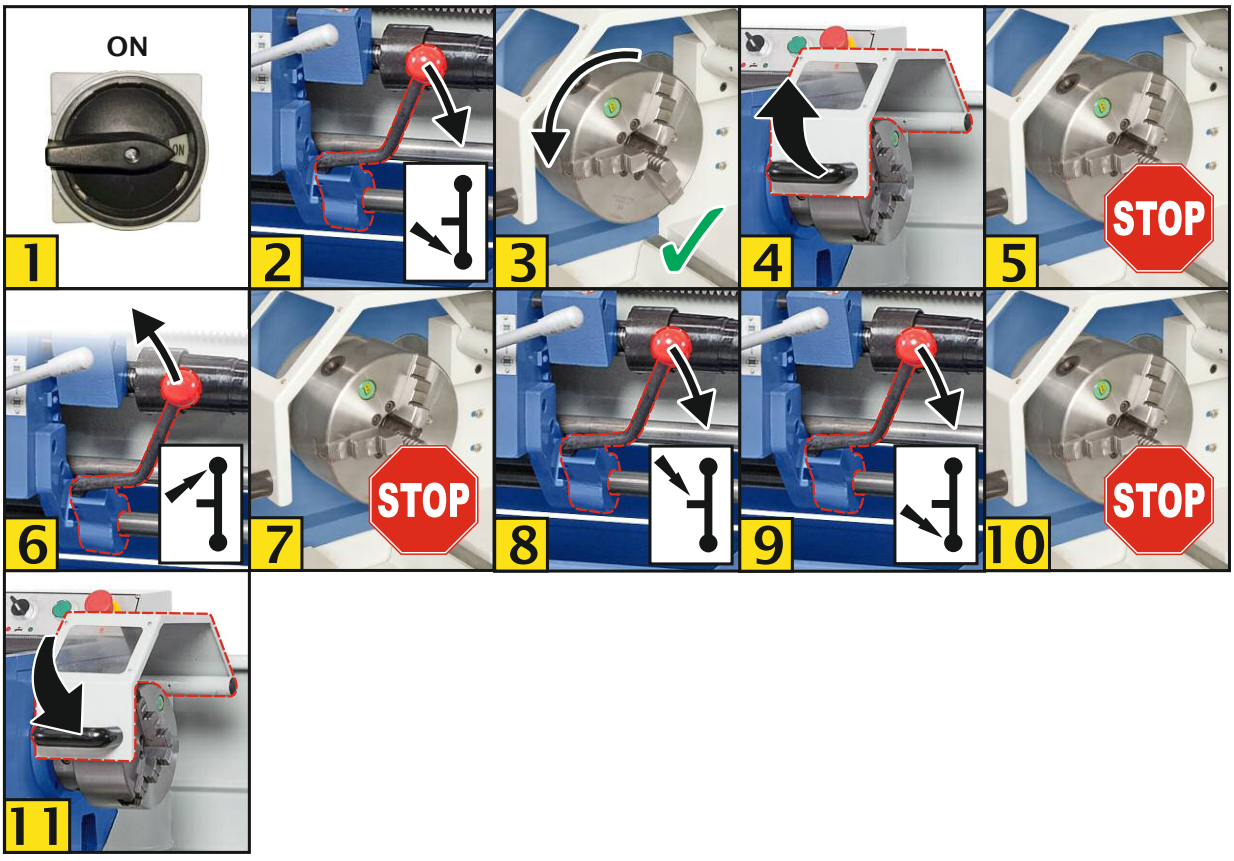
Improper use may lead to serious injuries and property damage. Prior to operation the machine operator must ensure that there is no other person near the work space of the machine and that all safety devices are in proper working order.

8.1 Inspection of safety devices

Inspect Emergency – Off Button

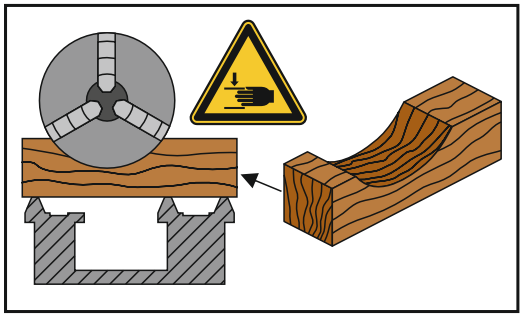


Inspect protective cover of jaw-chuck



8.2 Camlock - Chuck mounting/ demounting

⚠ WARNING

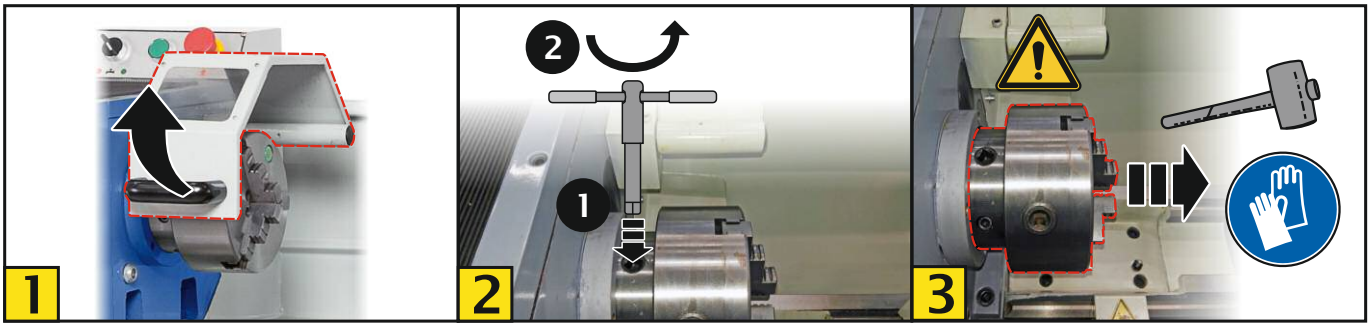


Risk of getting trapped!

Protect your hands and the bed guide with a chuck support, when demounting the chuck.

The heavy weight of a chuck that drops can lead to serious injuries!

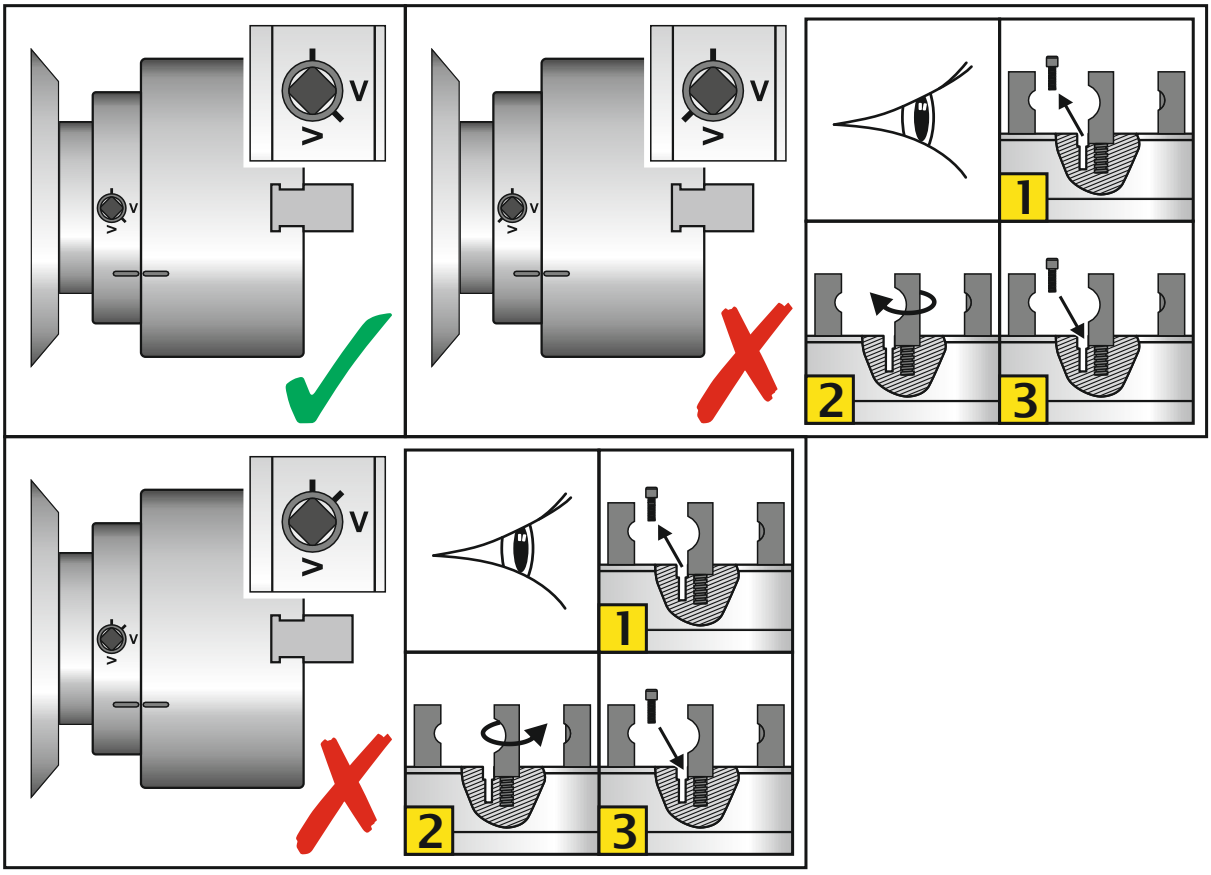
Demounting Camlock – Chuck



Mounting Camlock – Chuck

Follow the instructions of “Demounting Camlock–Chuck” in reverse order. Prior to mounting, ensure there are no traces of dirt on the contacting surfaces on any of the parts.

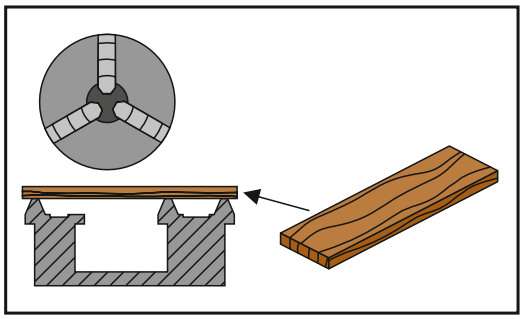
Adjustment of Camlock – Chuck



8.3 3-jaw chuck

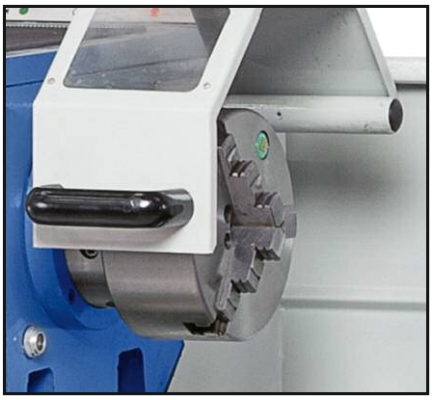
This part of the manual describes safety aspects to take into consideration when using a 3-jaw chuck on your lathe. Always pay attention to the safety features in the safety booklet.

! NOTE



When changing the chuck or when turning or replacing the clamping jaws always put a piece of timber or similar object on the bed guiding beneath the spindle. This helps to protect the precise finish of the machine from work pieces that drop.

The 3-jaw chuck, included in the standard accessories, is used to clamp concentric work pieces. The three jaws provide even pressure to keep the work pieces centred. This means that the three jaws move simultaneously via a scroll plate when turning the chuck wrench.



8.3.1 Lathe Chucks - requirements for safe operation

- **Chuck – speed rate setting.** There is a high risk of chucks or work pieces being catapulted away from the machine at high speed rates which can lead to serious or life-threatening injuries. Never use speed rates exceeding the permitted rate or safety limits of your work piece.

- **Use the correct equipment.** There are many work pieces which can only be safely processed when using additional clamping devices, such as a tailstock or a rest. It comes down to the experience of the operator to know when the processing with the lathe and the available accessories is too dangerous and when to use a different machine or process to ensure safe operating.

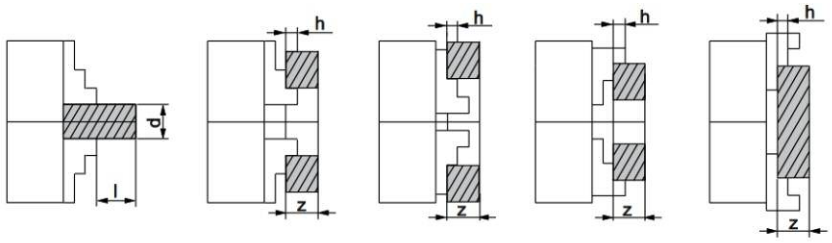
- **Trained operators.** Not using the chuck correctly can lead to work pieces being catapulted away from the machine at a speed that can kill the operator or any person standing within the machine surroundings. To minimize the risk of injury read and understand this document and consult andor train with an experienced operator before using chucks.

- **Capacity of the chuck.** Do not exceed the capacity of the chuck by using an oversized work piece. If your work piece is too big to be clamped by the chuck use a face plate or a larger chuck. This eliminates the risk of the work piece being catapulted away from the machine and injure or kill people.

- **Clamping force.** Insufficient clamping force can result in the work piece being catapulted from the machine hitting the operator or any other person nearby. For maximum clamping force ensure that the chucks are maintained and lubricated properly, that all jaws are fully in contact with the work piece and that the maximum clamping diameter is not exceeded.

- **Correct maintenance.** All chucks must be properly maintained and lubricated in order to reach maximum clamping force and to resist centrifugal forces. To minimize the risk of work pieces being catapulted away from the machine, stick to the maintenance intervals and guidelines of this manual.

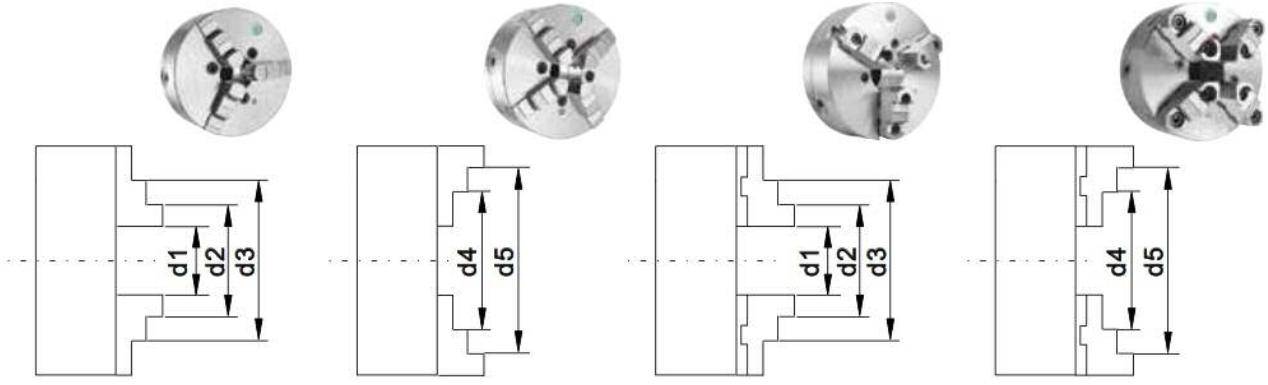
Remove the chuck wrench before turning on the machine!



1. l, z = maximale Werkstücklänge/-breite
2. d = Werkstückdurchmesser
3. h = Höhe Backenstufe
4. Werkstück ▨ ist ohne zusätzliche Spannhilfe (z.B. Lünette..) im Backenfutter befestigt

Futtergröße	80	100	125	160	200	250	315	400	500	630	800
Werkstückabmessung											
l	1,2 x d	1,2 x d	1,2 x d	1,2 x d	1,2 x d	1,2 x d	1,5 x d	1,5 x d	1,5 x d	1,0 x d	1,0 x d
z	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h	4 x h
Max. Spannkraft											
daN	1000	1700	2400	3100	3700	4600	5500	6500	7200	8000	9000
Max. Drehzahlen (min^{-1})											
Drehfutter Guss (PS)	4000	3500	3200	3000	2500	2000	1500	1000	700	500	300
Drehfutter Stahl (PO)	6000	5200	4800	4500	4000	3500	2800	2000	1200	1000	450
Drehfutter Guss (DK)	4000	3500	3000	2500	2000	1600	1200	1000	800	800	300
Unwucht Drehfutter Stahlausführung											
gcm	11	16	23	32	45	63	90	140	300	640	-

8.3.2 Main clamping ranges for lathe chucks



mm

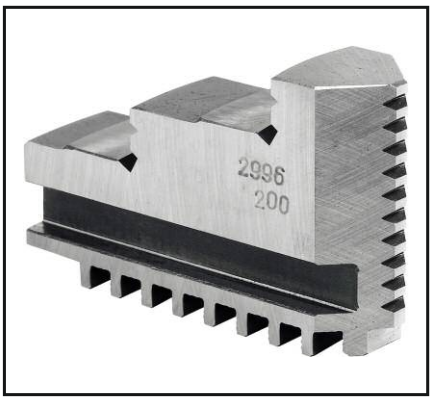
Futtergröße		80	100	125	160	200	250	315	400	500	630	800
d1	solid*	2-27	3-33	3-50	3-64	4-90	5-118	10-131	10-180	20-235	30-335	150-482
d1	reversible**	-	-	3-50	3-64	4-90	5-118	10-131	10-180	20-235	30-335	150-482
d2	solid	22-46	25-56	34-74	42-100	52-135	62-174	78-200	85-252	120-335	160-465	282-614
d2	reversible	-	-	34-76	42-97	50-130	58-165	65-182	72-228	120-410	140-590	252-736
d3 max.	solid	45-69	56-87	72-115	94-154	120-202	145-256	172-299	210-380	245-476	325-630	448-780
d3 max.	reversible	-	-	77-118	88-146	105-190	125-235	145-265	165-329	200-485	210-665	328-812
d4 max.	solid	25-50	32-62	39-83	50-107	60-145	77-188	90-215	103-272	140-357	180-487	302-634
d4 max.	reversible	-	-	52-96	62-121	72-156	86-197	103-226	127-294	110-400	120-570	240-724
d5 max.	solid	48-71	62-83	80-125	98-160	130-200	160-250	190-315	230-400	276-500	345-630	468-800
d5 max.	reversible	-	-	95-125	115-160	133-200	160-250	190-315	230-400	190-500	200-630	316-800

* Einteilige Backen ** Geteilte Backen

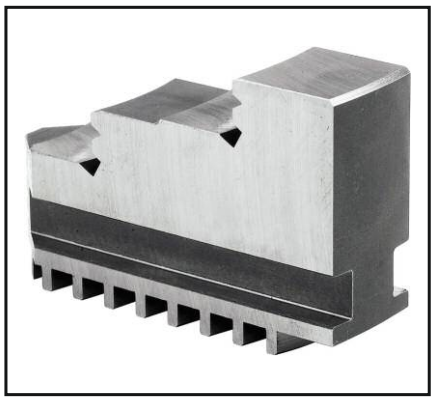
8.3.3 Clamping options

Along with the hard solid outside jaws the machine is also equipped with hard solid inside jaws which extends the range of applications. Both sets of jaws can clamp a work piece on the inside and the outside of the jaws.

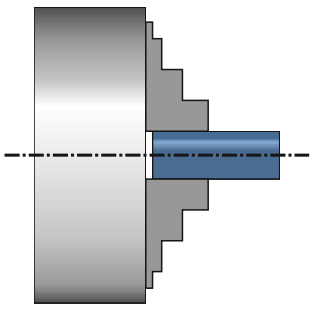
Hard solid outside jaws



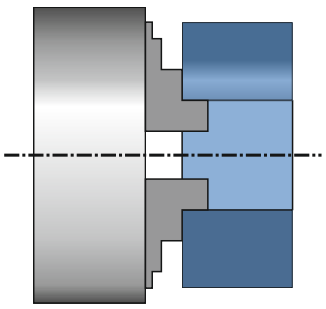
hard solid inside jaws



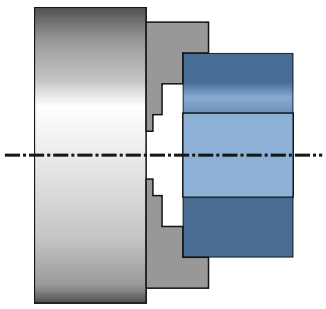
Clamping options



Clamping on the outer diameter with the hard solid outside jaws



Clamping on the inner diameter with hard solid outside jaws



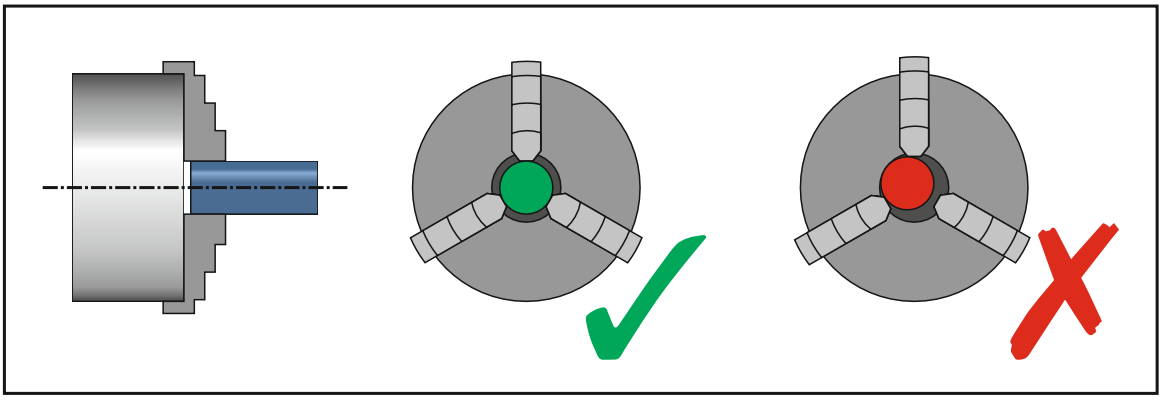
Clamping on the outer diameter with hard solid inside jaws

Additional jaws are optionally available.

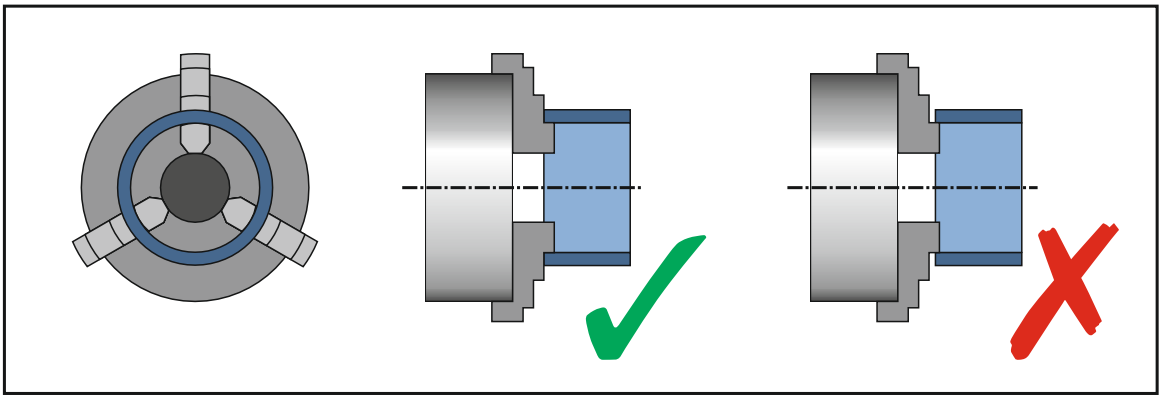
8.3.4 Clamping of work piece

Regardless of the configuration of the jaws in use, always ensure that the work piece is sufficiently clamped and pay attention to the following advice on clamping options.

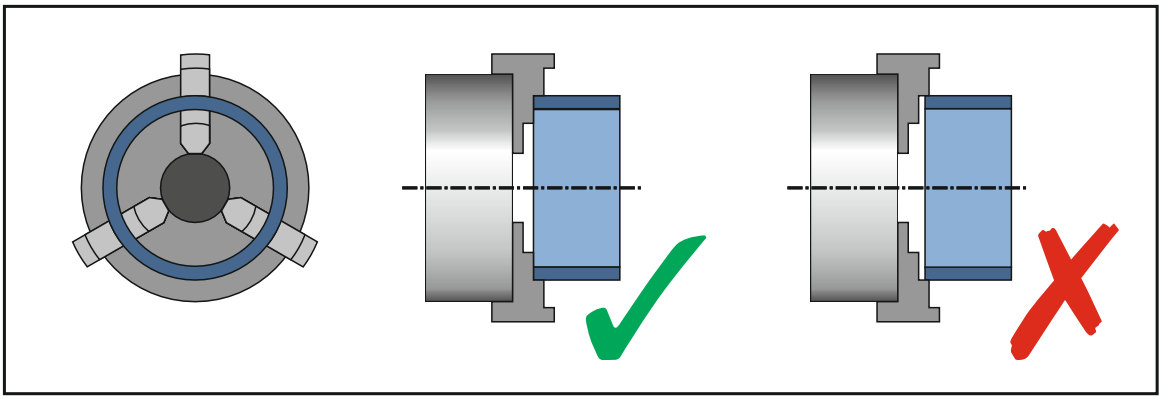
Clamping on the outer diameter (hard solid outside stepped jaw)



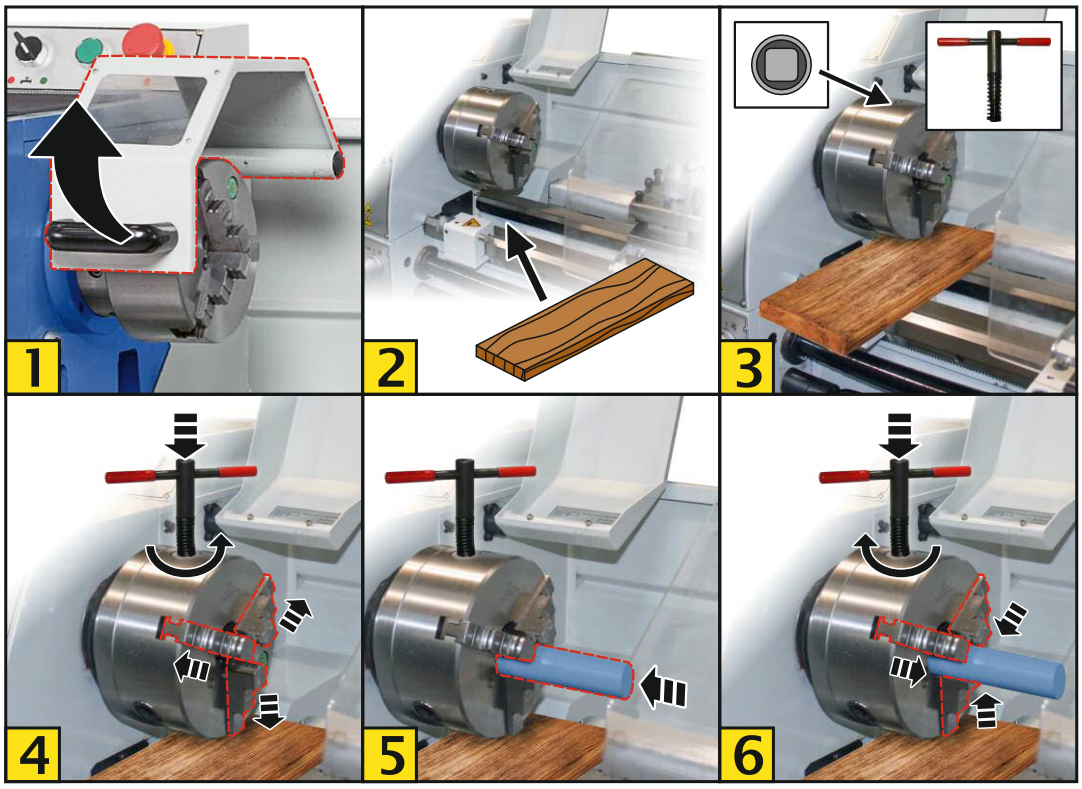
Clamping on the inner diameter (hard solid outside stepped jaw)



Clamping on the outer diameter (hard solid inside stepped jaw)



Example

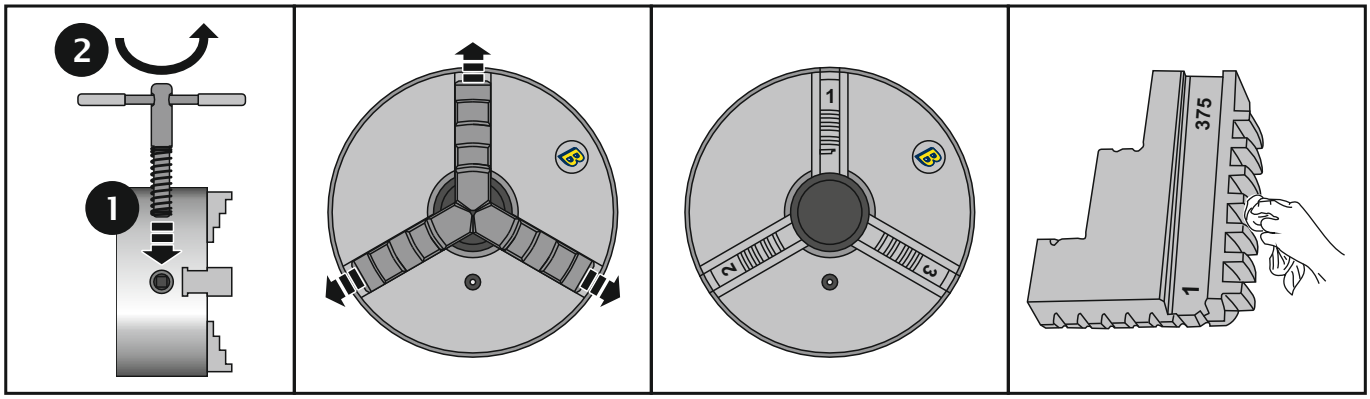


8.3.5 Reversing replacing clamping jaws

> **! NOTE**
>
> Apply a thin layer of protective coating after cleaning the jaws to avoid corrosion. Store the jaws in a dry and clean space.

Jaw removal

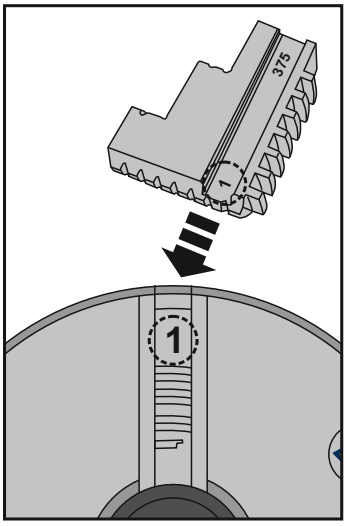
The clamping jaws must be demounted (see 8.2) before storing them on a flat, solid surface.



Note! Remove the clamping jaws from time to time in order to clean its divisions to ensure a long life span.

Mounting the jaws

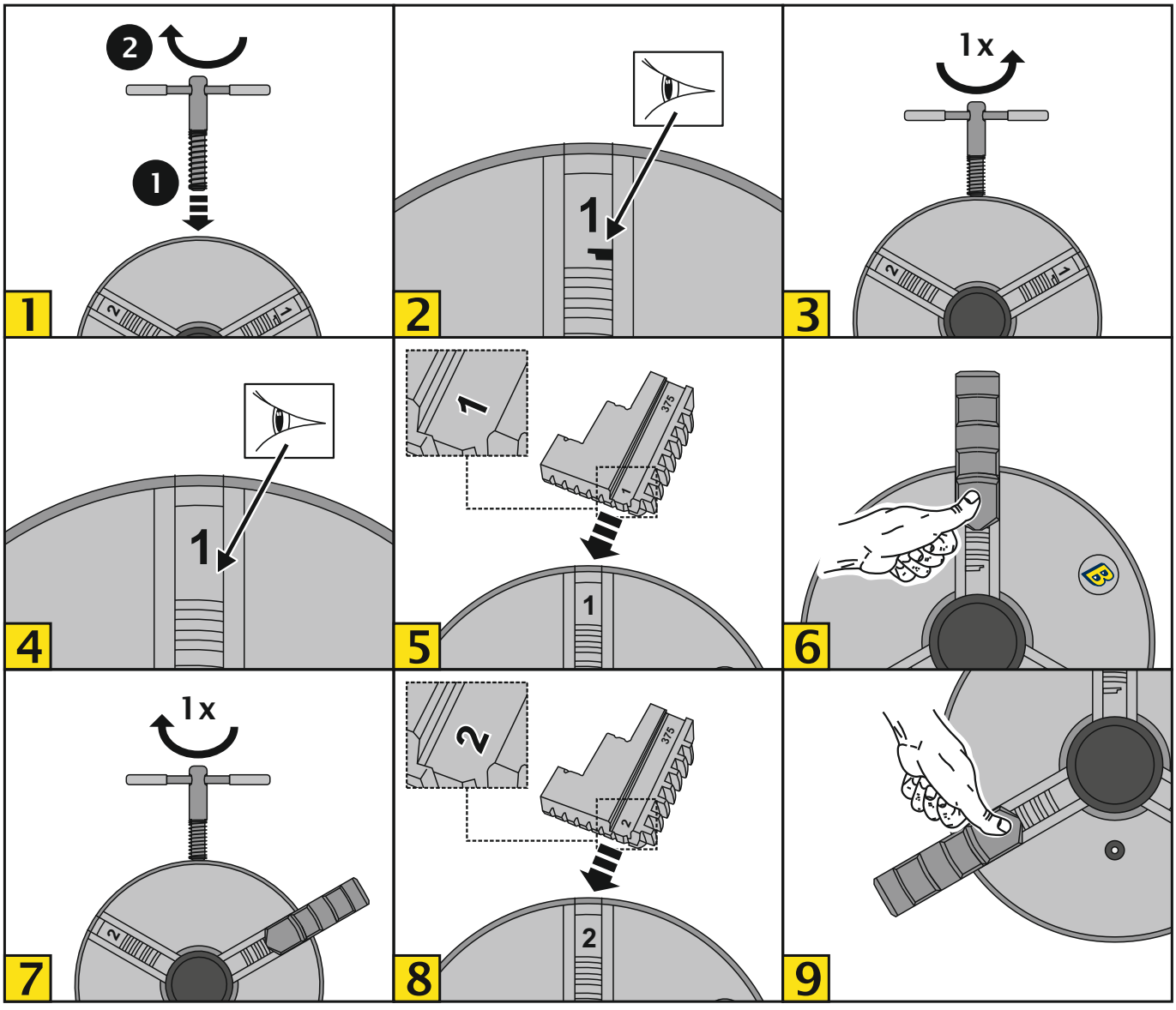
! NOTE

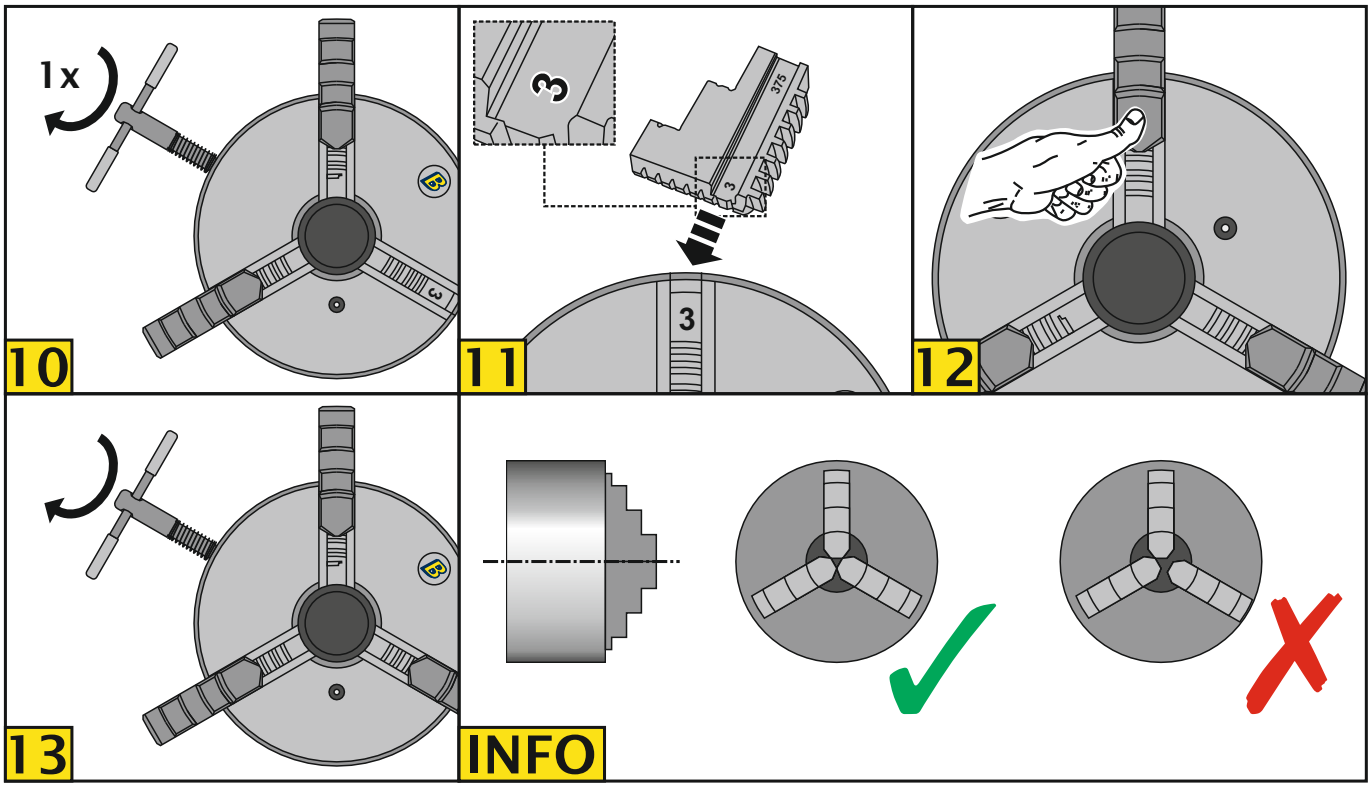


Markings on the jaws

The jaws and divisions are precisely manufactured.

All jaws and the divisions they sit in, are numbered and can only be used in respective combinations.





! NOTE

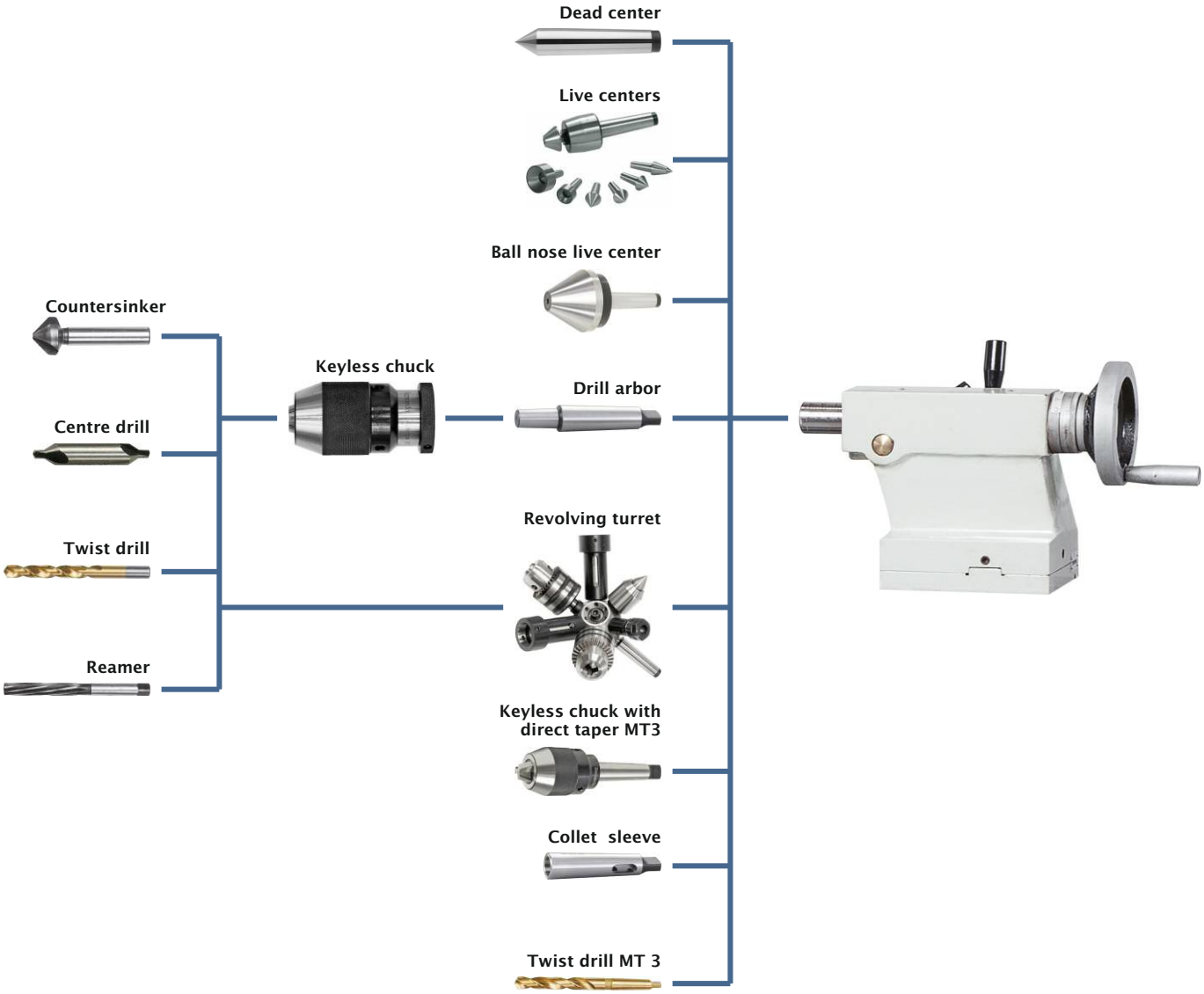
Pull the jaws out by hand to ensure they match the guiding thread.

⚠ WARNING

If the jaw is installed correctly, the jaw closes evenly in the centre of the chuck. If this is not the case the jaw has to be removed. Check the numbers again before installing!

8.4 Tailstock

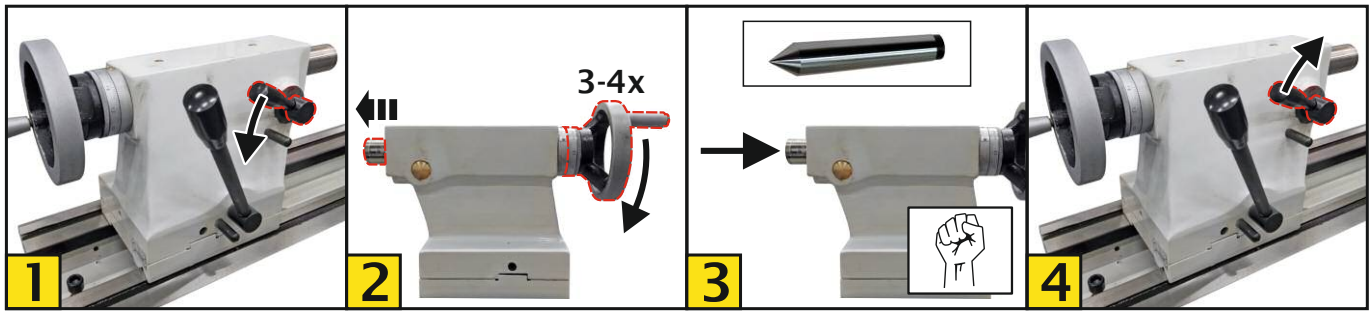
The barrel of the tailstock allows for clamping of several tools, such as dead center, live centers, revolving tailstock turret, drill chuck and more, which allows for a large variety of applications. The following image shows examples of what tools can be clamped in the tailstock quill.



8.4.1 Tool clamping

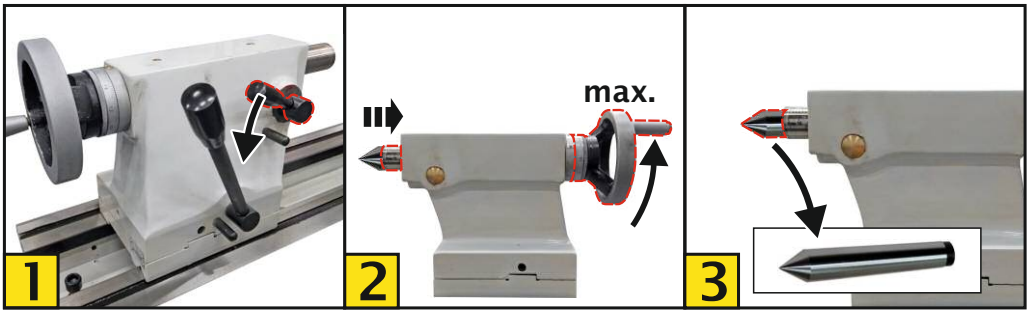
! NOTE

Prior to mounting tools ensure that there are no traces of grease, burrs or marks on the contacting surfaces of the tool and tailstock.
For correct tool removal the back end of the tool must be closed or possess a removal tang.

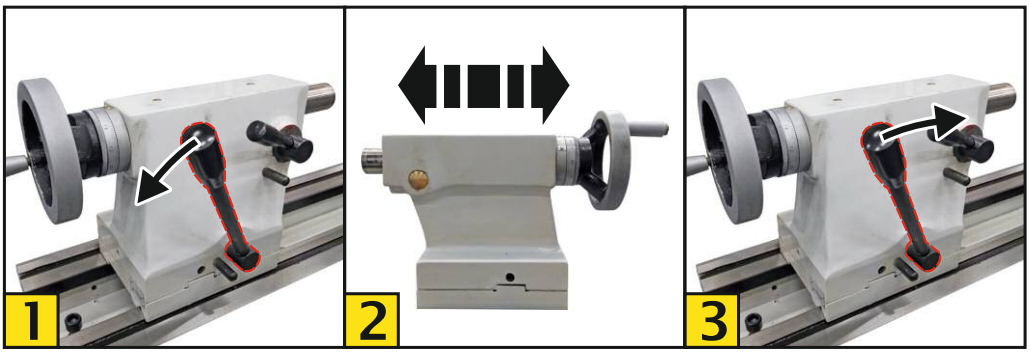


8.4.2 Tool removal

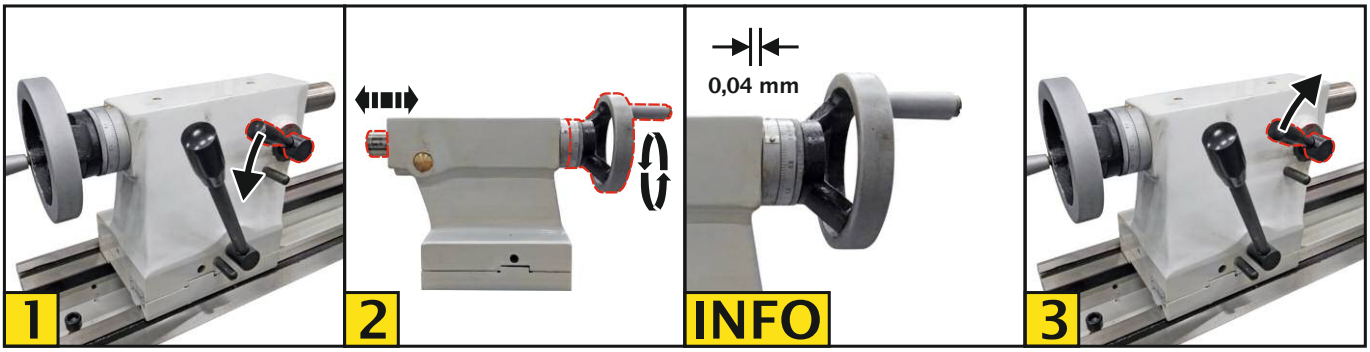
To remove the tools from the tailstock quill move the tailstock sleeve to the right – into the tailstock.



8.4.3 Positioning the tailstock



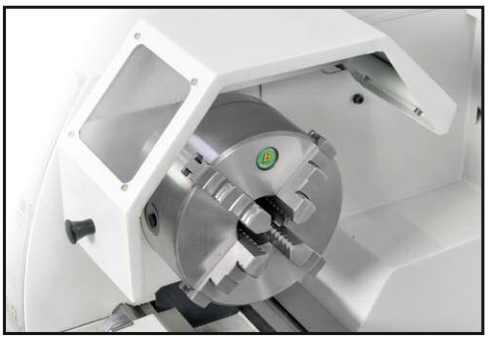
8.4.4 Tailstock quill travel



8.5 4 – jaw chuck (optional)

This part of the manual describes safety aspects to take into consideration when using the optionally available 4–jaw chuck on your lathe. Always pay attention to the safety features in the safety booklet.

Just like the 3–jaw chuck, the 4–jaw chuck is used to clamp concentric work pieces. This means that the four jaws move simultaneously via a scroll plate when turning the chuck wrench. The 4–jaw chuck is used for square work pieces.

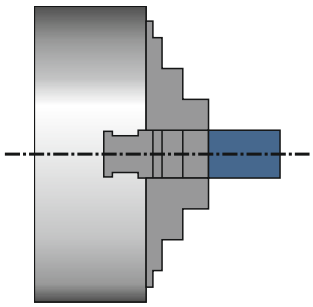


Note: Mounting a 4–jaw chuck requires an additional adaptor plate.

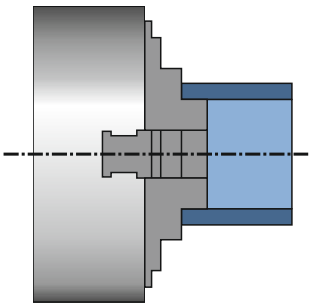
8.5.1 Clamping options

Hard solid outside and inside stepped jaws come with the 4–jaw chuck. (see 8.5.2)

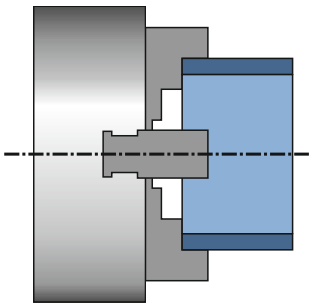
Clamping possibilities



Clamping on the outer diameter (hard solid outside stepped jaw)



Clamping on the inner diameter (hard solid outside stepped jaw)

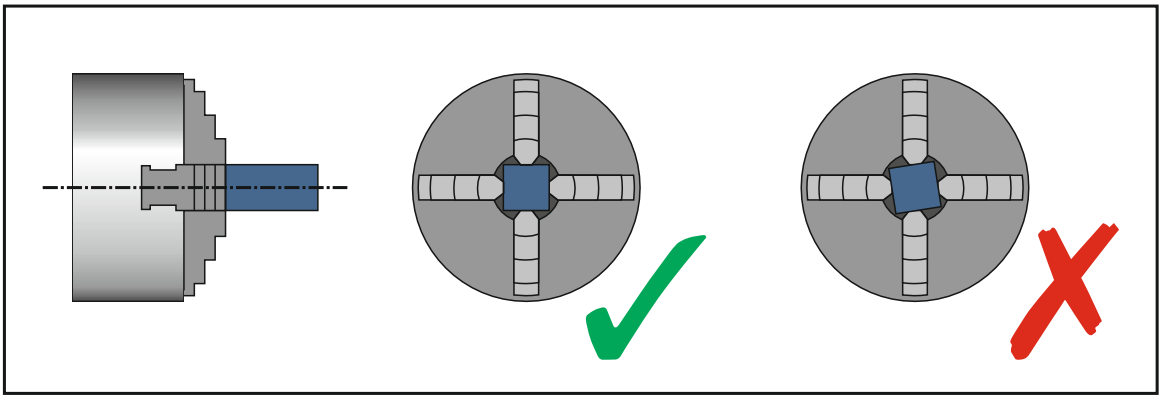


Clamping on the outer diameter (hard solid inside stepped jaw)

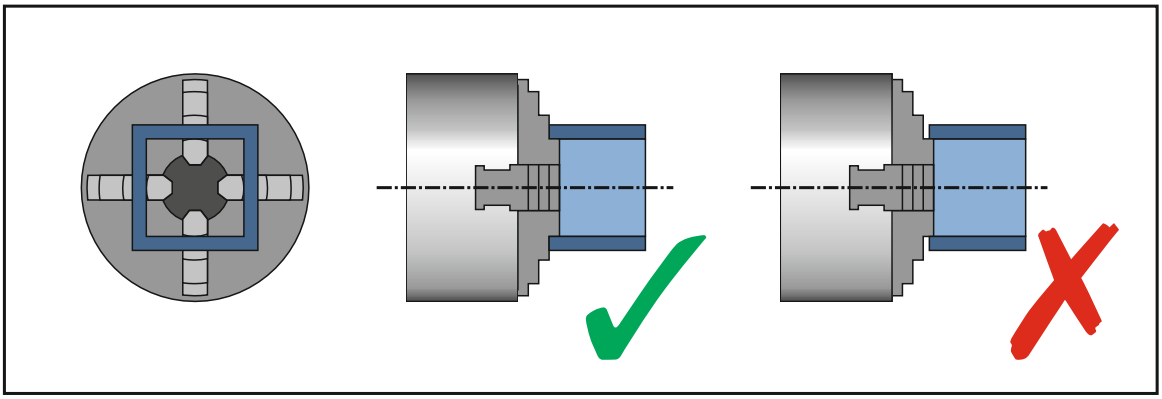
8.5.2 Clamping of work piece

Regardless of the configuration of the jaws in use, always ensure that the work piece is sufficiently clamped and pay attention to the following advice on clamping options.

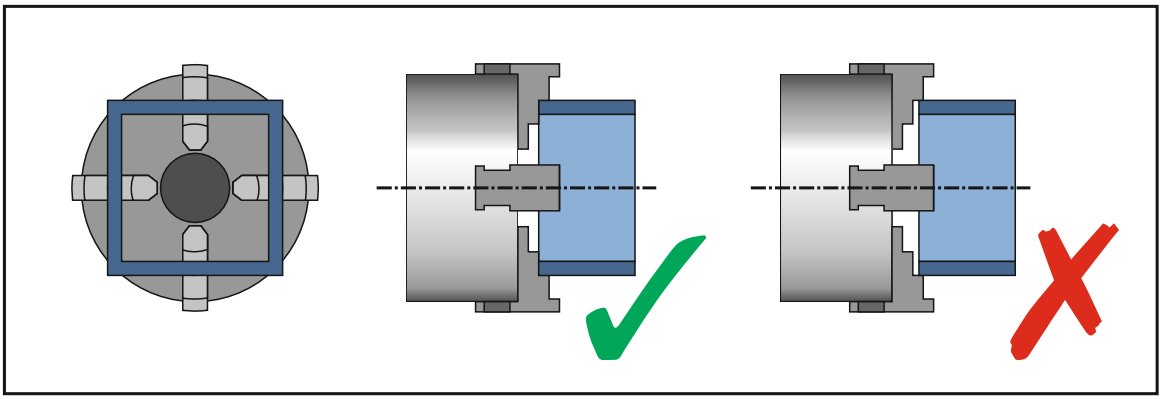
Clamping on the outer diameter (hard solid outside stepped jaw)



Clamping on the inner diameter (hard solid outside stepped jaw)



Clamping on the outer diameter (hard solid inside stepped jaw)



8.5.3 Reversing replacing clamping jaws

For the removal, replacement as well as the reversing of the clamping jaws proceed the same way as with the 3-jaw chuck. (see 8.3.5)

8.6 Independent chuck (optional)

⚠ DANGER

The independent chuck must only be used for turning operations at low speed!

This chapter describes safety aspects to take into consideration when using the optionally available independent chuck on your lathe. Always pay attention to the safety features in the safety booklet.

The independent chuck uses jaws which are not connected to each other. Each jaw is adjusted through a worm gear unit. This allows clamping of asymmetrical and rectangular pieces which can be positioned towards the spindle axis for face turning or boring drilling operations.
Another advantage of using the independent chuck is that work pieces can be positioned outside the spindle rotation axis, when boring or steps outside the centre have to be processed.

For extra gripping force for irregular shaped work pieces one or more jaws can be turned 180° in order to achieve a larger surface for clamping.

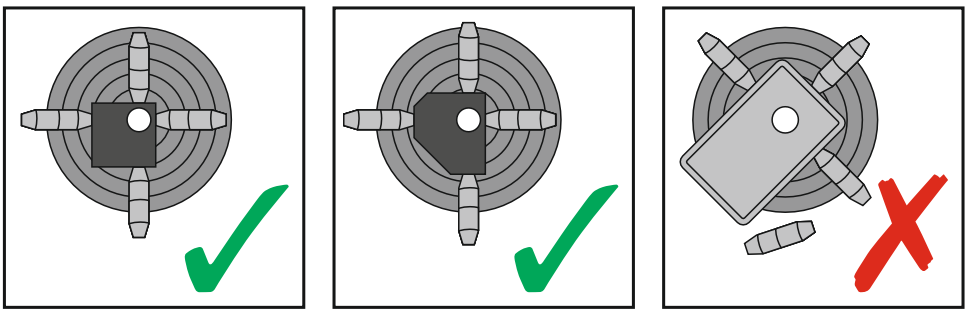
Note! Mounting the independent chuck requires an additional adaptor plate.

8.6.1 Clamping options

⚠ DANGER

If the work piece cannot be clamped with each of the four jaws, an independent plate must be used in order to have sufficient gripping force for safe operation. Otherwise the unbalance would be too strong. Even when only using an average speed rate, the chuck will remain unbalanced. There is a high risk of the operator or a person nearby being hit by a catapulted work piece.

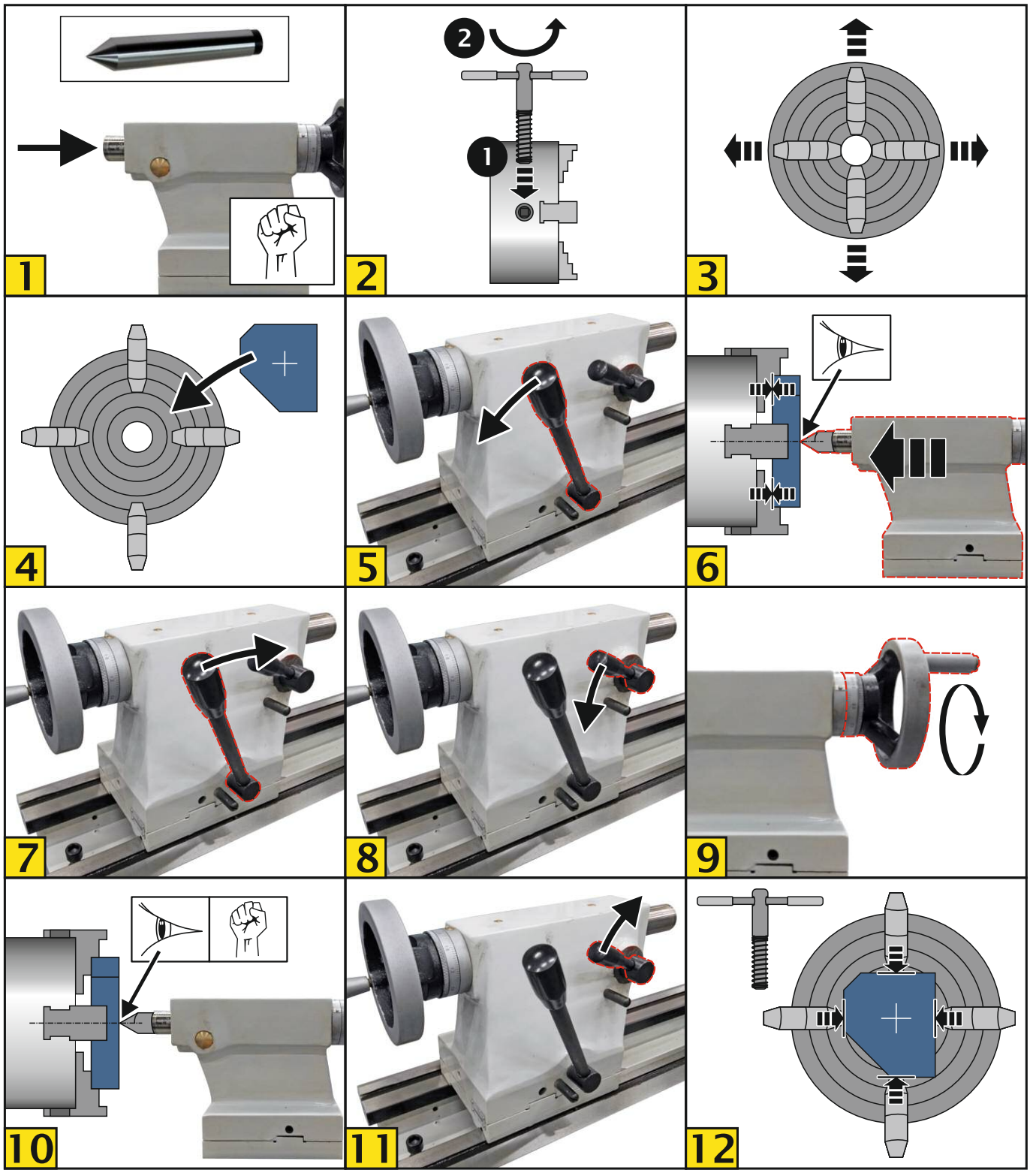
Clamping options

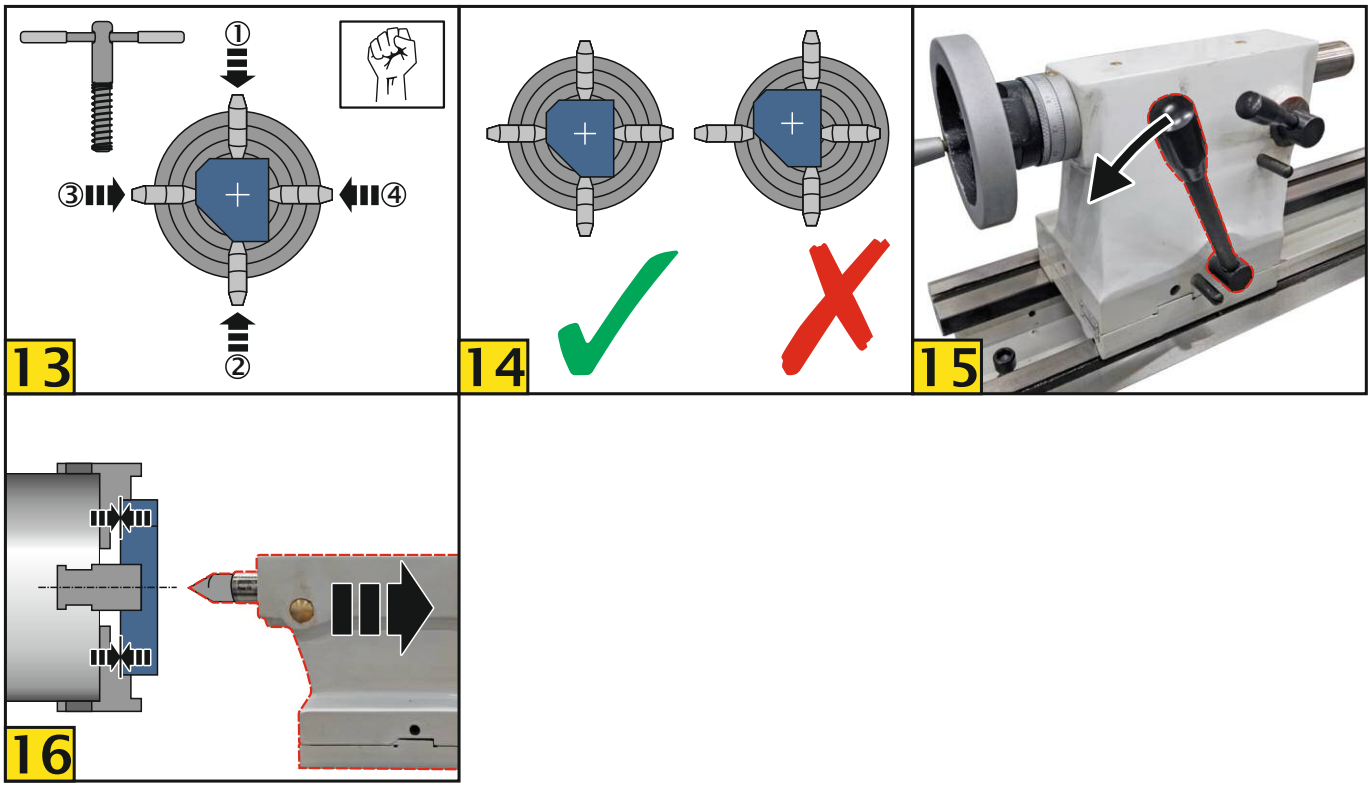


8.6.2 Clamping the work piece

The following example shows the clamping of an irregular work piece for boring. One or more jaws can be used in any combination to achieve best gripping force. Ensure that the work piece is positioned flat against the independent chuck.

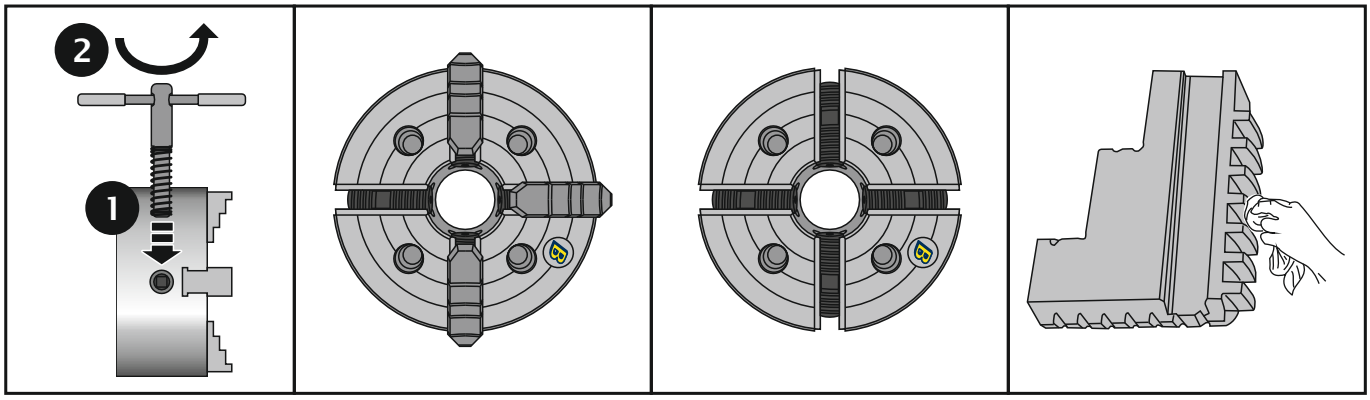
Example





8.6.3 Reversing replacing the clamping jaws

Each jaw can be reversed replaced individually.



8.7 Face plate (optional)

⚠ DANGER

The face plate must only be used at low speed rates. Use counter weights when experiencing a strong unbalance.

This part of the manual describes safety aspects to take into consideration when using the optionally available face plate on your lathe. Always pay attention to the safety features in the safety booklet.

There are several slots for T-bolts on the face plate which hold the clamping tools. If clamping with the independent chuck is insufficient unsafe the face plate must be used.

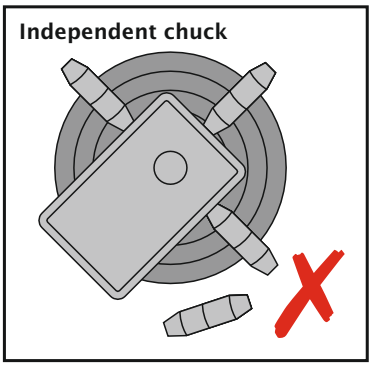
8.7.1 Clamping options

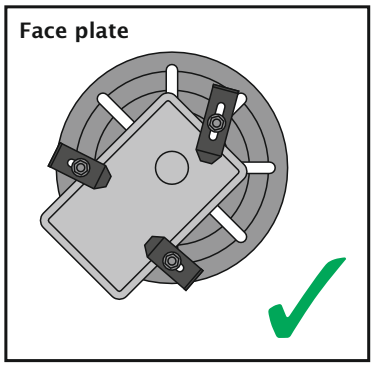
⚠ DANGER

Danger! However, neither the face plate nor the independent chuck are suitable for clamping all work pieces in a safe manner. Clamping a work piece off-centre or using an irregular shaped work piece often results in the whole construction turning off-centre. When increasing the speed, the work piece can be catapulted from the machine and lead to serious or life-threatening injuries for the operator or a person nearby.

Clamping options

The left picture shows an example of a work piece which cannot be clamped sufficiently by the independent chuck. One jaw is in the way of the work piece and removing the jaw bears extreme danger of the work piece being catapulted away from the machine.
The right picture shows how the work piece can be clamped correctly by using a face plate with at least three jaws that are evenly spaced for best gripping force.



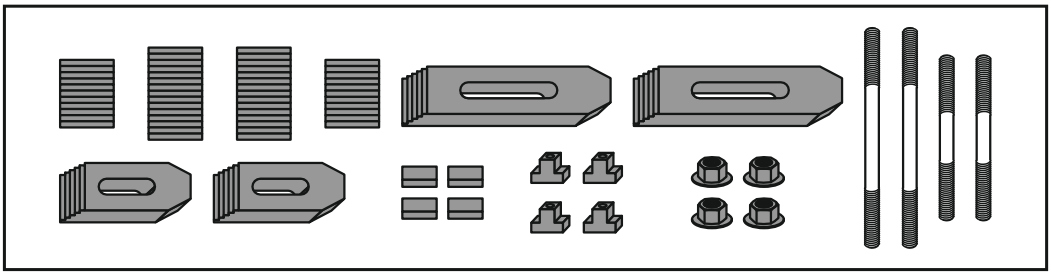


8.7.2 Clamping of work piece

⚠ DANGER

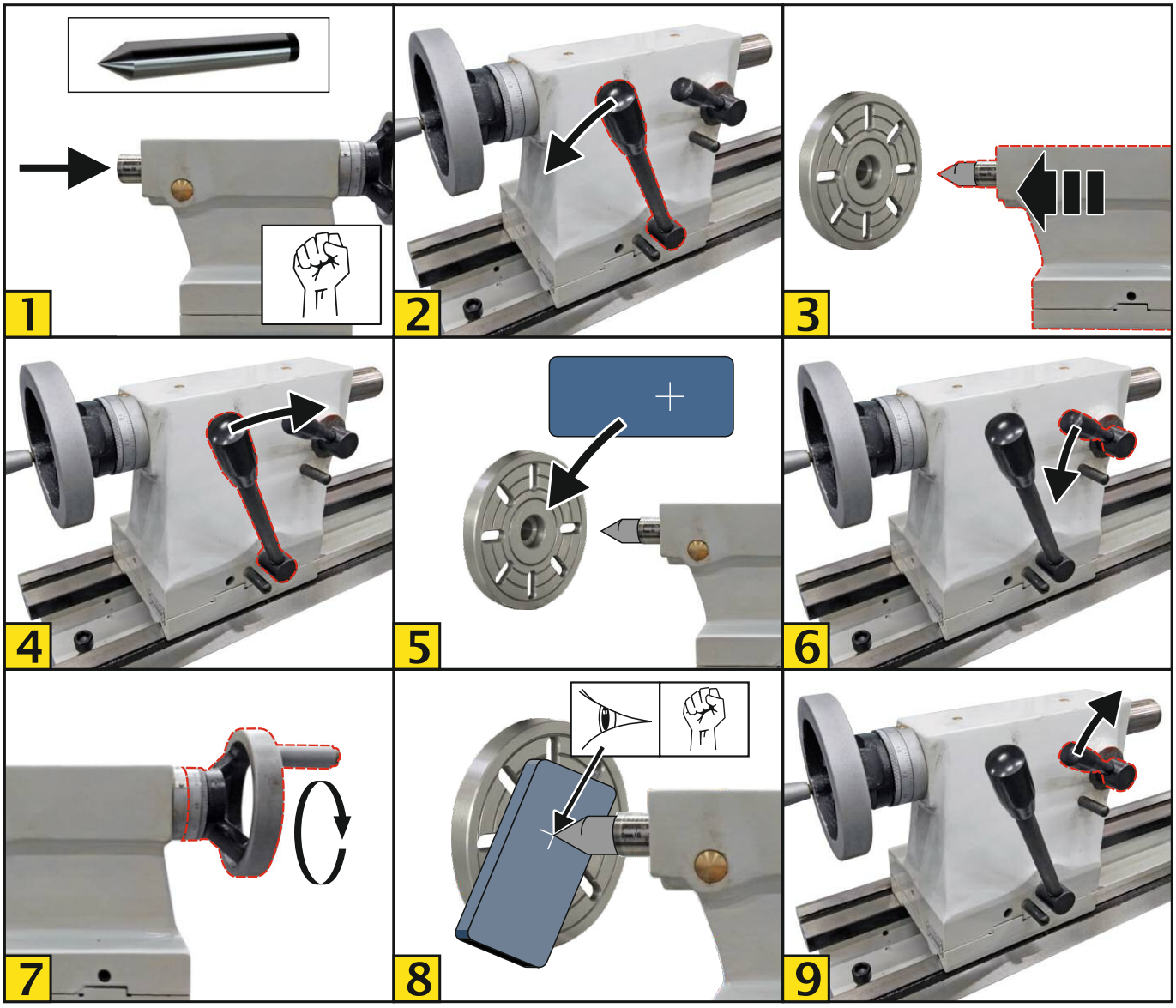
Clamp the work piece at three points minimum. The points should be as evenly spaced as possible. Insufficient or incorrect gripping force can result in the work piece being catapulted away from the machine. In addition, make sure that the face plate can turn without obstruction when the work piece is clamped.

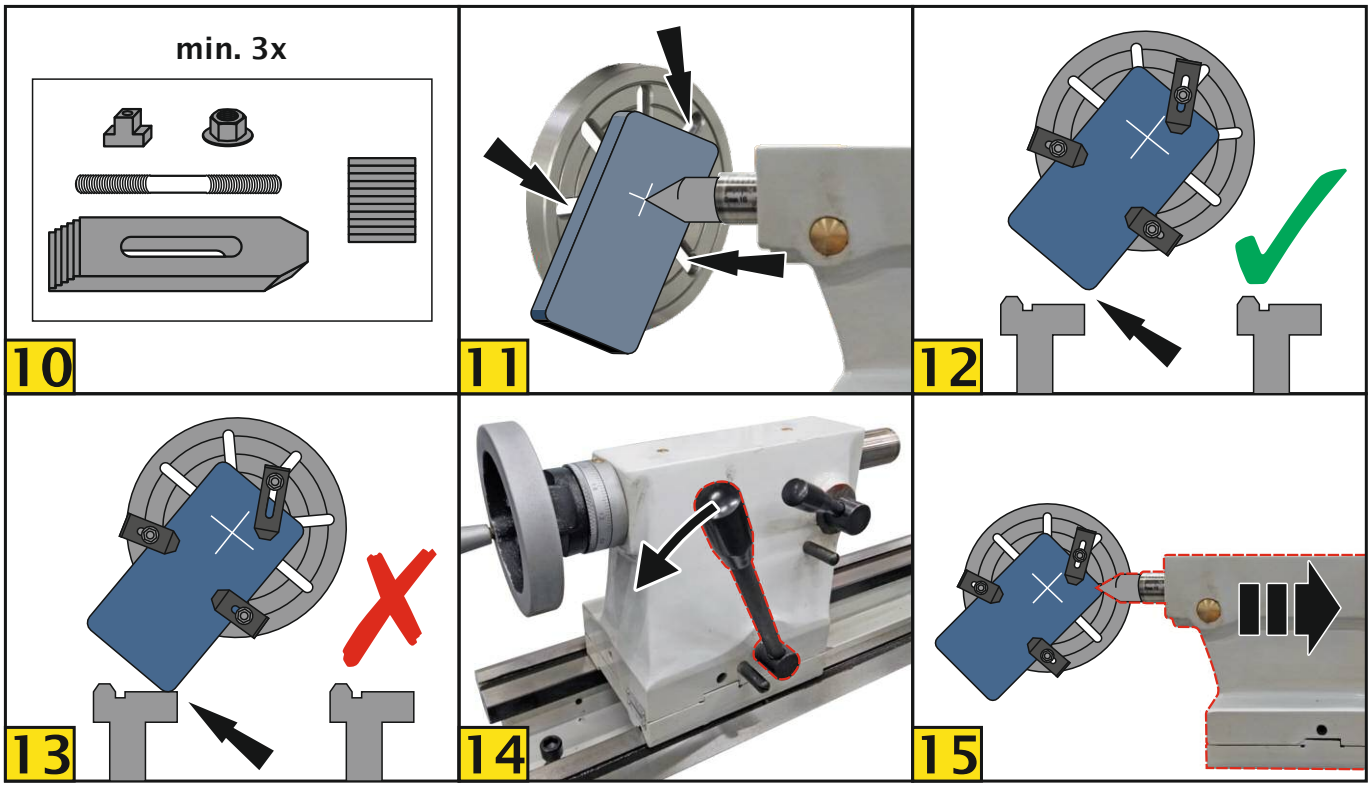
Using a clamping kit



The following example shows how the work piece is clamped onto a face plate. Make sure the work piece is positioned flat against the face plate.

Example




min. 3x
10
11
12
13
14
15

8.8 Collet chucks (optional)

This part of the manual describes safety aspects to take into consideration when using the optionally available collect chucks on your lathe.

Collect chucks are used for precise clamping of extremely thin work pieces.

For the mounting demounting of collect chucks proceed the same way as for 3-jaw chucks.

Collect chuck 5C feat. direct mount (D1-D4)

Collet chuck 5 C (D1 -D4)

Collet chuck set 5 C (3 – 26 mm)

8.9 Steady and follow rest (optional)

⚠ WARNING

Remember to use a low speed rate for most operations when using a rest. This reduces the risk of the work piece being catapulted away from the machine.

This passage describes safety aspects to take into consideration when using a follow rest or steady rest on your lathe.

Selecting the rest

The steady and follow rest are used to minimize deviation when using work pieces like poles, cones, pipes or solid shafts with small diameters.
The steady rest is clamped onto the machine bed and features three jaws to support the work piece at a point between the chuck and the tailstock.

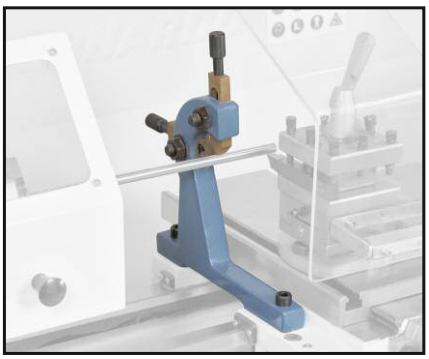
The follow rest is clamped onto the longitudinal slide and moves with it during cutting and thread cutting operations.

There are two jaws that support the work piece when cutting whereas the tip of the tool acts as a third support.

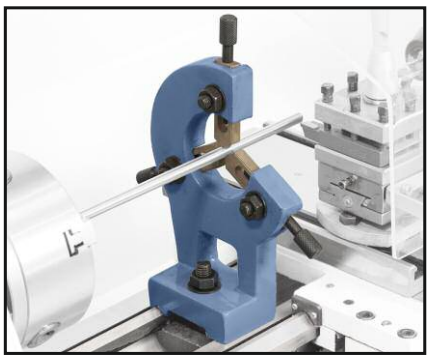
Both the steady and follow rest feature solid brass tips. The jaws feature guide nuts which host the head of an adjustable set screw. These screws are held in position by counter nuts. The set screws must be tightened so there is a small tension in the jaws for the guide. However, there must be a little play left so they can be moved.

When using the rests it is important to lubricate the contacting surfaces (brass tips) during processing. Use Slideway Oil (e.g. CGLP 68).

Follow rest

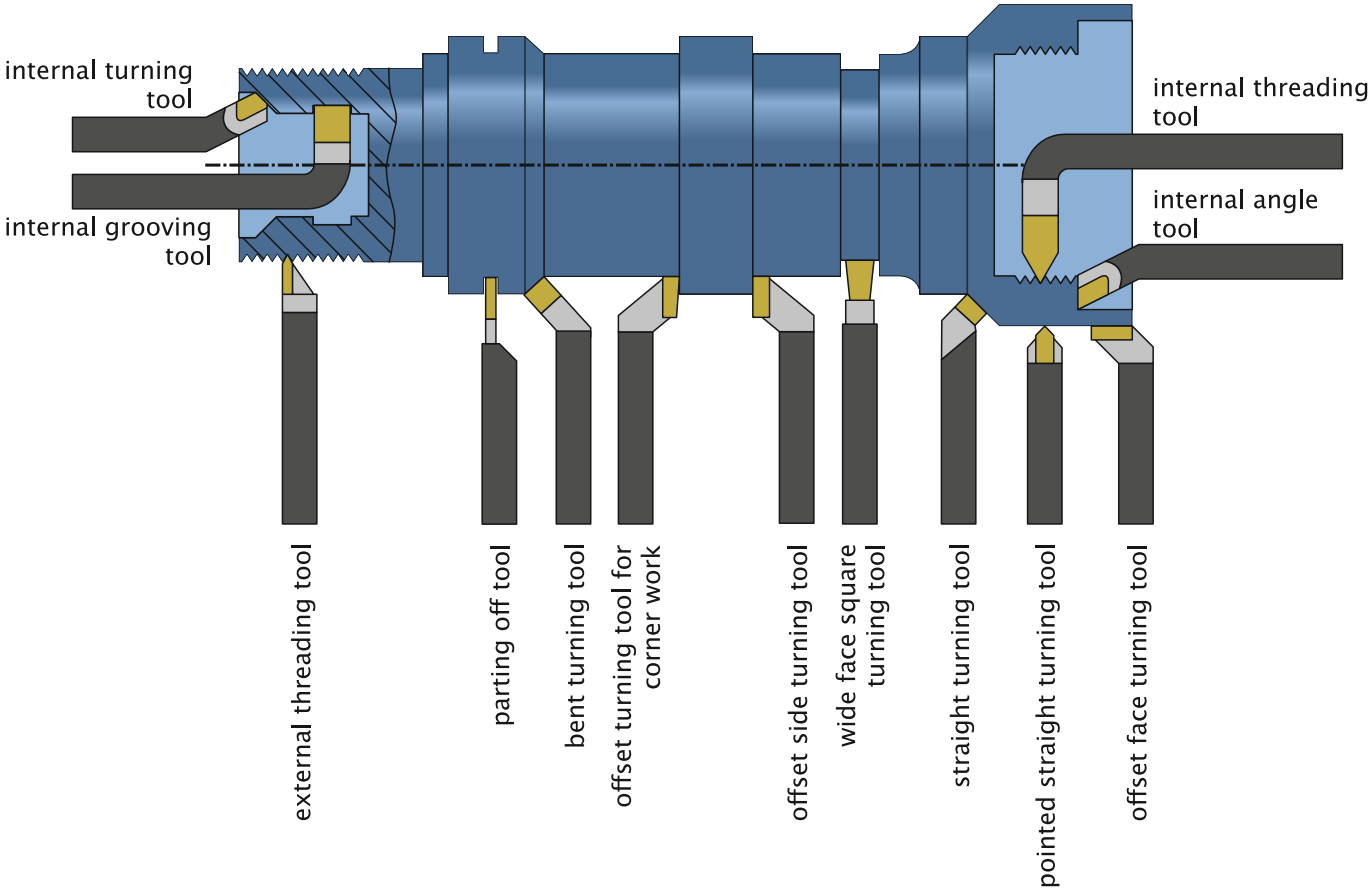


Steady rest



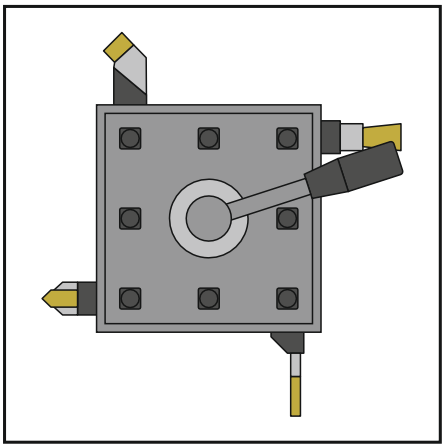
8.10 Selection of turning cutters

In order to achieve the desired finish, selecting a suitable cutting tool is necessary for each operation (roughing, finishing, thread cutting, internal and external grooving ...)
The following image shows different cutting tools and the applications.



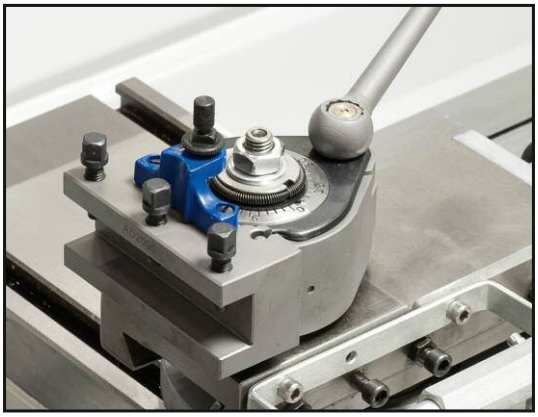
8.11 Tool holder

The installed tool holder, also called four-post tool holder, allows for the clamping of various cutting tools. The tool (turning cutter) must be fixed with a minimum of two clamping screws. Therefore it is possible to clamp four different tools at once. The tool holder can be turned 360° and can be locked in at each 90° stop.



Note! The tool post & holder set System Multifix can be installed in place of the four-post tool holder.

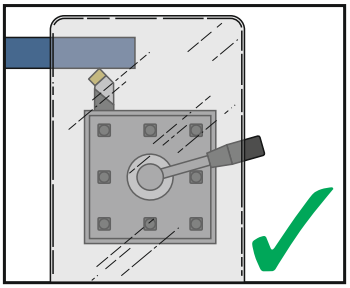
Tool post & holder set System Multifix (optional)

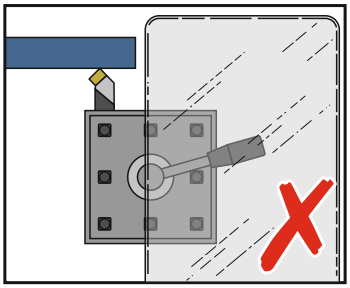


8.11.1 Splash and chip guard

⚠ ATTENTION

Before processing begins the splash and chip guard at the front must be positioned to protect the processing area from direct exposure to chips and/or coolant fluid.





For convenient tool removal the guard can be lowered as shown above.

8.11.2 Loading the tool holder

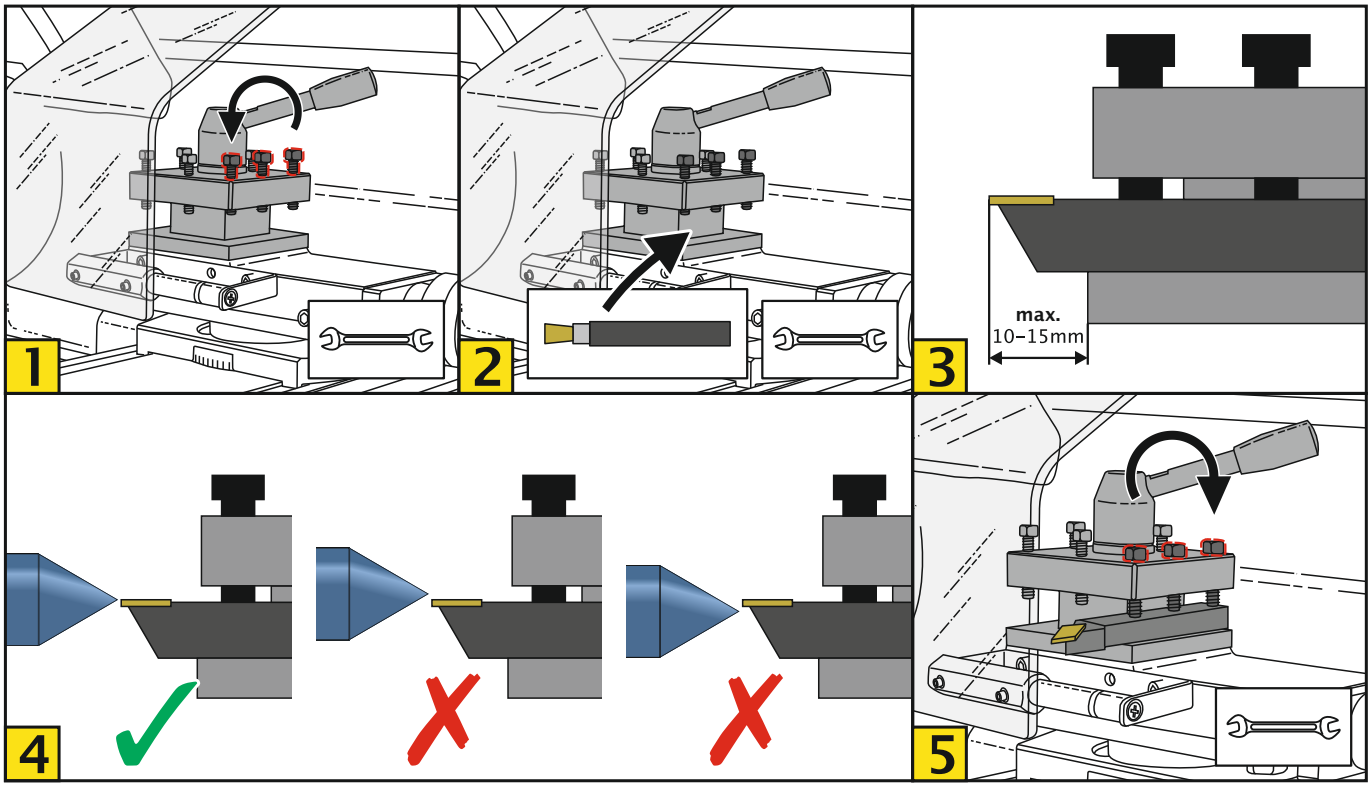
⚠ ATTENTION

Cutting tools should be clamped in the tool holder as short as possible to prevent breakage.

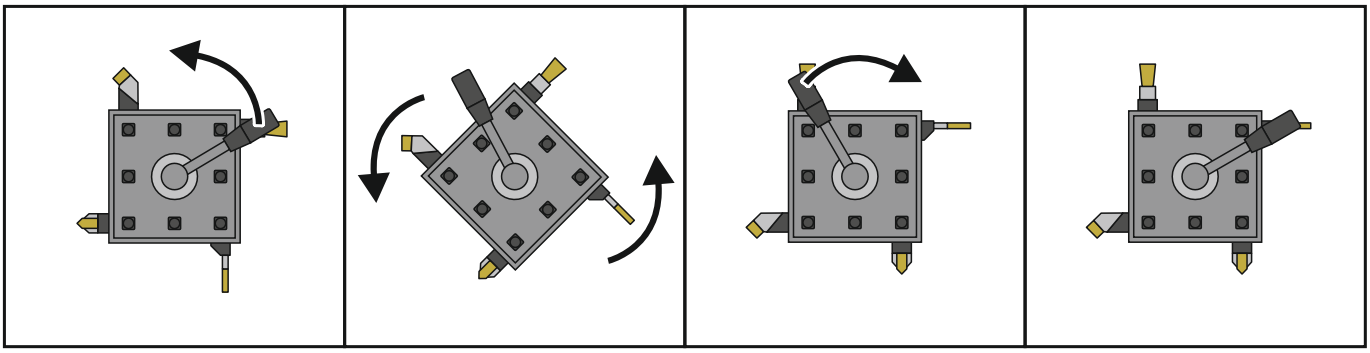
! NOTE

Use trays of variable sizes to achieve the correct height of centers. Ensure the trays extend the whole length of the tool holder.

For optimal turning results it is important to align the tool in the exact centre of the axis. When aligning the tool, use the tailstock including a centering device.



8.11.3 Rotating the tool holder



8.12 Operating mode – Turning

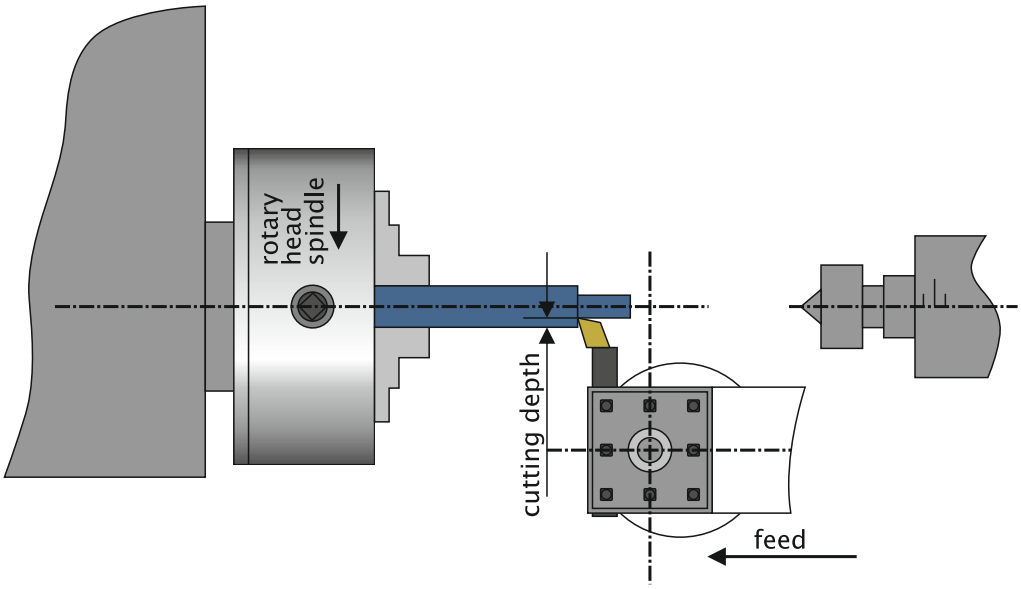
! NOTE
Use coolant fluid when using HSS turning tools.

8.12.1 Longitudinal turning

When turning lengthwise (longitudinally) the tool runs parallel to the axis. Depending on the length of the work piece use either the compound rest or the longitudinal slide. For longer work pieces us the tailstock with a center andor a rest for extra support.

The feed is either manual – by hand, or automatic – by auto feed.

Example: Longitudinal turning

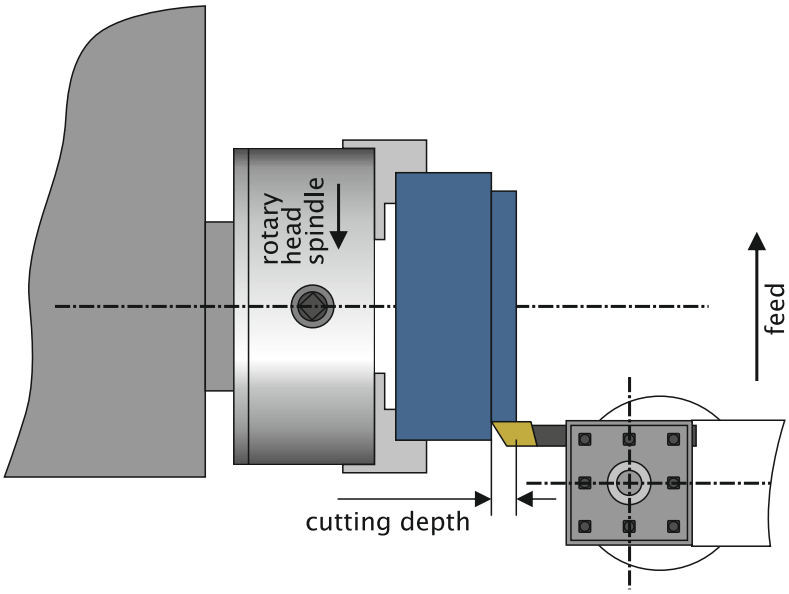


8.12.2 Face turning

When face turning the tool runs perpendicular to the axis. It is important for the height of the cutting tool blade to be exactly in the centre of the work piece. (see 8.11.1)

The feed is either manual – by hand, or automatic – by auto feed.

Example: Face turning



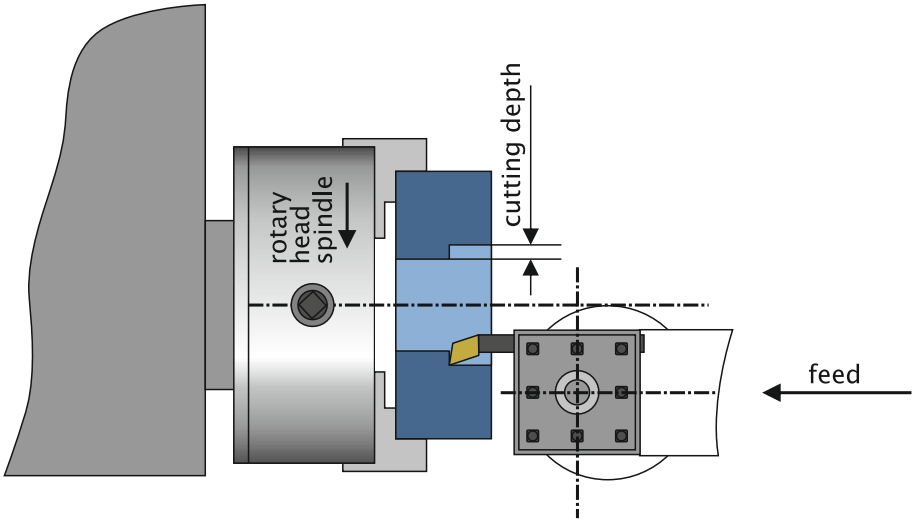
8.12.3 Internal external turning

⚠ ATTENTION
Only use little cutting depth when turning a work piece externally to prevent tool breakage.

When turning externally the tool either runs parallel or perpendicular to the axis.

When turning externally the longitudinal feed is either manual – by hand, or automatic – by auto feed. Cross feed however, is manual – by hand.

Example: external turning

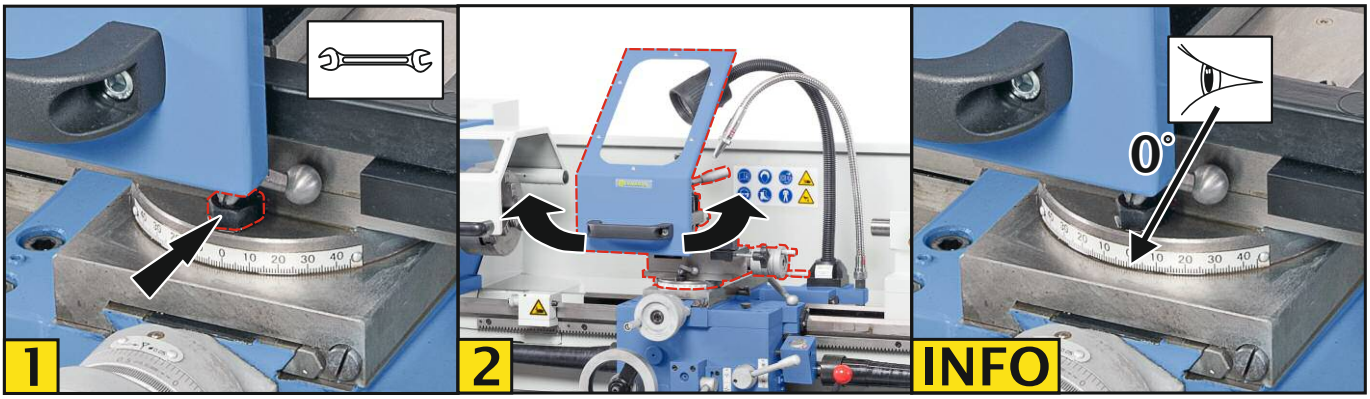


8.12.4 Taper turning

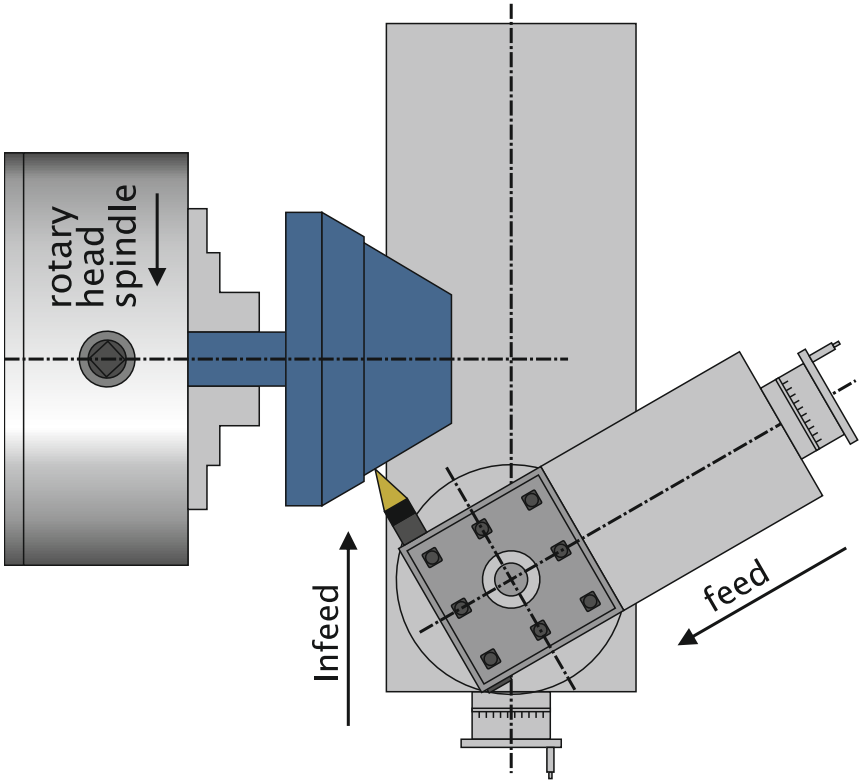
! NOTE
For a precise taper it is important for the cutting tool to be aligned exactly to the centre of the axis.

The compound rest can be swivelled when turning a short taper. Use the scale on the compound rest for the exact adjustment of the angle.

Swivelling the compound rest



Example Taper turning

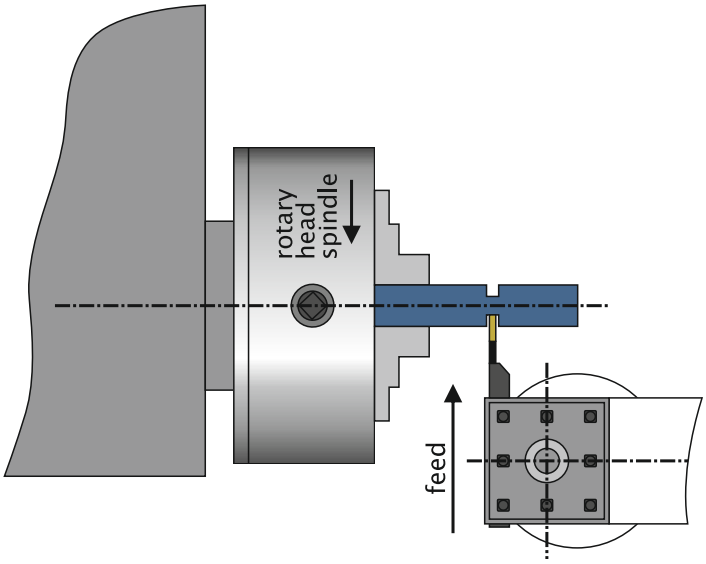


8.12.5 Internal external grooving

⚠ ATTENTION	! NOTE
To prevent tool breakage when grooving internallyexternally only use a small feed.	Use sufficient coolant fluid when grooving a work piece.

Turning small grooves or grooving externally requires special parting tools. During internal and external grooving the tool moves perpendicular to the turning axis.
The feed is usually manual or via cross slide.

Example: Internal external grooving



8.12.6 Turning between two centers

WARNING

Danger of suction!

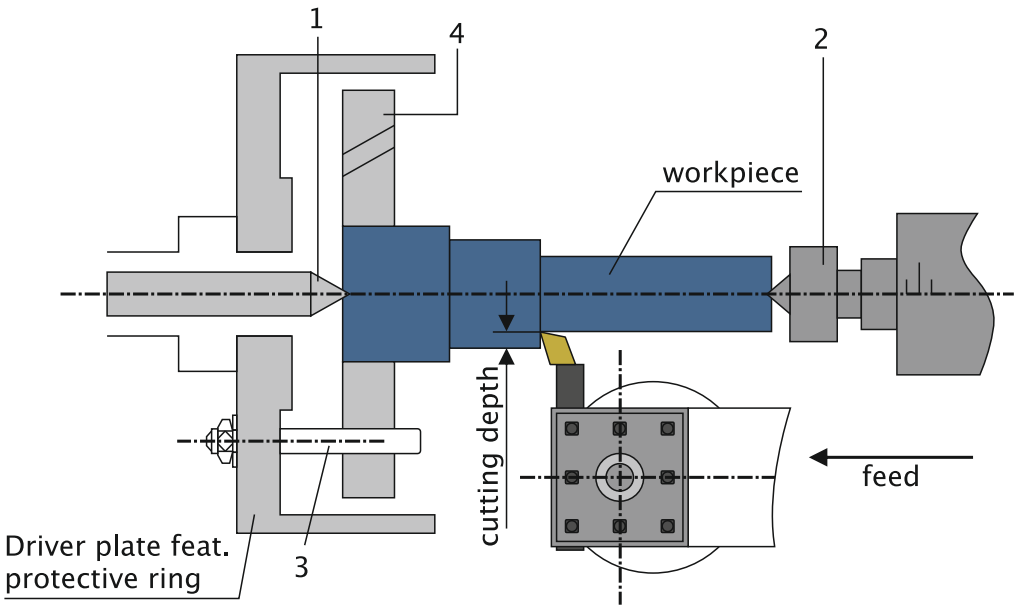
Only use lathe dogs drive plates with protective ring.

If the entire length of a work piece is processed or when taper turning, the work piece can be clamped between two centers.
Instead of the 3-jaw chuck mount the adaptor sleeve MT 53 (included) in the spindle nose and insert a dead center.
Mount a live center in the tailstock (MT 3 taper).

A drive plate (incl. protective ring), a carrier and a lathe dog clamp around the work piece and allow the rotary motion of the spindle to be transmitted to the work piece.
Note! The parts mentioned in the previous paragraph do not come standard.

Drill the middle of both ends of the work piece before clamping it.

Example: Turning between two centers



1. Dead center 60°
2. Live center 60°
3. Carrier
4. Lathe dog

Note! If the taper is turner along the entire length, the tailstock is offset. See 6.4. for more details. Furthermore, processing the entire length requires a face driver (not part of standard accessories).

8.13 Spindle speed setting

⚠ ATTENTION

When setting the spindle speed pay attention to the tool bit and the properties of the work piece.

The required spindle speed, which is the result of the tool diameter and the set cutting speed, can be established by

- calculation by using a formula or
- graphically by using the speed chart

The required cutting speed depends on

- material of tool (e.g. HSS–Bit) and
- material of work piece (e.g. construction steel S235JR).

When selecting the cutting speed refer to the manufacturer's guidelines.

Example: work piece diameter 25mm, cutting speed 32 mmin (HSS– tool, cast iron), Spindle speed?

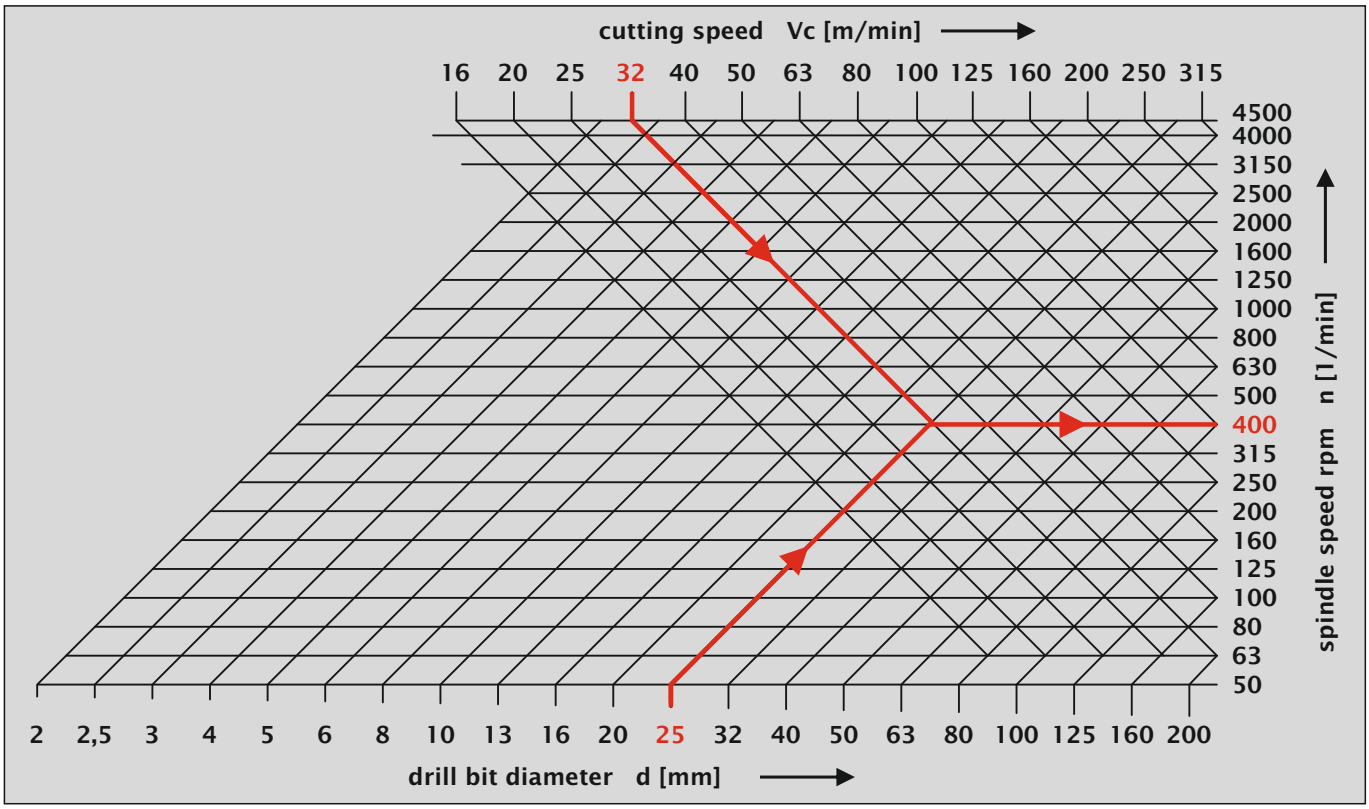
formula

$$n = \frac{1000 \times Vc}{d \times \pi}$$

calculation

$$n = \frac{1000 \times 32}{25 \times \pi} = 407{,}44 \sim \mathbf{400\ U/min}$$

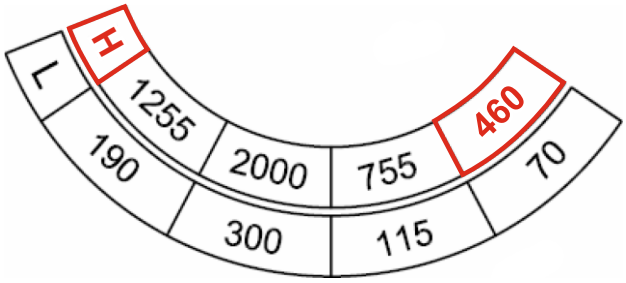
Vc cutting speed
n spindle speed rpm
d drill bit diameter
π 3,1416



Compare the established spindle rate to the available spindle rates displayed on the chart on the machine and select the most suitable one.

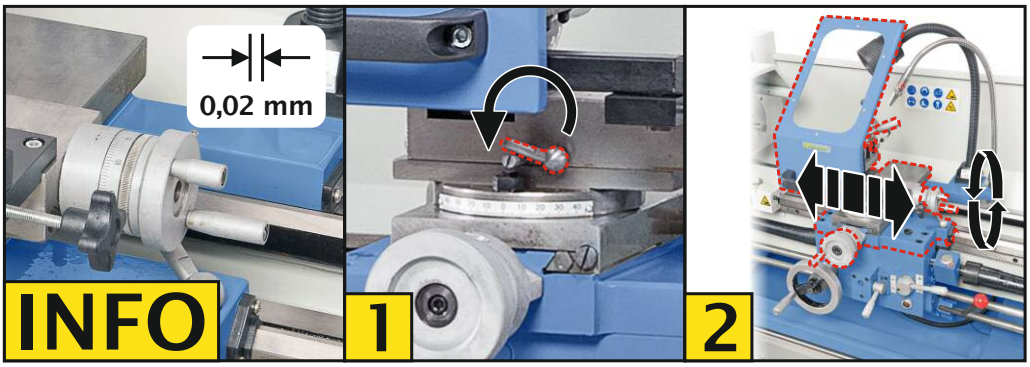
Required spindle rate: 400 rpm
Selected spindle rate: **460 rpm** (50Hz)

Example: 460 rpm

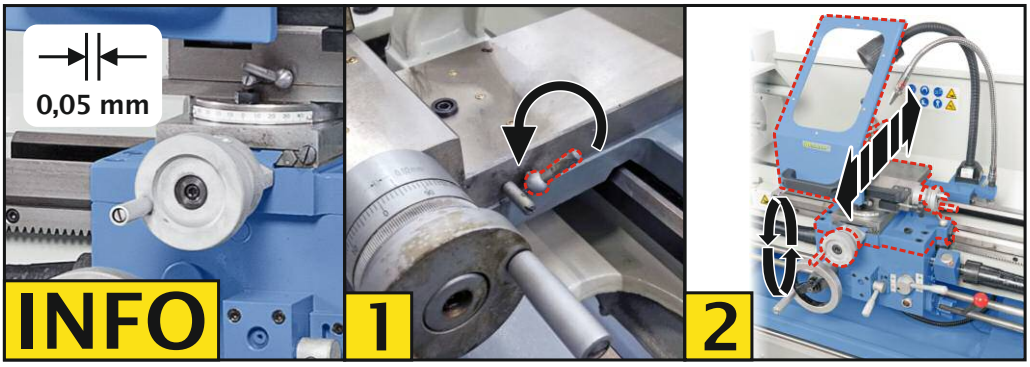


8.14 Manual feed

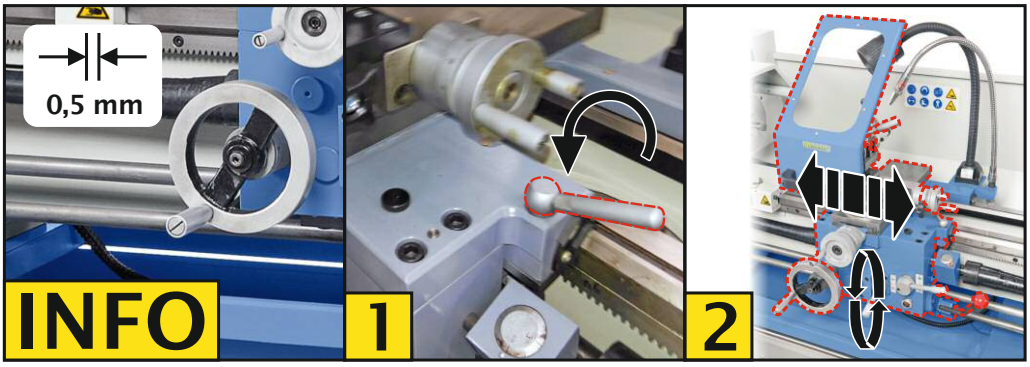
Manual feed of compound rest



Manual feed of cross slide (x-axis)



Manual feed of longitudinal slide



8.15 Automatic longitudinal and cross feed

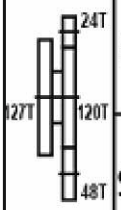
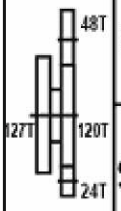
⚠ ATTENTION

The feed rate must be selected according to the
- spindle speed
- tool and
- work piece which is being processed!

The automatic feed is driven by main spindle, change gear unit, feed unit and leadscrew. Depending on the switch settings on the feed unit andor positioning of the change gears there is a variety of speed rates available.

Besides the speed rate and the tool in use, the correct feed rate has an impact on the desired finish. Refer to a feed chart book and the guidelines of the manufacturer.

8.15.1 Feed chart for longitudinal and cross feed

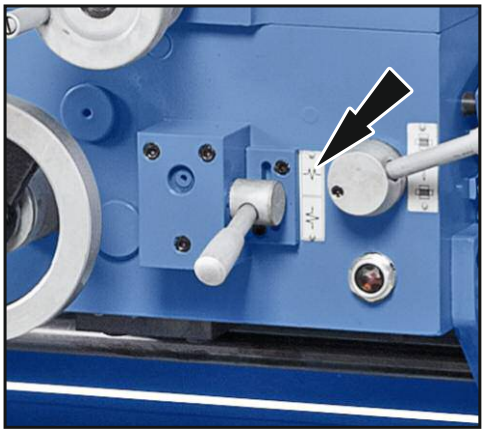
Position			B5	B4	C4	C3	C2	A4	D2	E4	A2	E2
	SI		0.053	0.073	0.083	0.092	0.104	0.11	0.115	0.129	0.138	0.16
			0.013	0.018	0.02	0.022	0.025	0.026	0.028	0.03	0.033	0.038
	SII		0.105	0.15	0.165	0.184	0.207	0.221	0.23	0.258	0.276	0.32
			0.025	0.035	0.04	0.044	0.05	0.053	0.055	0.06	0.066	0.076
	SI		0.21	0.29	0.33	0.369	0.415	0.44	0.46	0.516	0.55	0.645
			0.05	0.07	0.08	0.088	0.1	0.106	0.11	0.12	0.13	0.15
	SII		0.421	0.59	0.66	0.737	0.83	0.88	0.92	1.03	1.1	1.29
			0.1	0.14	0.16	0.176	0.2	0.21	0.22	0.25	0.26	0.31

8.15.2 Adjusting the feed rate

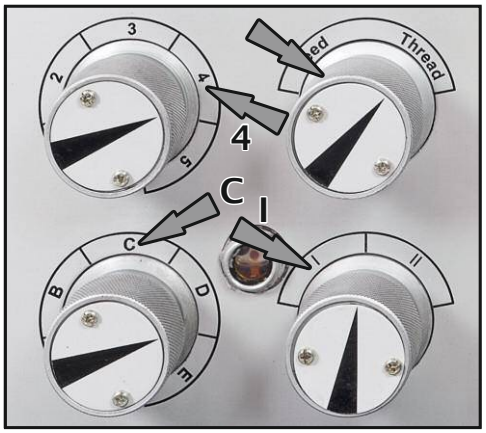
Example: Longitudinal feed 0.083 mm/rev

Position			B5	B4	C4	C3	C2	A4	D2	E4	A2	E2
24T / 127T / 120T / 48T	SI		0.053	0.073	0.083	0.092	0.104	0.11	0.115	0.129	0.138	0.16
			0.013	0.018	0.02	0.022	0.025	0.026	0.028	0.03	0.033	0.038
	SII		0.105	0.15	0.165	0.184	0.207	0.221	0.23	0.258	0.276	0.32
			0.025	0.035	0.04	0.044	0.05	0.053	0.055	0.06	0.066	0.076
48T / 127T / 120T / 24T	SI		0.21	0.29	0.33	0.369	0.415	0.44	0.46	0.516	0.55	0.645
			0.05	0.07	0.08	0.088	0.1	0.106	0.11	0.12	0.13	0.15
	SII		0.421	0.59	0.66	0.737	0.83	0.88	0.92	1.03	1.1	1.29
			0.1	0.14	0.16	0.176	0.2	0.21	0.22	0.25	0.26	0.31

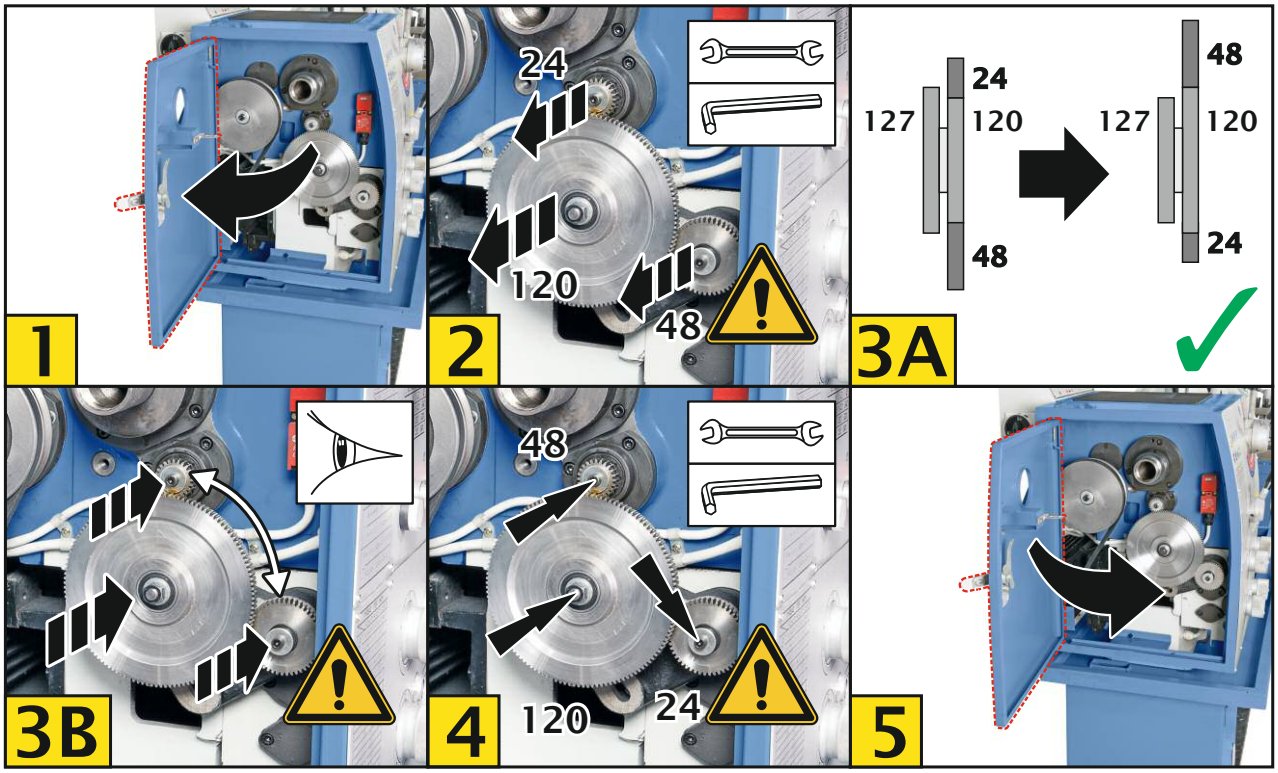
Set longitudinal feed



Feed unit setting



Reconfiguration of feed unit

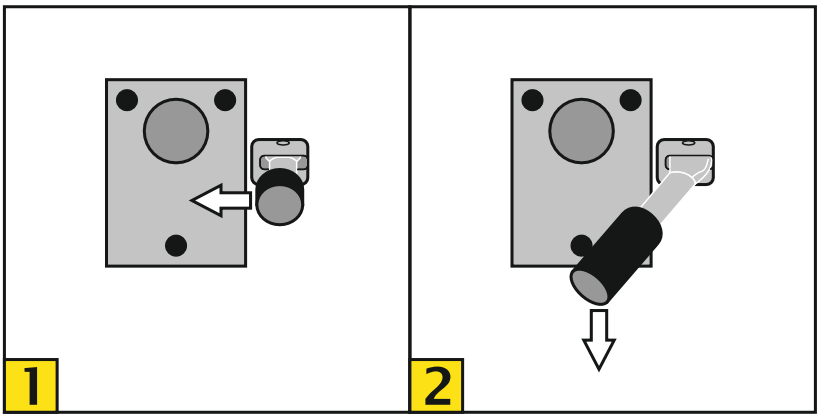


8.15.3 Automatic feed ON/ OFF

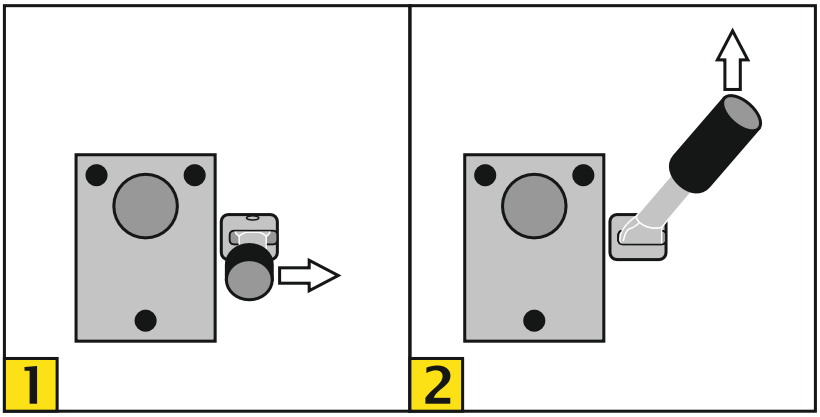
! NOTE
If the automatic longitudinal feed is used, the lever for the half nut must be in top position – half nut is disengaged.

The automatic feed for the cross and longitudinal slide is turned on off with the lever on the apron.

Activate cross feed



Activate longitudinal feed



When turning longitudinally with the automatic feed the micrometre stop can be used.
(see 6.5 for more information)

Change feed direction

Use the lever on the feed unit to change the direction of the feed for longitudinal or cross feed.

8.16 Thread cutting

The drive of the leadscrew is the same system as the drive of the automatic feed. However, contrary to the automatic feed, here, the leadscrew is selected instead of the feed rod as a starting point at the feed unit.

Different thread pitches can be selected depending on the position of switches on the feed unit and the positioning of the change gears.

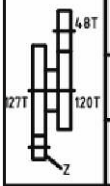
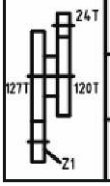
Besides the spindle rate and the tool in use, the correct feed rate is important for the required finish. Refer to a chart book and the manufacturer's guidelines when selecting the feed rate.

8.16.1 Thread cutting chart

Thread chart: pitch in mm

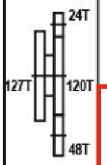
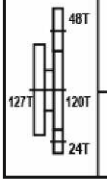
METRIC THREAD PITCH LIST										
		B4	C4	C3	C2	A4	D2	E4	A2	E2
24T / 127T / 120T / 48T	MI	0.4	0.45	0.5		0.6		0.7	0.75	
	MII	0.8	0.9	1		1.2	1.25	1.4	1.5	1.75
48T / 127T / 120T / 24T	MI	1.6	1.8	2	2.25	2.4	2.5	2.8	3	3.5
	MII	3.2	3.6	4	4.5	4.8	5	5.6	6	7

Thread chart: pitch in inch (imperial)

THREAD PER INCH										
		A2	A3	C3	A4	C3	C3	C3	A5	B4
	Z	24	24	38	24	22	24	26	24	24
	MII	4	4½	9½	5	5½	6	6½	7	7½
	MI	8	9	19	10	11	12	13	14	15
	Z1	48	48	38	48	44	48	52	48	48
	MII	16	18	19	20	22	24	26	28	30
	MI	32	36	38	40	44	48	52	56	60

8.16.2 Setting the thread pitch

Example: metric thread feat. pitch of 1.5 mm/rev

METRIC THREAD PITCH LIST										
		B4	C4	C3	C2	A4	D2	E4	A2	E2
	MI	0.4	0.45	0.5		0.6		0.7	0.75	
	MII	0.8	0.9	1		1.2	1.25	1.4	1.5	1.75
	MI	1.6	1.8	2	2.25	2.4	2.5	2.8	3	3.5
	MII	3.2	3.6	4	4.5	4.8	5	5.6	6	7

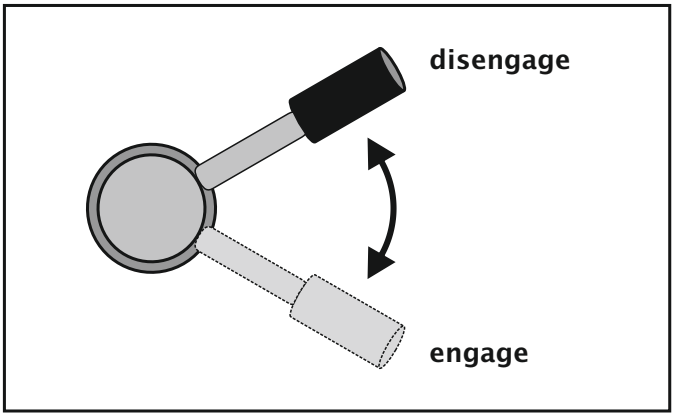
Feed unit setting

8.16.3 Leadscrew on/off

! NOTE
If the half nut is used the feed lever must be in middle position – feed is turned off!

When thread cutting, the half nut is engaged in order to connect the leadscrew with the longitudinal slide.

Half nut engaged disengaged



The thread dial can be used when thread cutting – see 6.6 for more information.

8.17 Adjustment of coolant fluid

⚠ WARNING

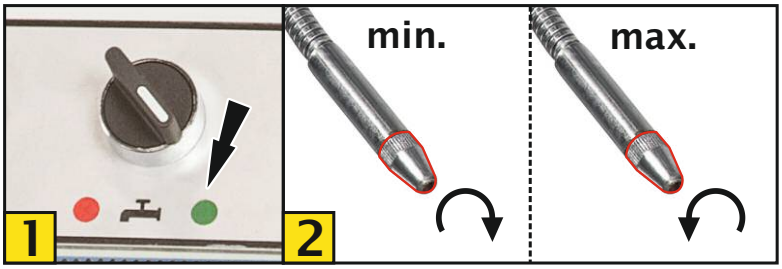
Growth of fungus and bacteria
After using coolant ensure that no coolant fluid remains in the hose.

⚠ ATTENTION

When valve is in locked position, turn off the coolant pump after a maximum of 10 minutes!

Using the coolant has the following advantages:

- Reducing heat in work piece and drill
- Extended drill life
- Improved surface finish of drilled holes
- Reduced chip binding
- Part corrosion is reduced



9. Care and maintenance

⚠ DANGER

Before starting any maintenance work or adjustments on the machine disconnect machine from the power supply and make sure that the machine cannot be turned on.

The following guidelines for machine maintenance and servicing plans are essential for problem free machine run and smooth operation.

If there are any queries regarding the maintenance and servicing plan contact the manufacturer, see page 2 for contact details.

9.1 Servicing plan

⚠ WARNING

Danger caused by coolant fluid

- Insufficient maintenance of the coolant fluid may lead to growth of fungus and bacteria, as well as work impairment.
- In accordance with the safety regulations wear protective clothing when handling coolant fluid.

⚠ WARNING

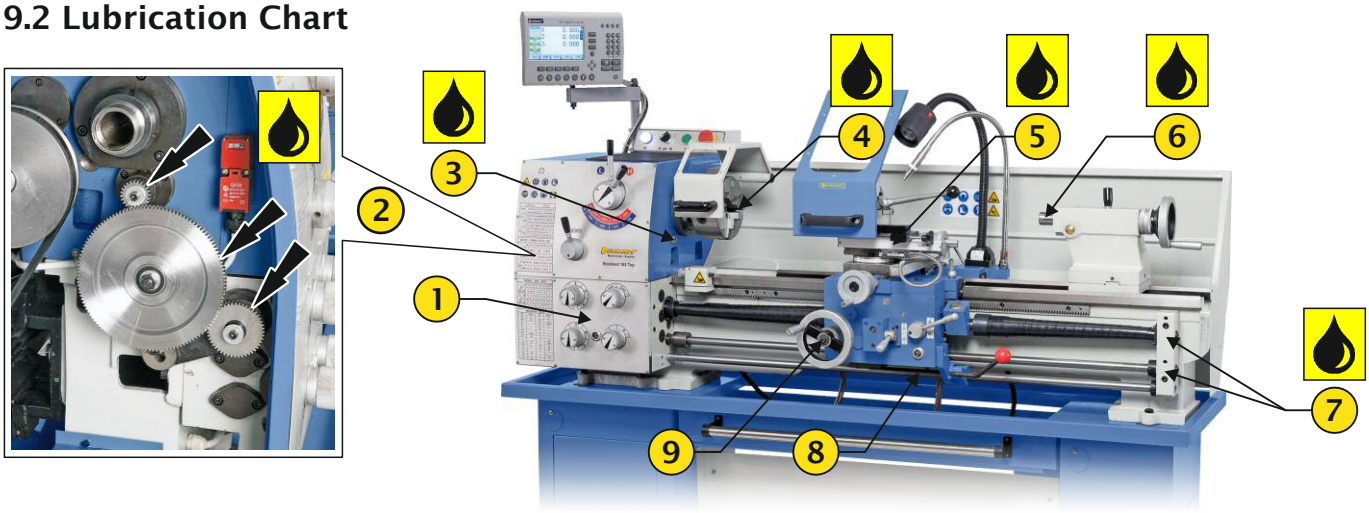
Spilt fluids and lubricants create an extremely slippery floor!

Avoid spillage of fluids and lubricants of all kind within machine surroundings in order to avoid accidents through slippery floors.

If using coolant fluid check pH levels, nitrite levels and bacterial count of coolant at regular intervals.

Intervals	Type of maintenance	Personnel
Once per work-shift	Check oil level - feed unit and apron	Operator
After each use	Wipe with a dry cloth or clean with a chip hook or magnetic stick	Operator
Every six months	Inspect electric functions	Qualified electrician
When required	Adjust main spindle bearings	Servicing/ maintenance personnel
When required	Adjust spindle nut of cross slide and compound rest	Servicing/ maintenance personnel
When required	Adjust safety clutch of feed rod	Servicing/ maintenance personnel

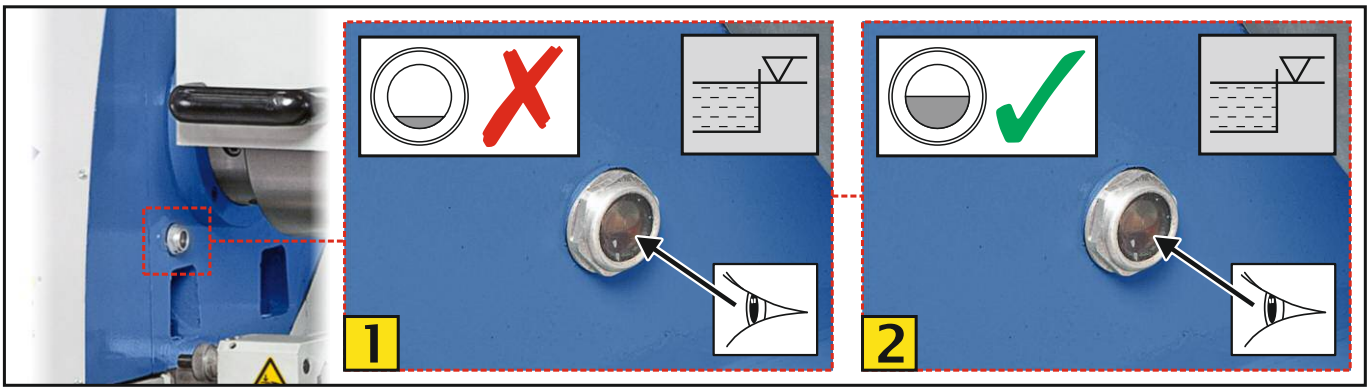
9.2 Lubrication Chart



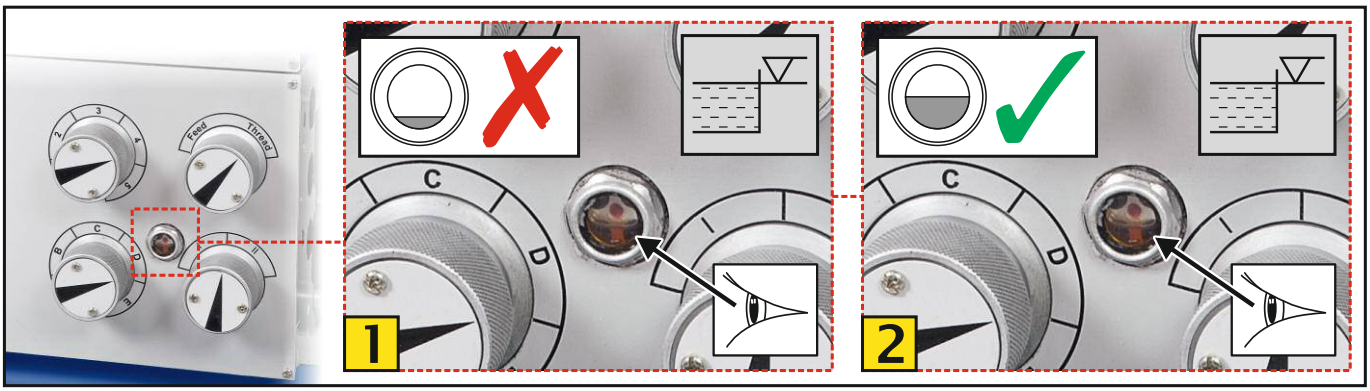
Position	Lubrication point	Periods	Lubricant
1	Feed unit	Once per year	Gear Oil CLP 68
2	Change gears	Once per month	Slideway Oil CGLP 68
3	Headstock	Once per year	Gear Oil CLP 68
4	3-jaw chuck (jaw guides)	Once per work-shift	Slideway Oil CGLP 68
5	Carriage (8x lubrication points)	Once per work-shift	Slideway Oil CGLP 68
6	Tailstock (2x lub.points)	Once per work-shift	Slideway Oil CGLP 68
7	Bearings of leadscrew and feed rod	Once per work-shift	Slideway Oil CGLP 68
8	Apron	Once per year	Gear Oil CLP 68
9	Hand wheel longitudinal slide	Once per work-shift	Slideway Oil CGLP 68

9.3 Inspection of oil level in gearbox

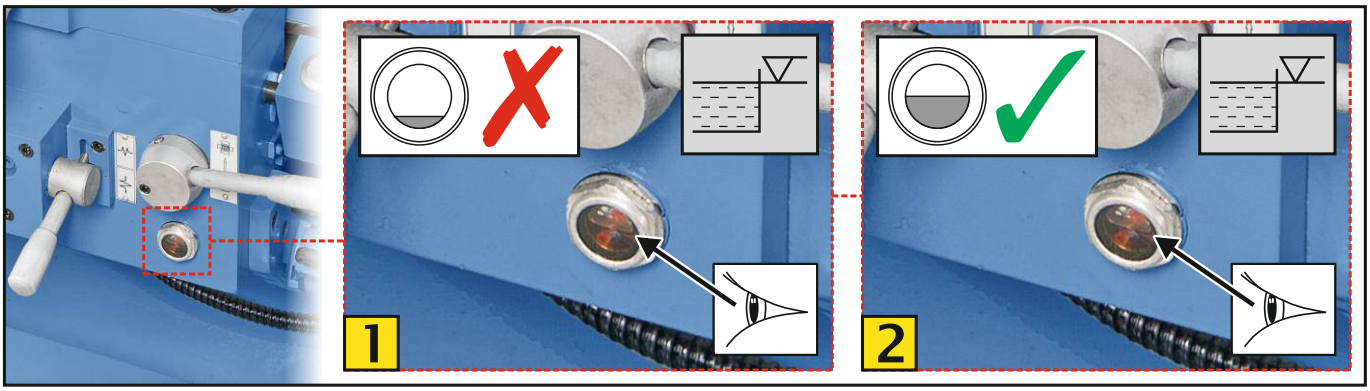
Headstock



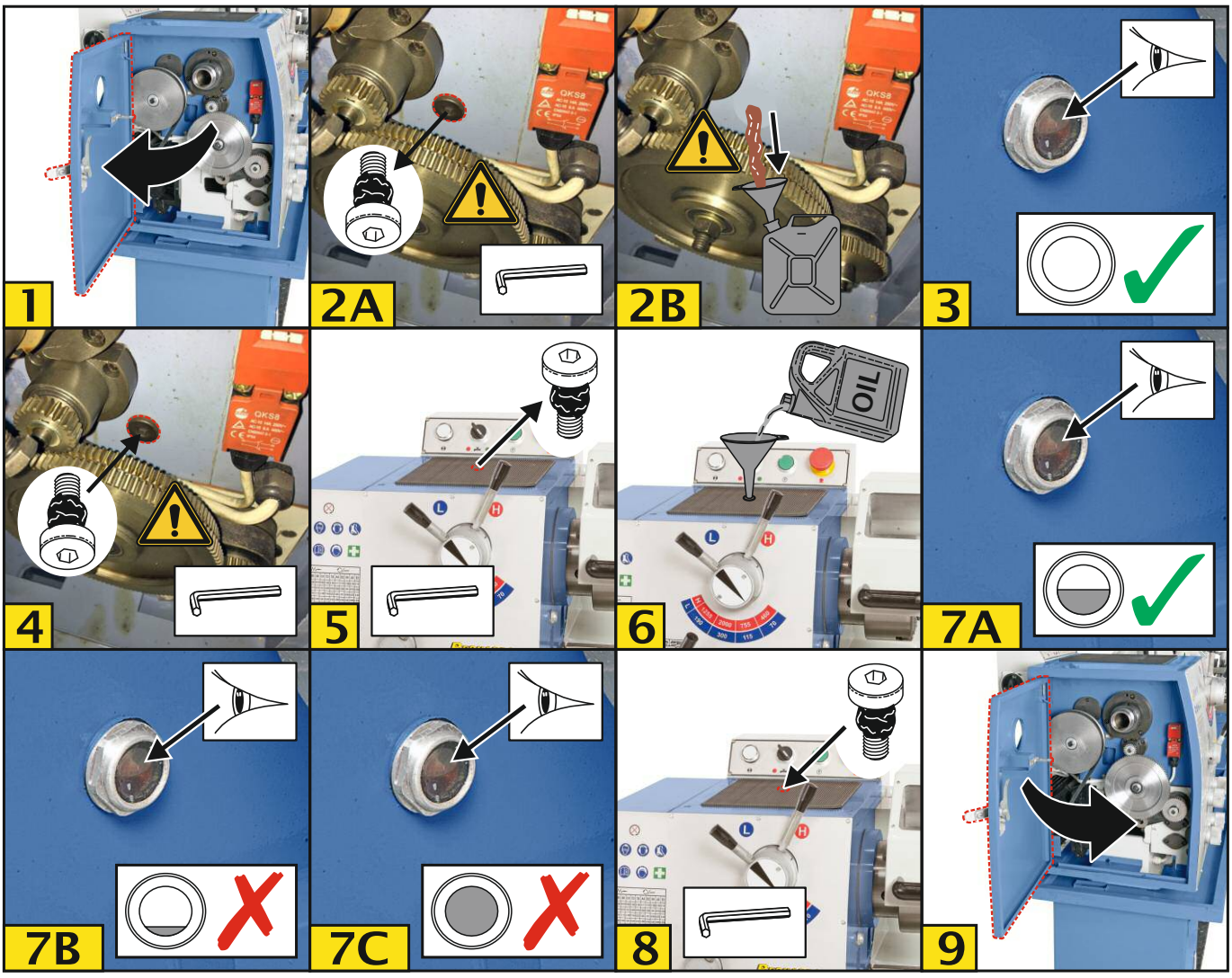
Feed unit



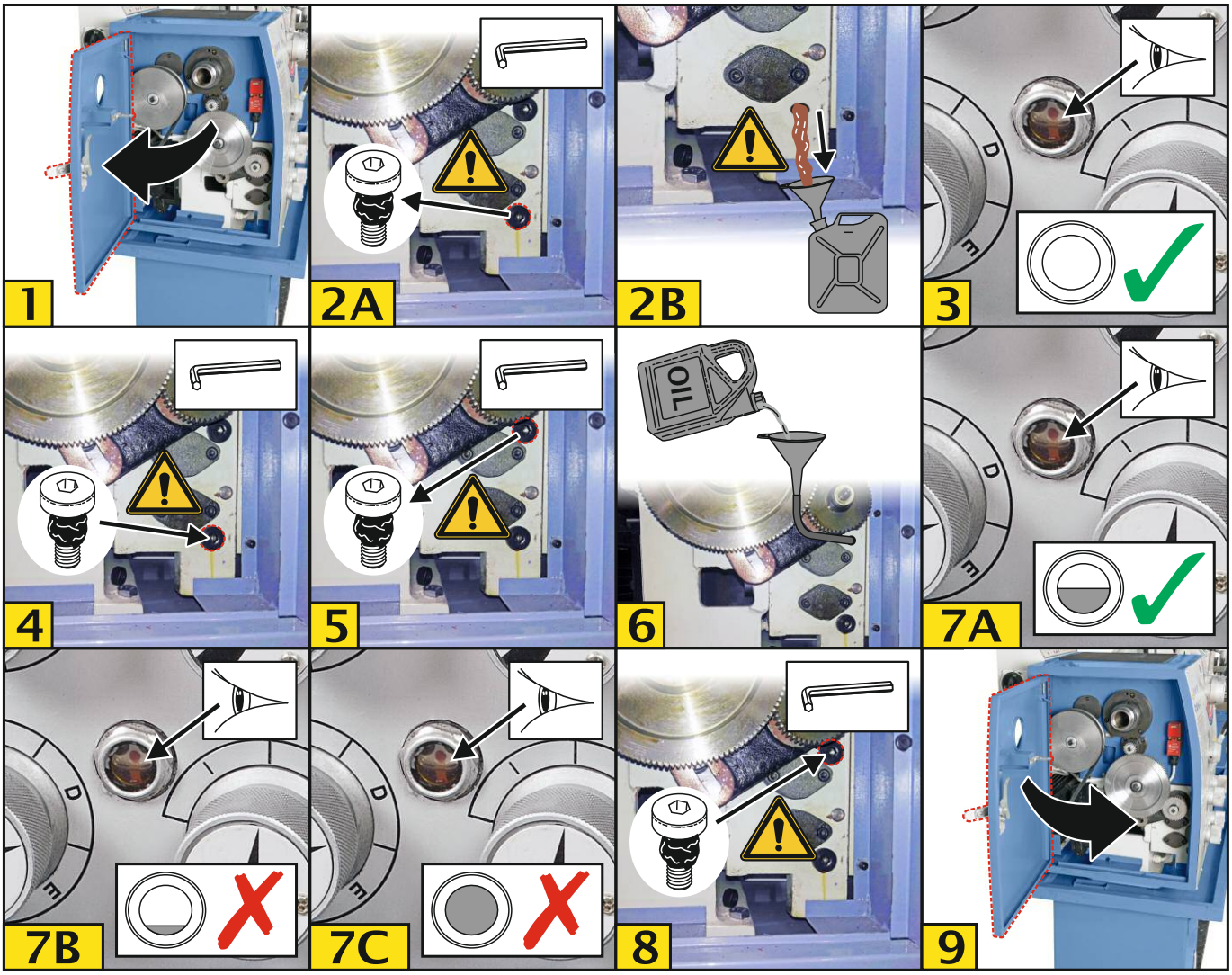
Apron



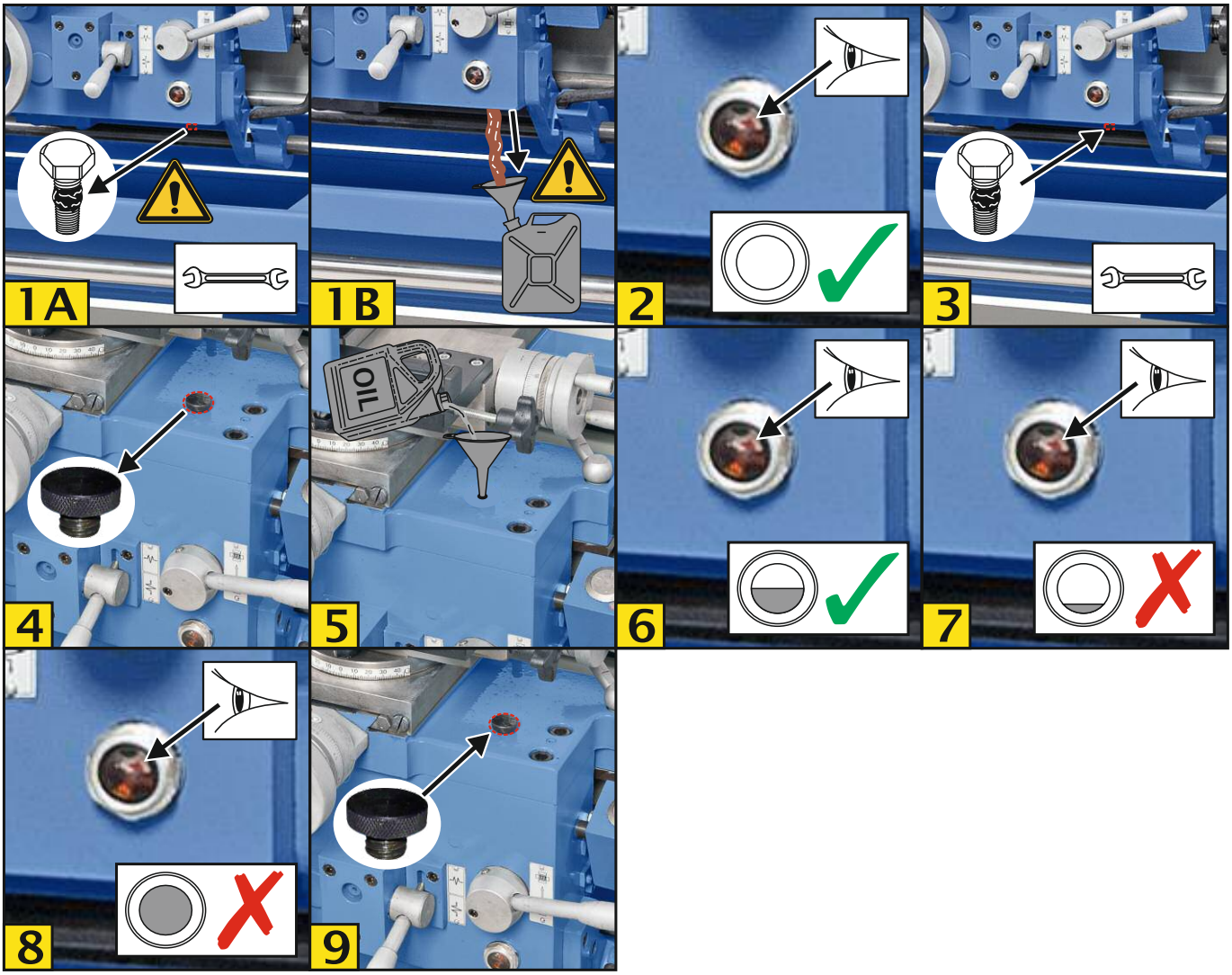
9.4 Replacement/ refill of gear oil – headstock



9.5 Replacement/ refill of gear oil – feed unit



9.6 Replacement/ refill of gear oil – apron

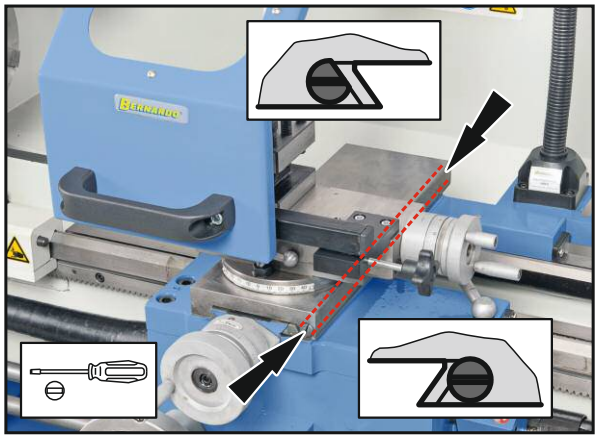


9.7 Adjustment of taper gibs

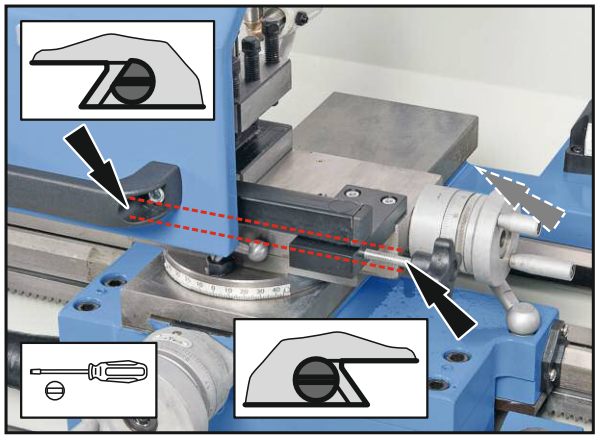
The guide clearance of the compound rest and cross slide can be adjusted as follows:

! NOTE	
Less clearance	**More clearance**
	

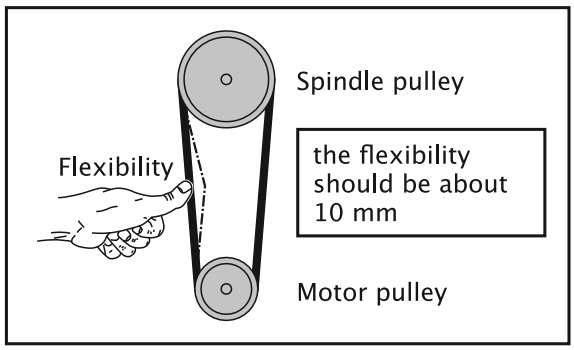
Position of set screws compound rest

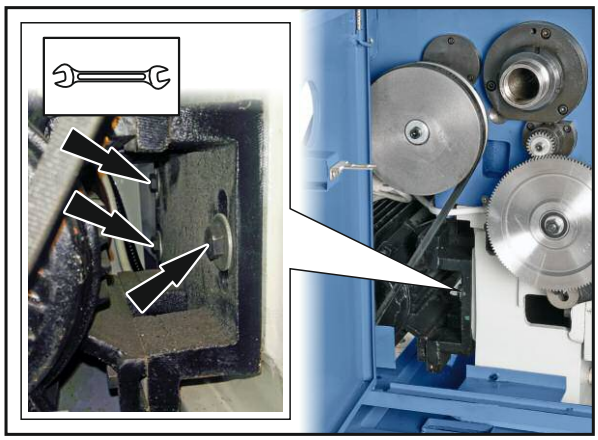


Position of set screws cross slide

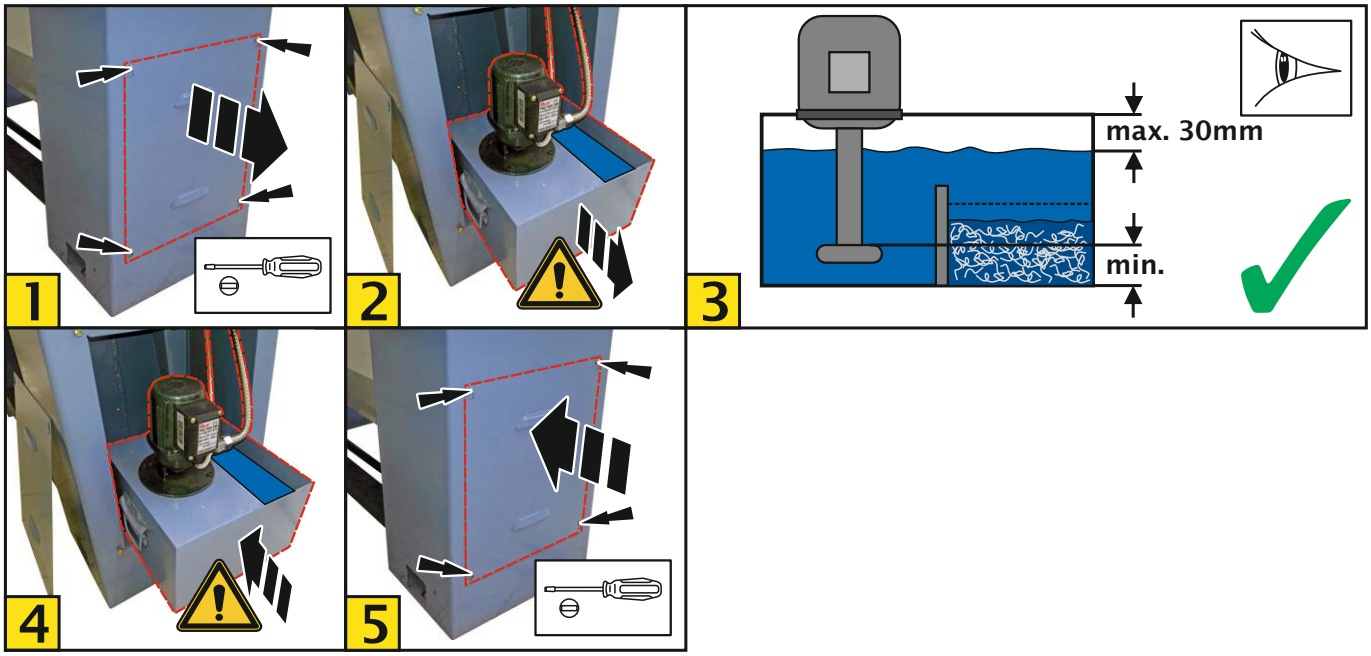


9.8 Tensioning replacement of transmission belt

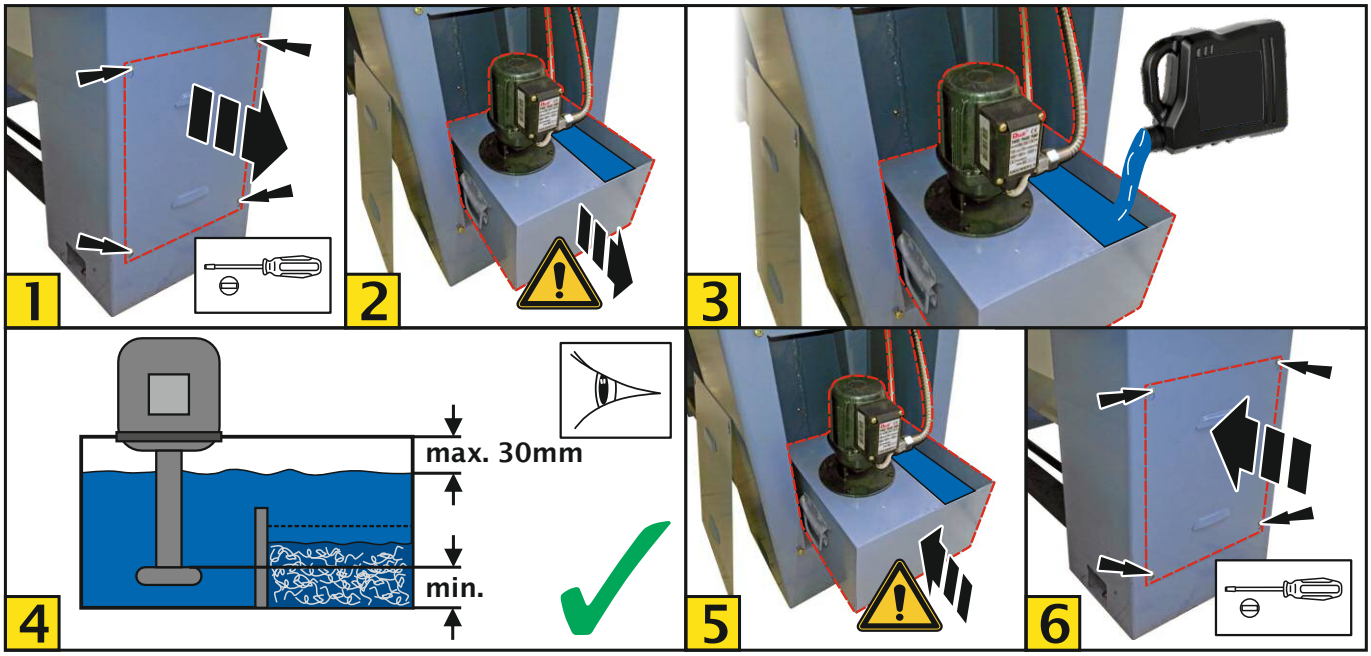




9.9 Check coolant fluid level



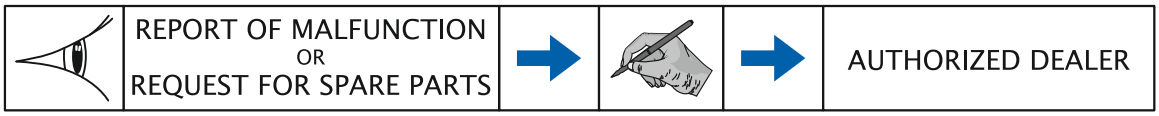
9.10 Refill coolant fluid container



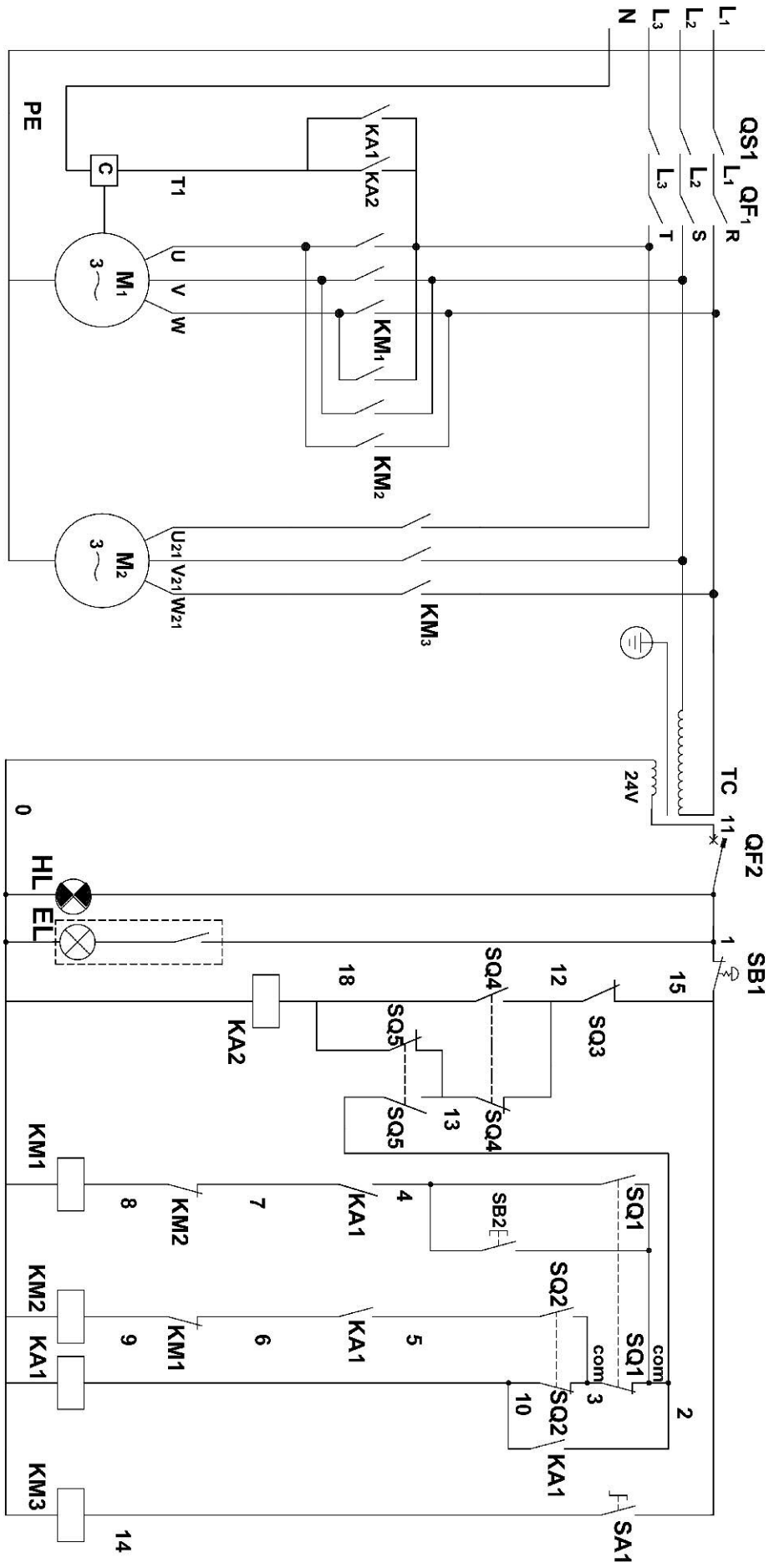
9.11 Replace coolant fluid

10. Disassembly and disposal

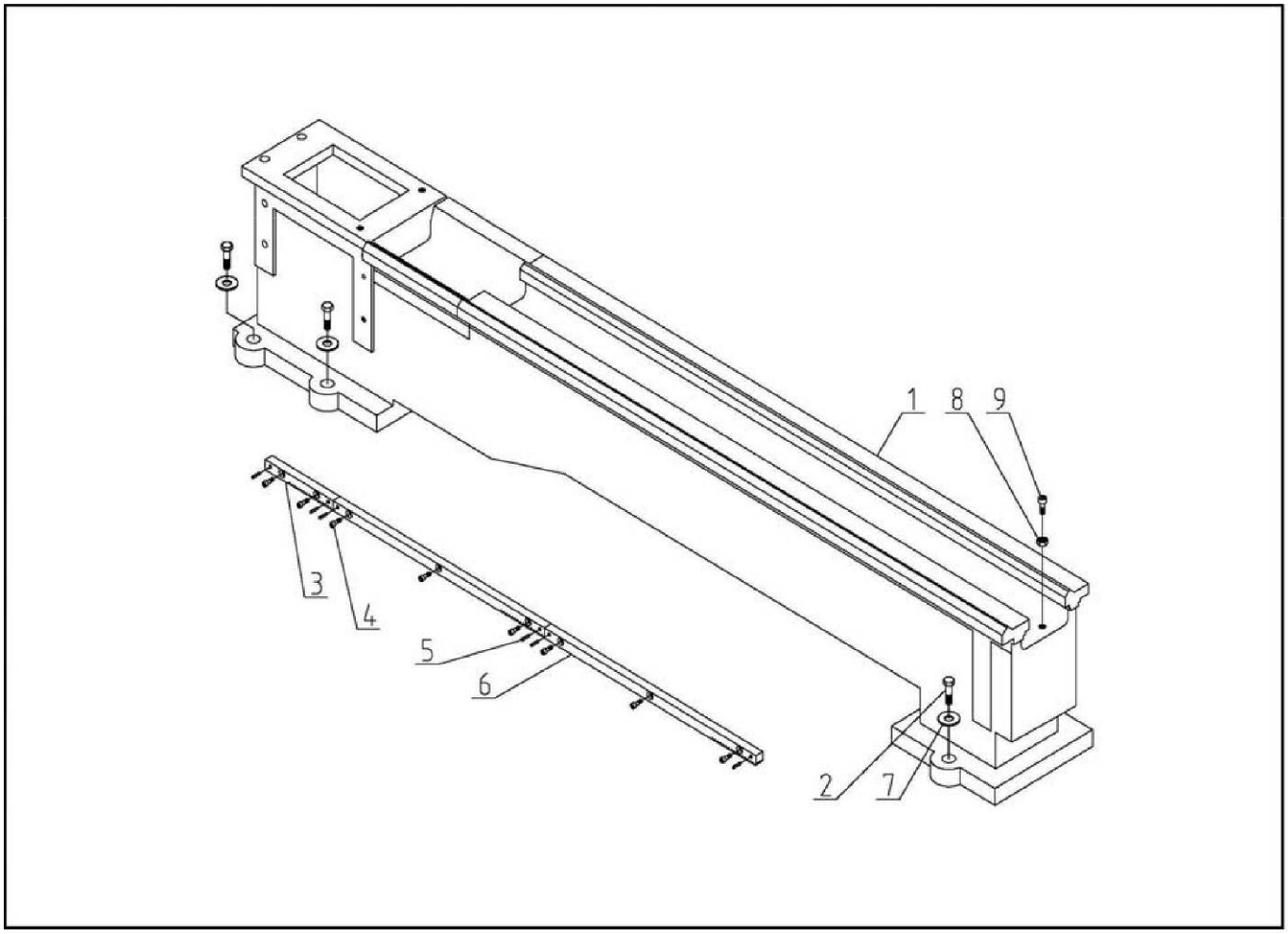
If you have no further use for the machine it has to be disassembled and disposed of in an environmentally friendly manner.



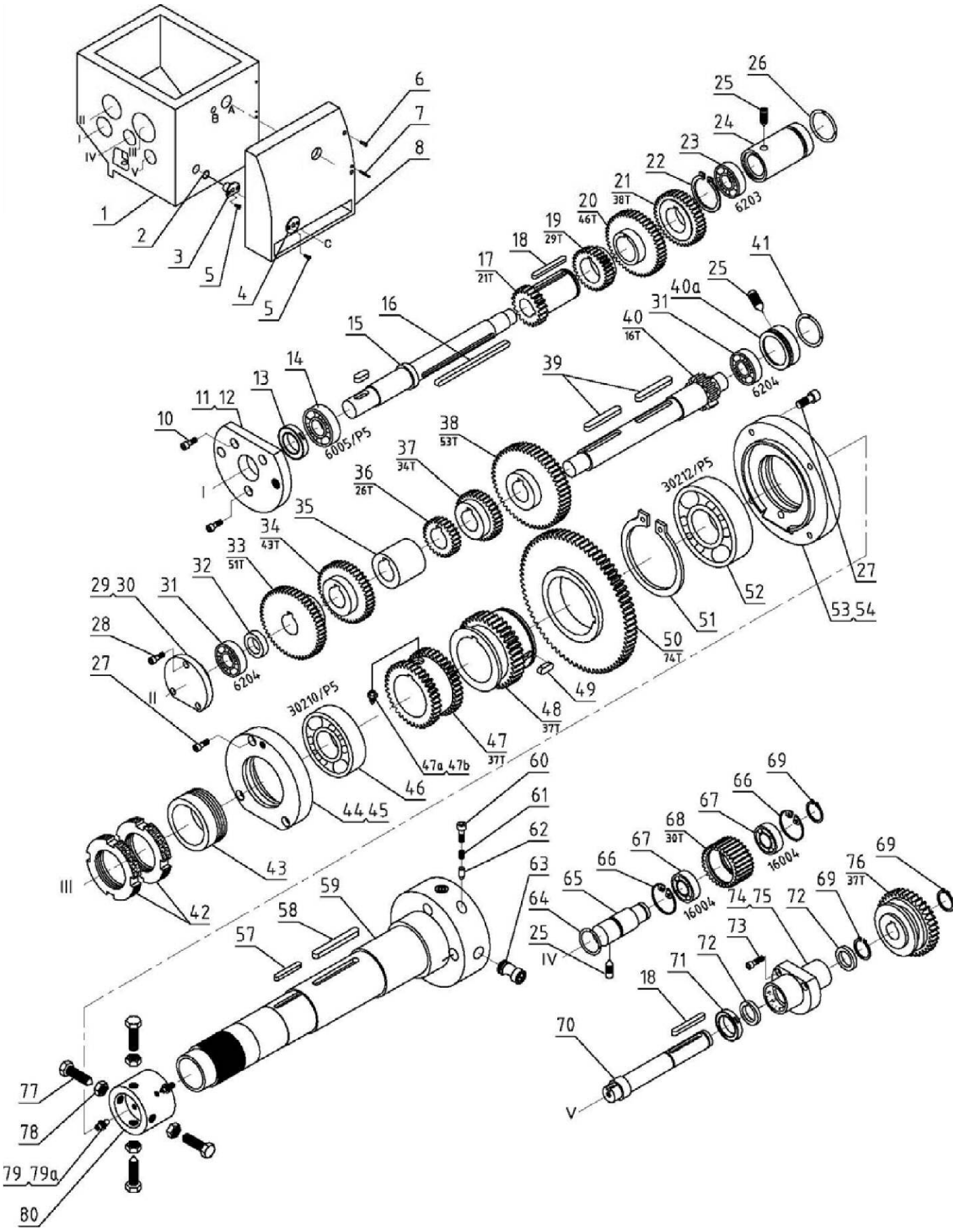
11. Wiring Diagram



12. Spare parts list

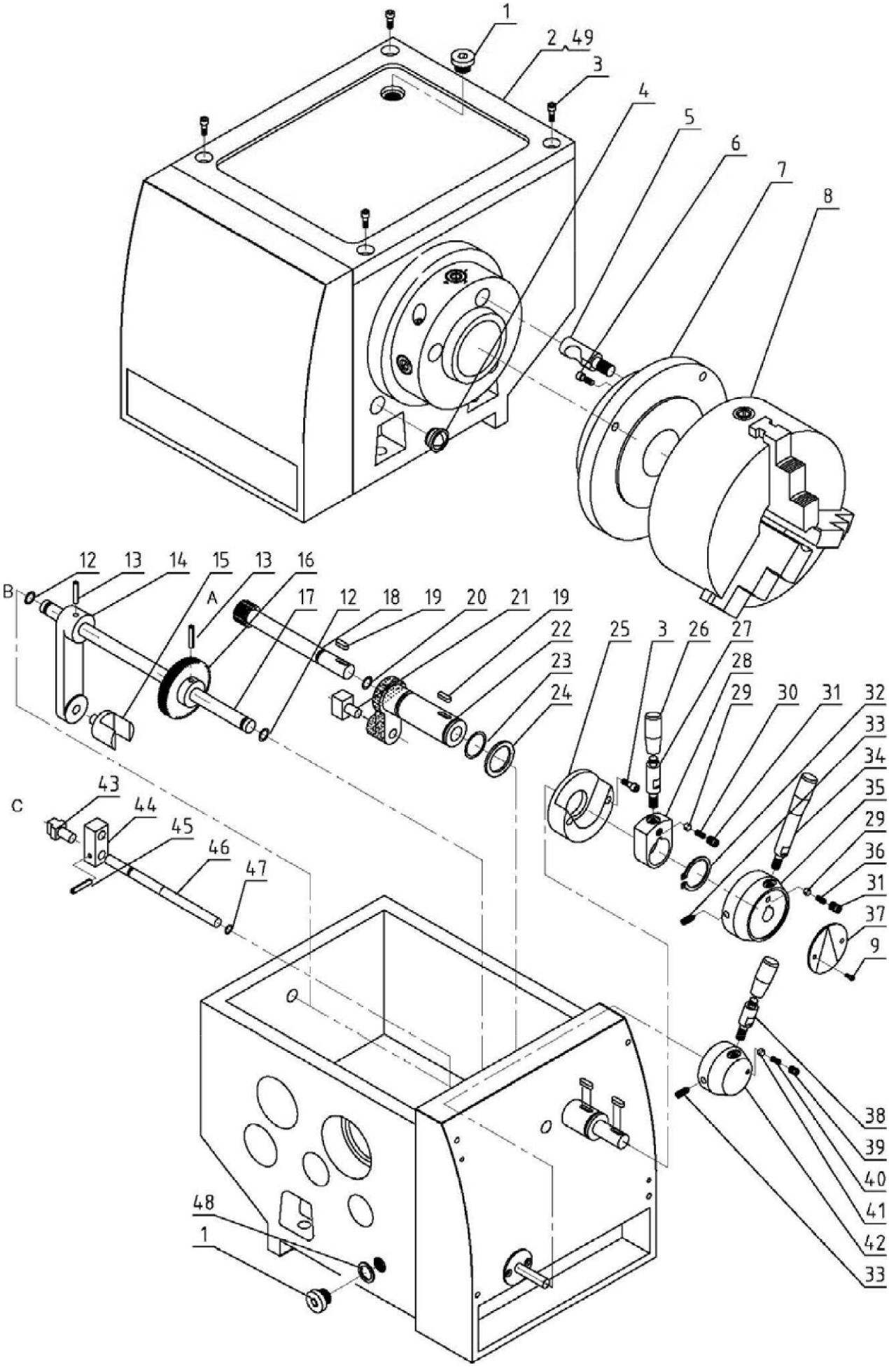


Index No	Part No	Description	Size	Qty
1	D330A-11101	Lathe Bed		1
2	GB/T5782-M12X40	Screw	M12X40	6
3	D330A-11205	Rack Gear		1
4	GB/T70-M6X15	Hex Socket Cap Screw	M6X15	8
5	GB/T879-6X25	Pin	6X25	6
6	D330A-11204	Rack Gear		2
7	GB/T97.1-12	Washer	12	6
8	GB/T6170-M10	Nut	M10	1
9	GB/T70-M10X35	Hex Socket Cap Screw	M10X35	1



Index No	Part No	Description	Size	Qty
1	D330A-21107	Head Stock		1
2	GB/T3452.1-20X2.65	Oil seal	20X2.65	1
3	D330A-21246	Sleeve		1
4	D330A-21235	Sleeve		1
5	GB/T819-M4X8	Screw	M4X8	4
6	GB/T70-M6X40	Hex Socket Cap Screw	M6X40	4
7	GB/T879-5X40	Pin	5X40	2
8	D330A-21113-1	Case frame		1
10	GB/T70-M6X20	Hex Socket Cap Screw	M6X20	3
11	D330A-21124	Cover		1
12	D330A-21601	Gasket		1
13	GB/T9877.1-25X40X7	Oil seal	25X40X7	1
14	GB/T276-6005	Bearing	6005	1
15	D330A-21215	Shaft		1
16	GB/T1096-A6X120	Key	A6X120	1
17	D330A-21217	Gear		1
18	GB/T1096-A6X50	Key	A6X50	2
19	D330A-21218	Gear		1
20	D330A-21219	Gear		1
21	D330A-21220	Gear		1
22	GB/T894.1-35	Circlip		1
23	GB/T276-6203	Bearing	6203	1
24	D330A-21106	Front plug		1
25	GB/T78-M8X16	Screw	M8X16	3
26	GB/T3452.1-40X3.1	Oil seal	40X3.1	1
27	GB/T70-M6X25	Hex Socket Cap Screw	M6X25	7
28	GB/T70-M4X12	Hex Socket Cap Screw	M4X12	3
29	D330A-21104	Cover		1
30	D330A-21602	Gasket		1
31	GB/T276-6204	Bearing	6204	2
32	D330A-21211	Washer		1
33	D330A-21222	Gear		1
34	D330A-21209	Gear		1
35	D330D-21221	Washer		1
36	D330A-21210	Gear		1
37	D330A-21223	Gear		1
38	D330A-21224	Gear		1
39	GB/T1096-A8X55	Key	A8X55	2
40	D330A-21212	Shaft		1
40a	D330A-21225	Front plug		1
41	GB/T3452.1-47X3.1	Oil seal	47X3.1	1

Index No	Part No	Description	Size	Qty
42	D330A-21208	Nut		1
43	D330A-21102	Collar		1
44	D330A-21103	End cover		1
45	D330A-21603	Gasket		1
46	GB/T297-30210	Bearing		1
47	D330A-21207	Gear		1
47a	GB/T78-M4X10	Screw	M4X10	1
47b	GB/T6170-M4	Nut	M4	1
48	D330A-21227	Gear		1
49	GB/T1096-A8X18	Key	A8X18	1
50	D330A-21226	Gear		1
51	GB/T894.1-72	Circlip	72	1
52	GB/T297-30212	Bearing		1
53	D330A-21108	Front cover		1
54	D330A-21605	Gasket		1
57	GB/T1096-A6X40	Key	A6X40	1
58	GB/T1096-A8X85	Key	A8X85	1
59	D330A-21228A	Spindle		1
60	GB/T70-M8X16	Hex Socket Cap Screw	M8X16	3
61	GB2089-4.5X16X0.8	Spring	4.5X16X0.8	3
62	D330A-21230	Pin		3
63	D330A-21231	Cam		3
64	GB/T3452.1-25X2.4	Oil seal	25X2.4	1
65	D330A-21238	Shaft		1
66	GB/T893.1-42	Circlip	42	2
67	GB/T276-16004	Bearing	16004	2
68	D330A-21237	Gear		1
69	GB/T894.1-20	Circlip	20	3
70	D330A-21239	Shaft		1
71	GB/T9877.1-24X32X5	Oil seal	24X32X5	1
72	D330A-21202	Washer		2
73	GB/T70-M5X16	Hex Socket Cap Screw	M5X16	3
74	D330A-21101	Cover		1
75	D330A-21604	Gasket		1
76	D330A-21201	Gear		1
77	D330A-21302	Screw		4
78	GB/T6172-M10	Gear	M10	4
79	GB/T78-M6X16	Screw	M6X16	2
79a	GB/T6170-M6	Nut	M6	2
80	D330A-21301A	Washer		1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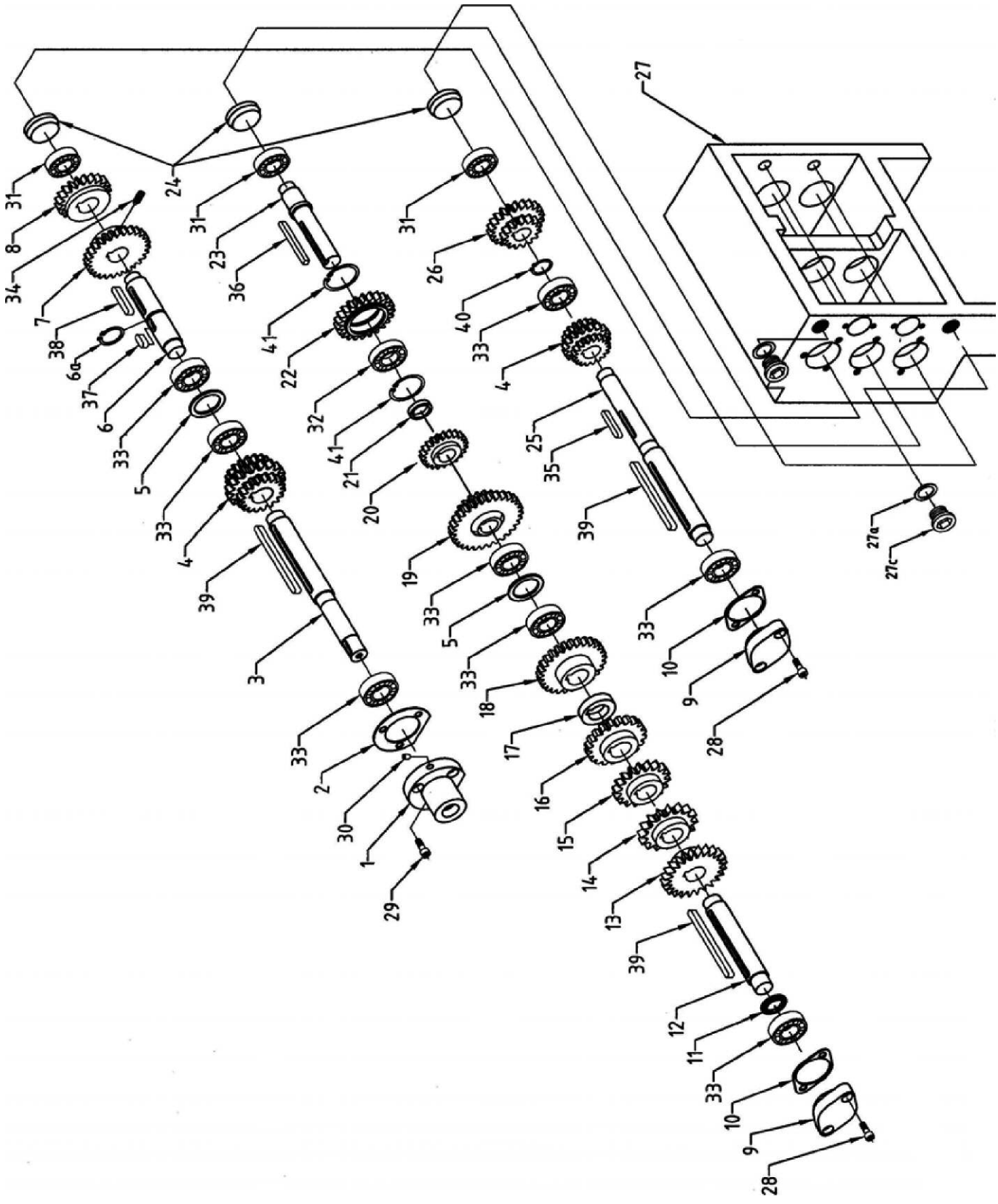
Index No	Part No	Description	Size	Qty
1		Hexagonal socket head	M16X1.5	2
2	D330A-21112-1	Cover board		1
3	GB/T70-M6X25	Hex Socket Cap Screw	M6X25	6
4	JB/T7941.2-M16X1.5	Oil sight	M16X1.5	1
5	D330A-81201	Cam lock stud		3
6	GB/T70-M6X12	Hex Socket Cap Screw	M6X12	3
7		Back Plate For 3-Jaw		1
8		Three jaw chuck		1
12	GB/T3452.1-14X2.4	Oil seal	14X2.4	2
13	GB/T879-5X30	Pin	5X30	2
14	D330A-21109	Rocker		1
15	D330A-21233	Shift fork		1
16	D330A-21234	Gear		1
17	D330A-21232	Shaft		1
18	D330A-21241-1	Shaft		1
19	GB/T1096-A5X14	Key	A5X14	2
20	GB/T3452.1-16X2.4	Oil seal	16X2.4	1
21	D330A-21403	Shift fork		1
22	D330A-21121-1	Shift collar		1
23	GB/T3452.1-30X3.1	Oil seal	30X3.1	1
24	D330A-21240	Washer		1
25	D330A-21118	Handle base		1
26	GB7271.3-M8	Cover	M8	3
27	D330A-21248-1	Handle		1
28	D330A-21119	Handle base		1
29	B308-6	Ball		2
30	GB2089-6X13X1	Spring	6X13X1	1
31	GB/T77-M8X8	Screw	M8X8	2
32	GB/T894.1-30	Circlip	30	1
33	GB/T77-M6X16	Screw	M6X16	2
34	D330A-21249	Handle		1
35	D330A-21117	Handle base		1
36	GB2089-6X26X1	Spring	6X26X1	1
37		Position sign plate		1
38	D330A-21248	Handle		1
39	GB/T77-M6X8	IScrew	M6X8	1
40	GB2089-6X26X1	Spring	6X26X1	1
41	GB308-5	Ball		1
42	D330A-21120	Handle base		1
43	D330A-21402	Shift fork		1
44	D330A-21111	Rocker		1
45	GB/T879-4X18	Pin	4X18	1
46	D330A-21236-1	Shaft		1
47	GB/T3452.1-10X1.9	Oil seal	10X1.9	1
48		Copper washer	16	1
49	D330A-21606	Gasket		1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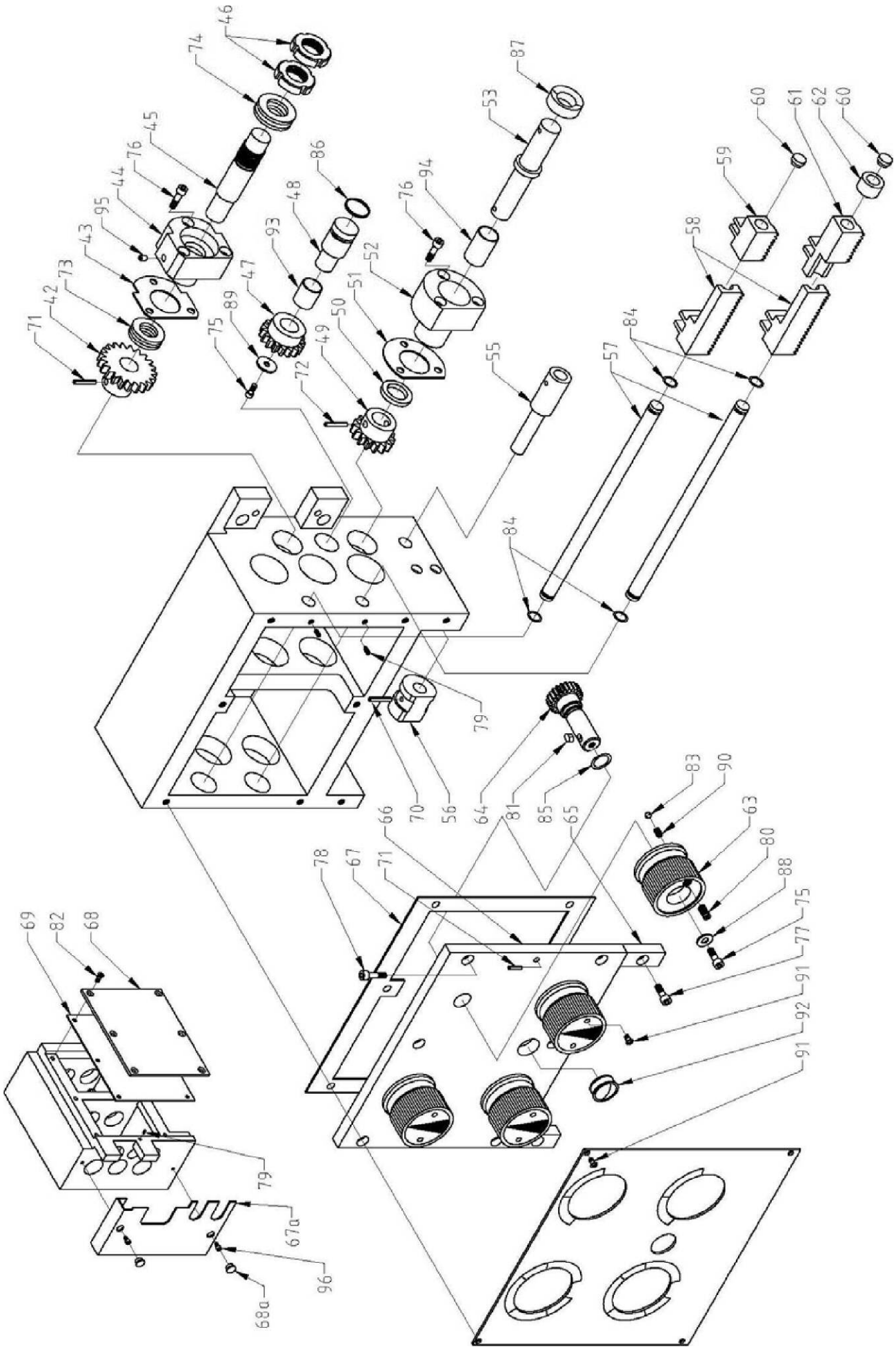
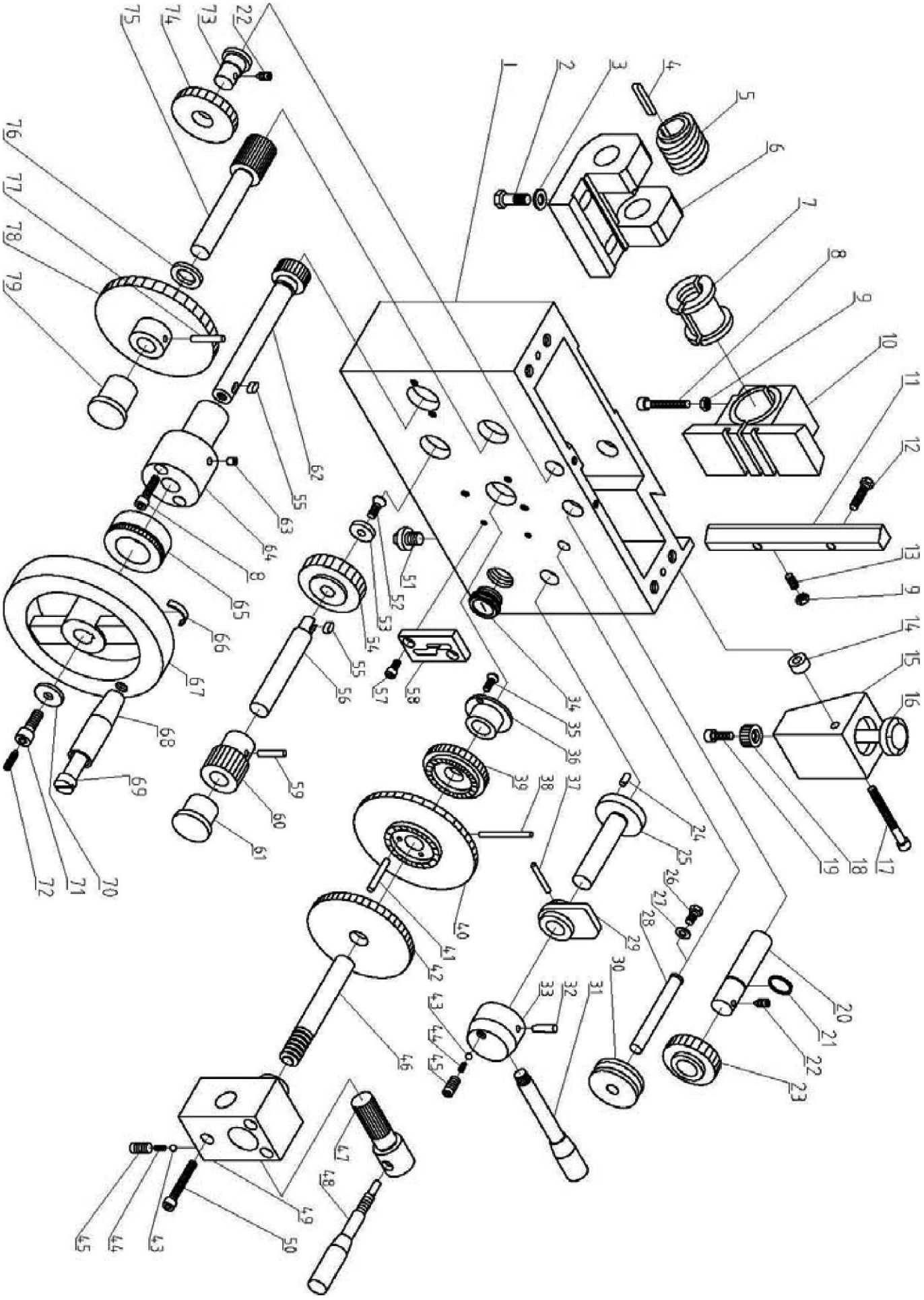


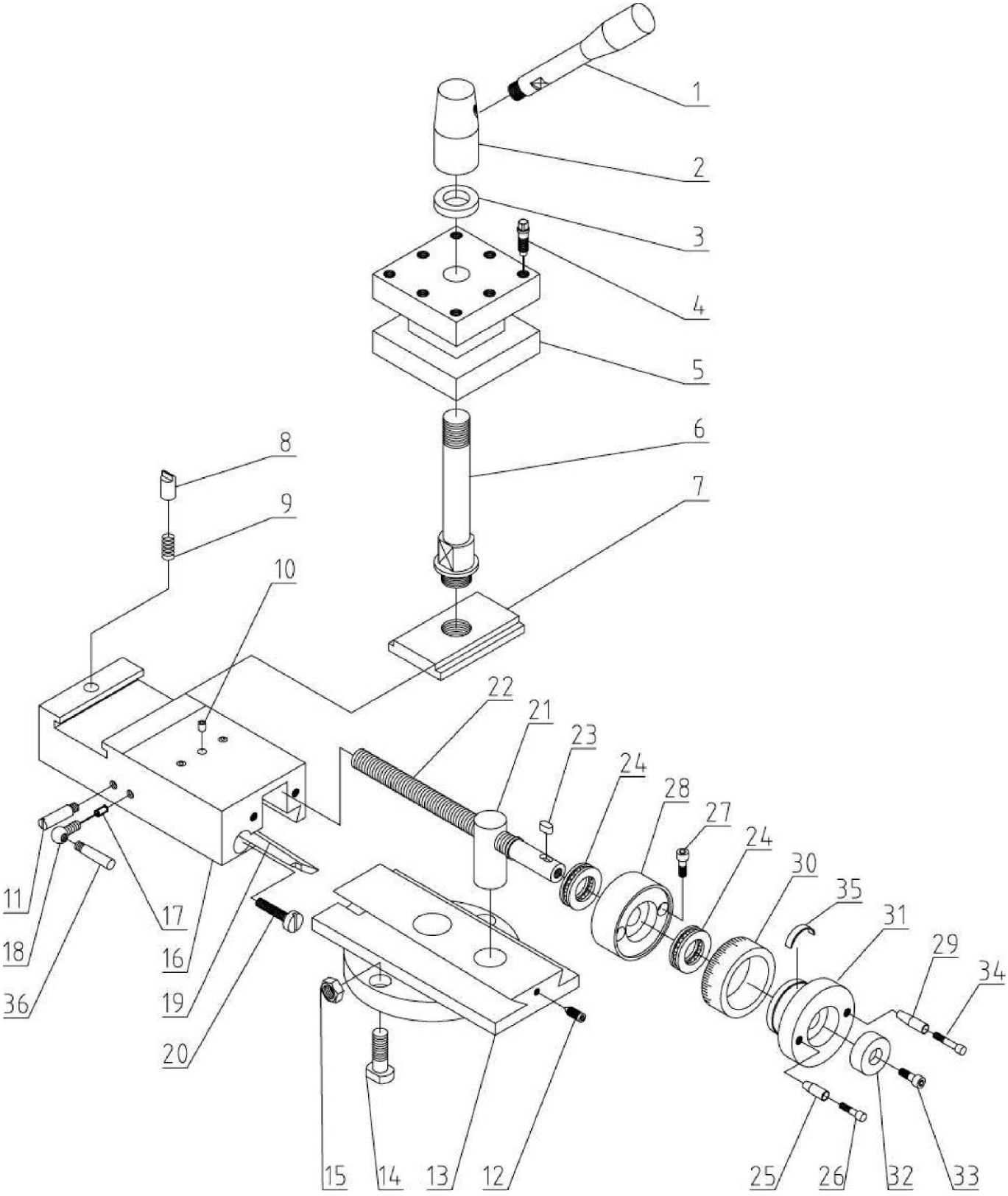
Index No.	Part No.	Description	Size	Qty.
1	D330A-3034	Cover		1
2	D330A-3035	Oil seal		1
3	D330A-3041	Shaft		1
4	D330A-3005	Gear		2
5	D330A-3066	Washer		2
6	D330A-3067	Shaft		1
6a	GB894.1-20	Circlip	20	1
7	D330A-3027	Gear		1
8	D330A-3025	Gear		2
9	D330A-3044	Cover		2
10	D330A-3046	Oil seal		2
11	D330A-3045	Washer		1
12	D330A-3033	Shaft		1
13	D330A-3029	Gear		1
14	D330A-3031	Gear		1
15	D330A-3032	Gear		1
16	D330A-3003	Gear		1
17	D330A-3030	Washer		1
18	D330A-3002	Gear		1
19	D330A-3026	Gear		1
20	D330A-3007	Gear		1
21	D330A-3008	Washer		1
22	D330A-3009	Gear		1
23	D330A-3019	Shaft		1
24	CQ6230-3017B	Cover		3
25	D330A-3004	Shaft		1
26	D330A-3006	Gear		1
27	CQ6230-3001E	Gear box		1
27a		Copper Washer	16	2
27c		Screw	M16X1.5	2
28	GB/T70-M6X12	Hex Socket Cap Screw	M6X12	4
29	GB/T70-M6X16	Hex Socket Cap Screw	M6X16	3
30	JB/T7940.4-6	Oil prot	6	1
31	GB/T276-6002	Bearing	6002	3
32	GB/T276-16003	Bearing	16003	1
33	GB/T276-6003	Bearing	6003	8
34	GB/T78-M6X8	Screw	M6X8	1
35	GB/T1096-A5X35	Key	A5X35	1
36	GB/T1096-C5X40	Key	C5X40	1
37	GB/T1096-A6X15	Key	A6X15	1
38	GB/T1096-A6X35	Key	A6X35	1
39	GB/T1096-A6X90	Key	A6X90	3
40	GB/T894.1-17	Circlip	17	1
41	GB/T893.1-35	Circlip	35	2
42	.D330A-3018	Gear		1
43	CQ6230-3068D	Oil seal		1
44	CQ6230-3084D	Cover		1
45	D330 A-3021	Shaft		1

Index No.	Part No.	Description	Size	Q t y .
46	D330A-GB812	Nut		2
47	D330A-3016	Gear		1
48	D330A-3015	Shaft		1
49	D330A-3014	Gear		1
50	D330A-3085	Washer		1
51	CQ6230-3086D	Oil Seal		1
52	CQ6230-3022F	Cover		1
53	CQ6230-3013E	Shaft		1
55	CQ6230-3011D	Shaft		1
56	D330A-3012	Position Piec		1
57	CQ6230-3089A	Shaft		2
58	CQ6230-3049C	Gear Rack		2
59	CQ6230-3062C	Gear Rack		1
60	CQ6230-3091B	Cover		2
61	CQ6230-3050C	Gear Rack		1
62	D330A-3079	Washer		1
63	CQ6230-3054F	Boss		4
64	CQ6230-3088	Gear		4
65	CQ6230-3061B	Washer		2
66	CQ6230-3059E	Cover		1
67	CQ6230-3087D	Oil seal		1
67a	D330A-3001A	Cover		1
68	D330A-3042	Cover		1
68a		Cover	ϕ 13	2
69	D330A-3070	Oil seal		1
70	GB/T879-4X28	Pin	4X28	1
71	GB/T879-5X26	Pin	5X26	2
72	GB/T879-5X28	Pin	5X28	2
73	GB/T301-51103	Bearing		1
74	GB/T301-51104	Bearing		1
75	GB/T70- M6X12	Hex Socket Cap Screw	M6X12	5
76	GB/T70- M6X25	Hex Socket Cap Screw	M6X25	6
77	GB/T70- M8X16	Hex Socket Cap Screw	M8X16	2
78	GB/T70- M8X20	Hex Socket Cap Screw	M8X20	6
79	GB/T78- M5X8	Screw	M5X8	3
80	GB/T77- M8X6…	Screw	M8X6	4
81	GB/T1096-A5X8	Key	A5X8	4
82	GB/T819-M6X10	Screw	M6X10	6
83	GB308-89-6	Ball	6	4
84	GB/T3452.1-12X1.8	Oil seal	12X1.8	4
85	GB/T3452.1-16X2.4	Oil seal	16X2.4	4
86	GB/T3452.1-22X2.4	Oil seal	22X2.4	1
87	GB/T9877.1-18X30X10	Oil seal	18X30X10	1
88	GB/T97.1-6	Washer	6	4
89	GB/T96-6	Washer	6	1
90	GB2089-6X18X0.8	Spring	6X18X0.8	4
91	GB/T818-M4X6	Screw	M4X6	12
92		Oil seal	M22X1.5	1
93		Copper Washer	16X18X20	1
94		Copper Washer	17X19X30	1
95	JB/T7940.4-6	Oil port	6	1
96	GB/T70-M5X8	Hex Socket Cap Screw	M5X8	2

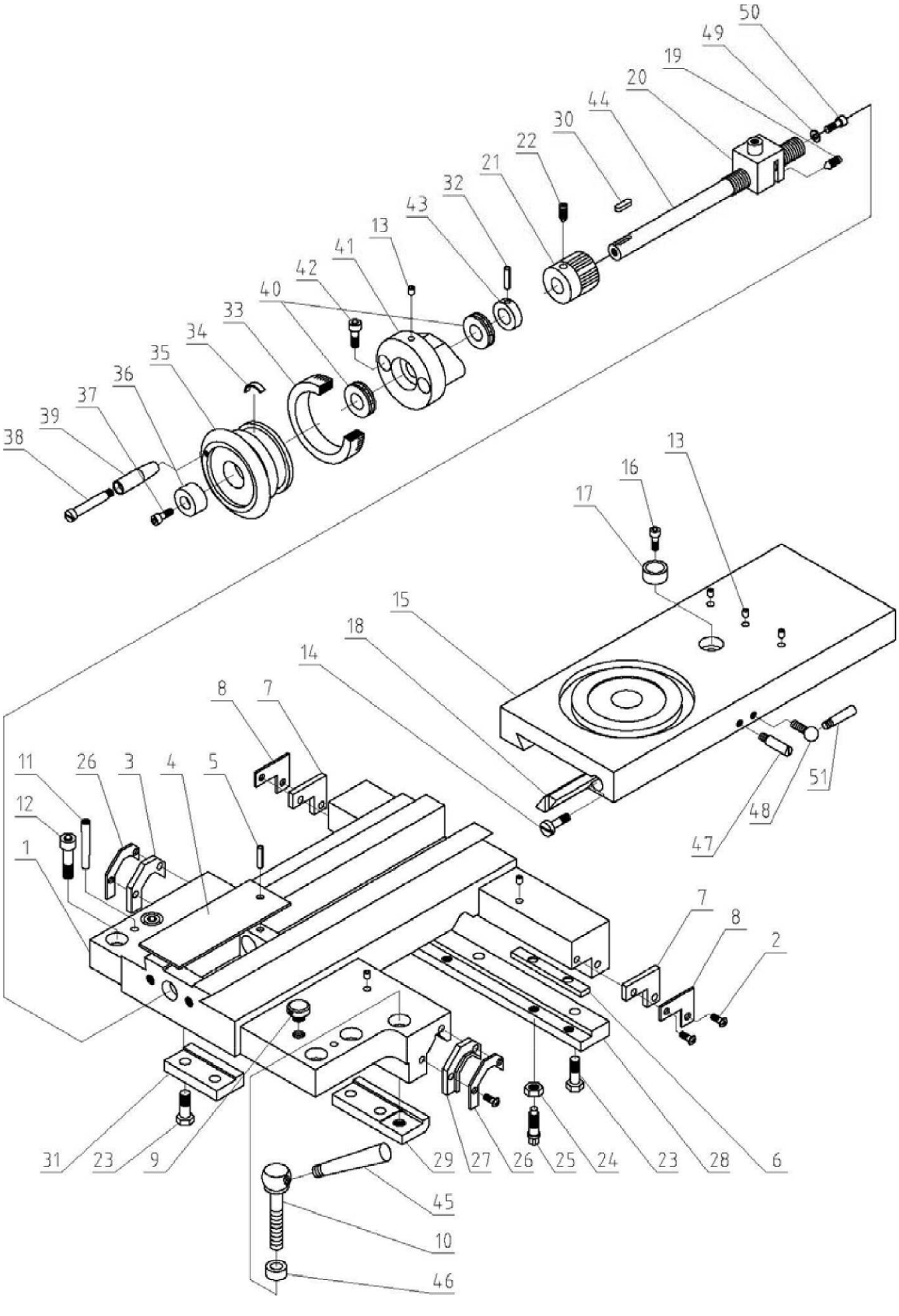


Index No	Part No	Description	Size	Qty
1	CQ6230-4001	Apron Casting		1
2	GB/T5782-M8X30	Cap Screw	M8X30	2
3	GB/T97.1-8	Washer	8	2
4	GB/T1096-5X36	Key	5X36	1
5	CQ6230-4008	Worm		1
6	CQ6230-4009	Bracket		1
7	CQ6230-4003	Half Nut Half Nut		1
8	GB/T70-M6X40	Cap Screw	M6X40	3
9	GB/T6175-M6	Nut	M6	3
10	CQ6230-4002	Bracket		1
11	CQ6230-4022	Gib		1
12	GB/T5782-M6X25	Cap Screw	M6X25	2
13	GB/T77-M6X15	Screw	M6X15	2
14	CQ6230-4007	Washer		1
15	CQ6230-4005	Bracket		1
16	CQ6230-4006	Shaft		1
17	GB/T70-M6X60	Cap Screw	M6X60	1
18	CQ6230-4004	Gear		1
19	GB/T70-M6X15	Cap Screw	M6X15	1
20	CQ6230-4046	Shaft		1
21	GB/T894.1-18	Circlip	18	1
22	GB/T78-M6X6	Screw	M6X6	2
23	CQ6230-4035	Gear		1
24	GB/T119-5X10	Pin	5X10	2
25	CQ6230-4023	Shaft		1
26	GB/T5782-M6X10	Cap Screw	M6X10	1
27	GB/T97.1-6	Washer	6	1
28	CQ6230-4024	Shaft		1
29	CQ6230-4021	Locating Block		1
30	CQ6230-4025	Fork		1
31	CQ6230-4044	Lever		1
32	GB/T117-5X40	Taper Pin	5X40	1
33	CQ6230-4045	Lever Hand		1
34	JB/T7941.2-M22X1.5	Oil seal	M22X1.5	1
35	GB/T65-M5X12	Screw	M5X12	2
36	CQ6230-4016	Washer		1
37	GB/T879-4X30	Pin	4X30	1
38	GB/T879-4X50	Pin	4X50	1
39	CQ6230-4014	Gear		1
40	CQ6230-4013	Gear		1

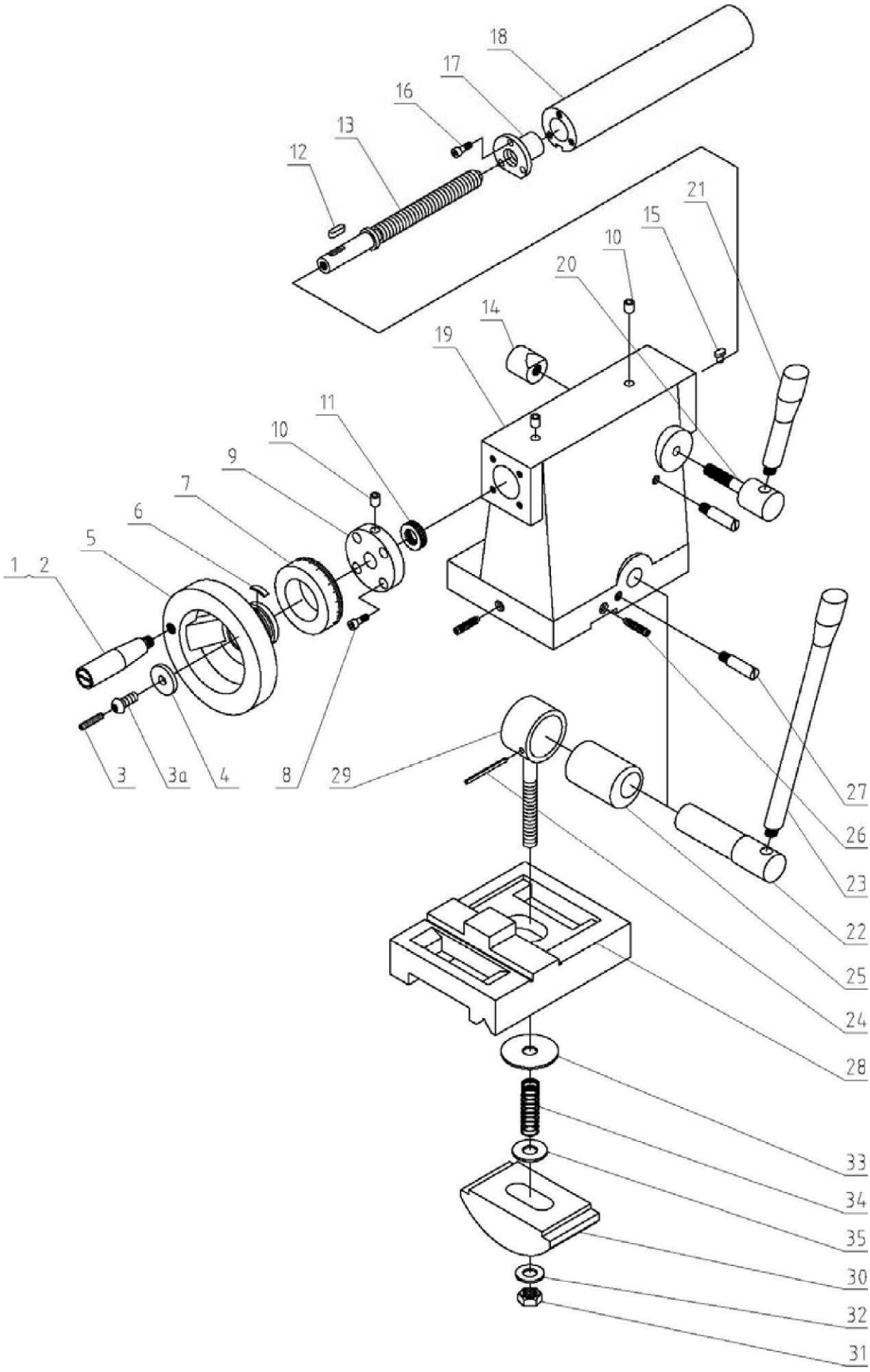
Index No	Part No	Description	Size	Qty
41	GB/T119-5X33	Pin	5X33	3
42	CQ6230-4013	Gear		1
43	GB308---6	Steel Ball	6	2
44	CQ6123-14-01	Sping		2
45	GB/T77-M8X8	Screw	M8X8	2
46	CQ6230-4015	Shaft		1
47	CQ6230-4042	Gear		1
48	CQ6230-4041	Lever		1
49	CQ6230-4039	Bracket		1
50	GB/T70-M6X45	Cap Screw	M6X45	3
51		Bolt	M10X1	1
52	GB/T819-M6X12	Screw	M6X12	1
53	CQ6230-4048	Washer		1
54	CQ6230-4017	Gear		1
55	GB/T1096-5X10	Key	5X10	2
56	CQ6230-4018	Shaft		1
57	GB/T70-M5X10	Cap Screw	M5X10	2
58	CQ6230-4043	Locating Block Shaft		1
59	GB/T879-5X25	Pin	5X25	1
60	CQ6230-4019	Gear		1
61	CQ6230-4020	Washer		1
62	CQ6230-4030	Shaft		1
63	GB/T7940.4—6	Oil Port	6	1
64	CQ6230-4031	Bracket		1
65	CQ6230-4036	Graduated Dial		1
66	CQ6230-4037	Cursor		1
67	CQ6230-4034	Hand Wheel		1
68	CQ6230-4032	Handle		1
69	CQ6230-4033	Handle screw		1
70	CQ6230-4038A	Washer		1
71	CQ6230-4047	Screw		1
72	GB/T79-5X30	Screw	5X30	1
73	CQ6230-4011	Shaft		1
74	CQ6230-4010	Gear		1
75	CQ6230-4028	Shaft		1
76	CQ6230-4027	Washer		1
77	GB/T879-5X30	Pin	5X30	1
78	CQ6230-4029	Gear		1
79	CQ6230-4026	Washer		1



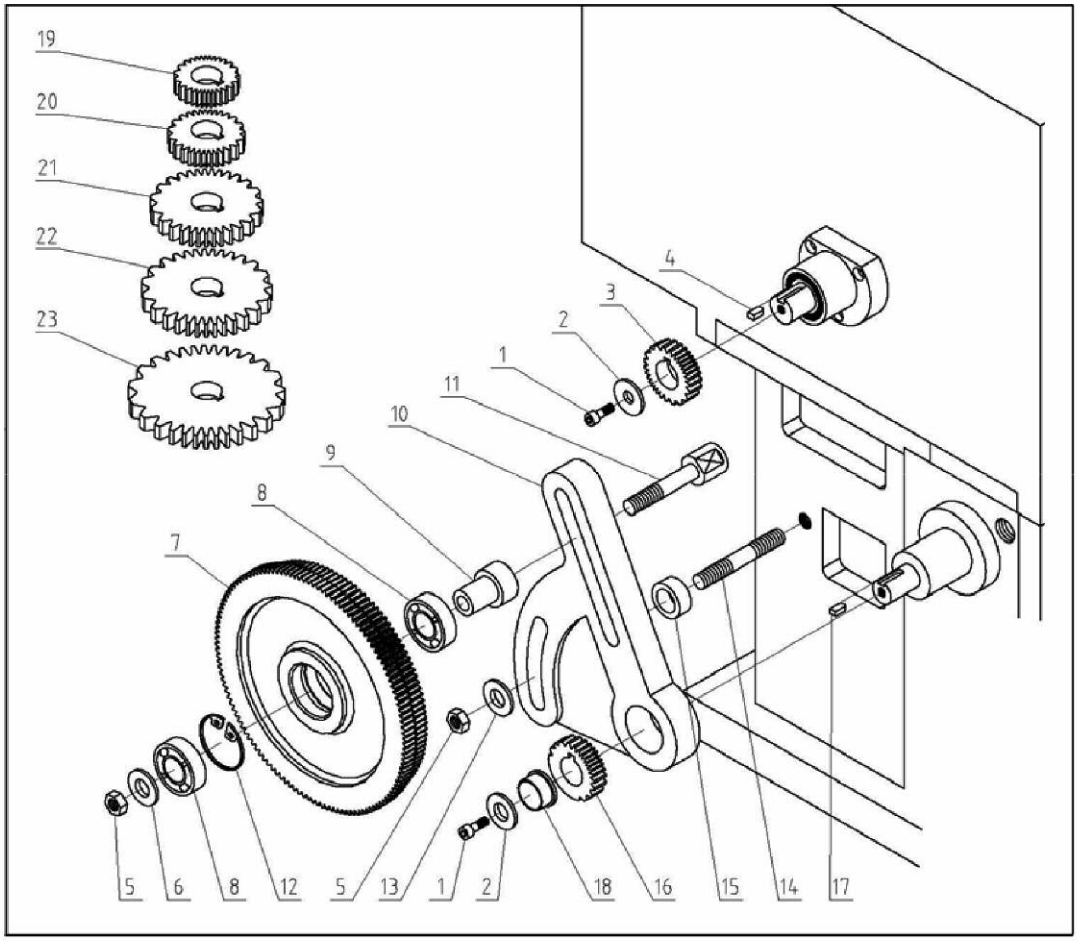
Index No	Part No	Description	Size	Qty
1	CQ6230-5010	Handle		1
2	CQ6230-5009	Boss		1
3	CQ6230-5008	Collar		1
4	GB/T83-M10×45	Screw	M10×45	8
5	CQ6230-5005	Tool Post		1
6	CQ6230-5006	Shaft		1
7	CQ6230-5003	Nut		1
8	CQ6230-5004	Pin		1
9	GB2089-1.2×6×8	Spring	1.2×6×8	1
10	JB/T7940.4-6	Oil cup	6	3
11	D330A-S2003	Shaft		1
12	GB/T78-M6×16	Screw	M6×16	1
13	CQ6230-5001	Compound		1
14		"T" Screw		2
15	GB/T6175-M10	Nut	M10	2
16	CQ6230-5002	Compound		1
17	CQ6230-5024	Pin		1
18	D330A-S2001	Screw		1
19	CQ6230-5023	Gib		1
20	CQ6230-5021	Screw		2
21	CQ6230-5012	Nut		1
22	CQ6230-5011	Guide Screw		1
23	GB/T1096-A4×8	Key	A4×8	1
24	GB/T301-51101	Bearing		2
25		Collar		1
26		Bolt		1
27	GB/T70-M6×25	Hex Socket Cap Screw	M6×25	2
28	CQ6230-5013	Bracket		1
29		Collar		1
30	CQ6230-5014	Index Ring		1
31		Hand Wheel		1
32		Washer		1
33	GB/T70-M6×12	Hex Socket Cap Screw	M6×12	1
34		Bolt		1
35	CQ6230-4037	Leaf spring		1
36	D330A-S2002	Bolt		1



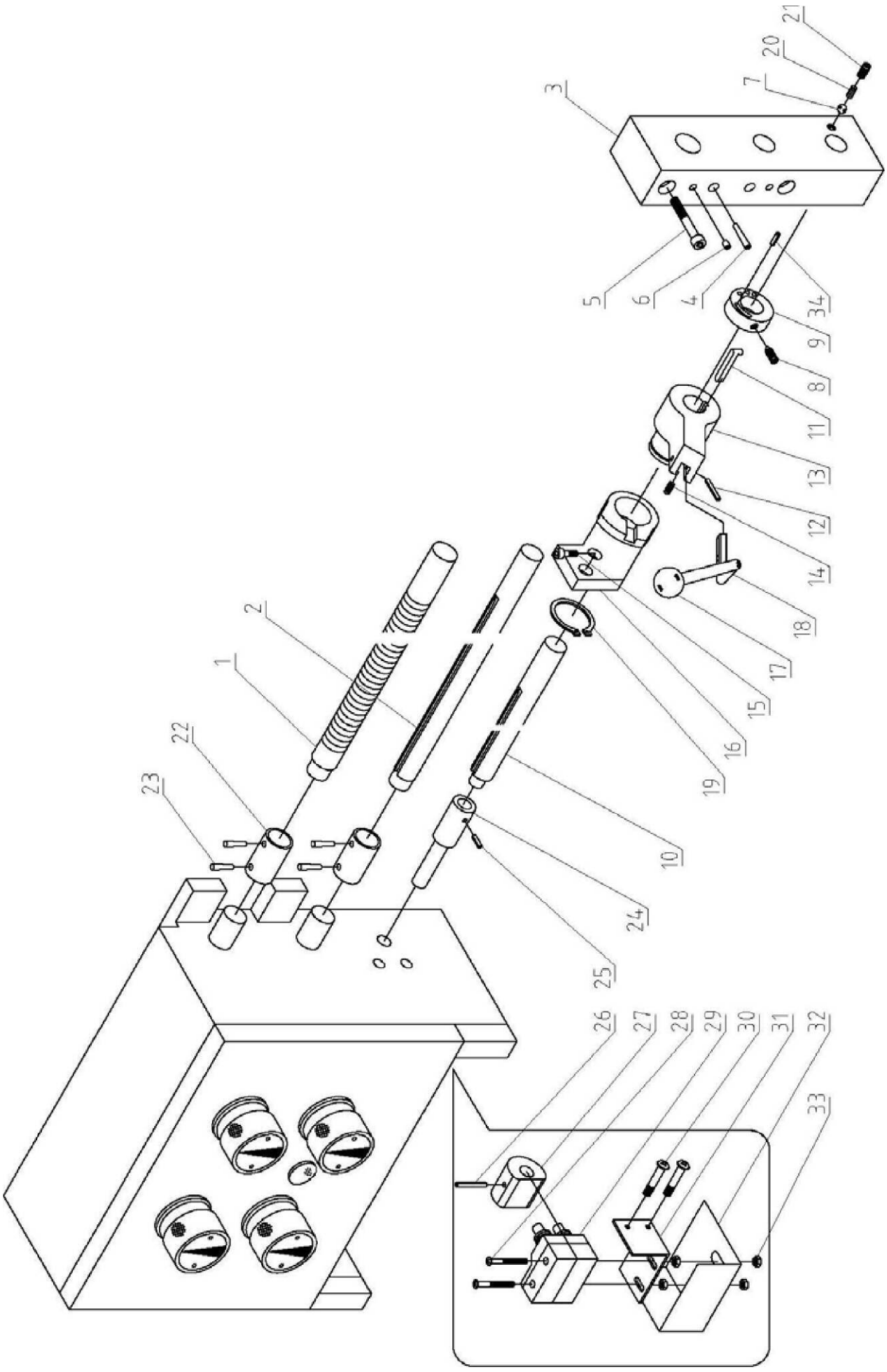
Index No	Part No	Description	Size	Qty
1	D330A-51101	Saddle		1
2	GB818-M5X12	Screw	M5X12	8
3	D330A-51301	Wipper		1
4	D330A-51211	Cover		1
5	GB/T879-3X10	Pin	3X10	1
6	D330A-51216	Press plate		2
7	D330A-51303	Press plate		2
8	D330A-51204	Wipper		2
9	D330A-51215	Screw		1
10	D330A-S1001	Screw		1
11	GB/T118-6X45	Taper Pin	6X45	2
12	GB/T70-M10×30	Hex Socket Cap Screw	M10×30	4
13	JB/T7940.4-6	Oil cup	6	6
14	D330A-51214	Screw		2
15	D330A-51102	Tool post		1
16	GB/T70-M6×12	Hex Socket Cap Screw	M6×12	1
17	D330A-51201	Bushing		1
18	D330A-51212	Gib		1
19	GB/T78-M4×12	Screw	M4×12	2
20	D330A-51401	Nut		1
21	D330A-51202	Gear		1
22	GB/T78-M6×8	Screw	M6×8	1
23	GB/T5782-M8×25	Screw	M8×25	7
24	GB/T6175-M8	Nut	M8	4
25	GB/T83-M8×25	Screw	M8×25	4
26	D330A-51205	Press plate		2
27	D330A-51302	Wipper		1
28	D330A-51104	Press Plate		1
29	D330A-51105	Press Plate		1
30	GB/T1096-5×20	Key	5×20	1
31	D330A-51103	Press Plate		1
32	GB/T879-4X25	Pin	4X25	1
33	D330A-51208	Index Ring		1
34	CQ6230-4037	Leaf spring		1
35	D330A-51207	Hand wheel		1
36	D330A-51207-1	Washer		1
37	GB/T70-M6×16	Hex Socket Cap Screw	M6×16	1
38	JD10-06027A	Handle screw		1
39	JD10-06027	Handle		1
40	GB/T301-51102	Bearing	51102	2
41	D330A-51106	Bracket		1
42	GB/T70-M8×30	Hex Socket Cap Screw	M8×30	2
43	D330A-51210	Washer		1
44	D330A-51206	Guide Screw		1
45	D330A-S1002	Handle		1
46	D330A-S1003	Lock Handle		1
47	D330A-S2003	Screw		1
48	D330A-S2001	Screw		1
49	GB/T97.1-5	Washer	5	1
50	GB/T70-M5×12	Hex Socket Cap Screw	M5×12	1
51	D330A-S2002	Handle		1



Index No	Part No	Description	Size	Qty
1	CQ6230-4033	Handle		1
2	CQ6230-4032	Lever		1
3	GB/T77-M5X25	Screw	M5X25	1
3a	D330A-6044	Adjusting screw		1
4	D330A-6045	Washer		1
5	D330A-6005	Hand Wheel		1
6	CQ6230-4037	Leaf Spring		1
7	D330A-6010	Index Ring		1
8	GB/T70-M6X16	Hex Socket Cap Screw	M6X16	4
9	D330A-6011	Bracket		1
10	JB/T7940.4-8	Oil Cup	8	3
11	GB/T301-51102	Bearing		1
12	GB/T1096-A4X15	Key	A4X15	1
13	D330A-6006	Guide Screw		1
14	D330A-6023	Lock Nut		1
15	D330A-6015	Key		1
16	GB/T70-M4×12	Hex Socket Cap Screw	M4×12	3
17	D330A-6012	Nut		1
18	D330A-6013	Quill		1
19	D330A-6001	Tail stock		1
20	D330A-6022	Lock screw		1
21	D330A-6021	Handle		1
22	D330A-6017	Shaft		1
23	D330A-6004	Handle		1
24	GB/T119-5×30	Pin	5×30	1
25	D330A-6018	Collar		1
26	GB/T79-M10×50	Screw	M10×50	3
27	D330A-6003	Screw		2
28	D330A-6002	Base		1
29	D330A-6019	Shaft		1
30	D330A-6020	Base Shoe Black		1
31	GB/T6175-M12	Nut	M12	1
32	GB/T97.1-12	Washer		1
33	D330A-6042	Washer		1
34	D330A-6041	Spring		1
35	D330A-6043	Washer		1



Index No.	Part No.	Description	Size	Q t y .
1	GB/T70-M6X12	Hex Socket Cap Screw	M6X12	2
2	GB/T96-6	Washer	6	2
3	D330A-91202	Gear		1
4	GB/T1096-A5X8	Key	A5X8	1
5	GB/T6175-M10	Nut	M10	2
6	GB/T97.1-10	Washer	10	1
7	D330A-91208	Gear		1
8	GB/T276-6003	Bearing		2
9	D330A-91209	Collar		1
10	D330A-91101	Quadrant		1
11	D330A-91210	Screw		1
12	GB/T893.1-35	Circlip	35	1
13	GB/T97.1-10	Washer	10	1
14	GB/T901-M10X60	Screw	M10X60	1
15	D330A-91212	Washer		1
16	D330A-91206	Gear		1
17	GB/T1096-A5X8	Key	A5X8	1
18	D330A-91213-1	Washer		1
19	D330A-91201	Change gear		1
20	D330A-91203	Change gear		1
21	D330A-91204	Change gear		1
22	D330A-91205	Change gear		1
23	D330A-91207	Change gear		1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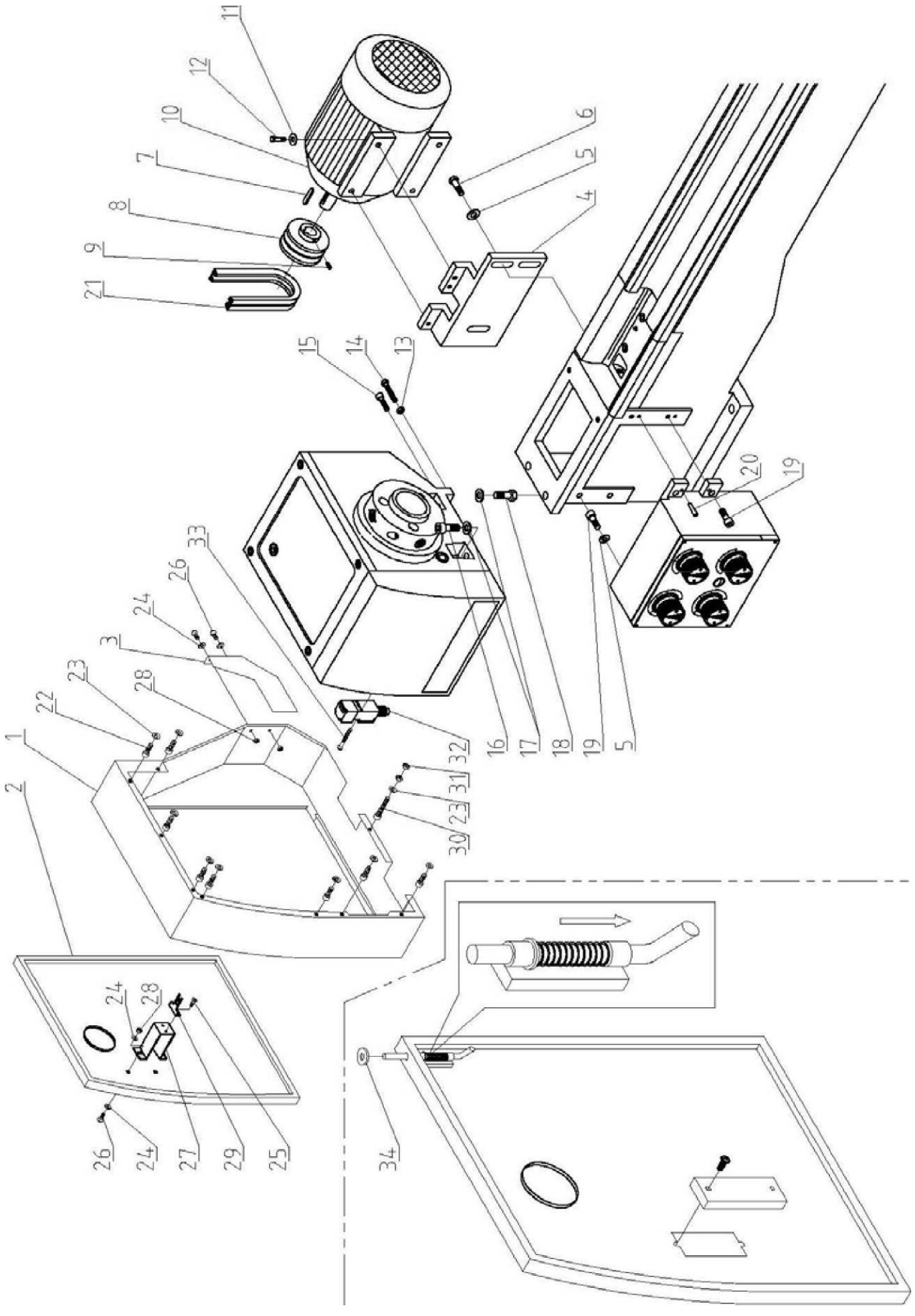
Index No	Part No	Description	Size	Qty
1	D330A-11201	Guide Screw		1
2	D330A-11202	Rod		1
3	D330A-11102	Bracket		1
4	GB/T118-6X45	Taper Pin	6X45	2
5	GB/T70-M8X60	Hex Socket Cap Screw	M8X60	2
6	JB/T7940.4-6	Oil cup	6	2
7	GB308---6	Ball	6	1
8	GB/T78-M6×10	Screw	M6×10	1
9	D330A-11209-1	Bushing		1
10	D330A-11203	Feed Rod		1
11	D330A-11104-1	Key		1
12	GB/T879-4X25	Pin	4X25	1
13	D330A-11104	Bracket		1
14	GB2089-10X1X12	Spring	10X1X12	1
15	GB/T70-M6X12	Hex Socket Cap Screw	M6X12	2
16	D330A-11105	Bracket		1
17	JB/T7271.1-M10X32	Handle ball	M10X32	1
18	D330A-11206	Handle		1
19	GB/T894.1-32	Circlip	32	1
20	GB2089-1×5×30	Spring	1×5×30	1
21	GB/T77-M8X8	Screw	M8X8	1
22	D330A-11207	Washer		2
23	GB/T879-4X24	Pin	4X24	4
24	CQ6230-3011D	Shaft		1
25	GB/T879-4X20	Pin	4X20	1
26	GB/T879-4X30	Pin	4X30	1
27	D330A-3012	Position Piec		1
28	GB818-M4X50	Screw	M4X50	2
29		Switch	LXW5-11M	2
30	GB818-M4X20	Screw	M4X20	2
31	D330A-71207	Bracket		1
32	D330A-71207-1	Cover		1
33	GB/T6175-M4	Nut	M4	4
34	GB/T879-4X12	Pin	4X12	1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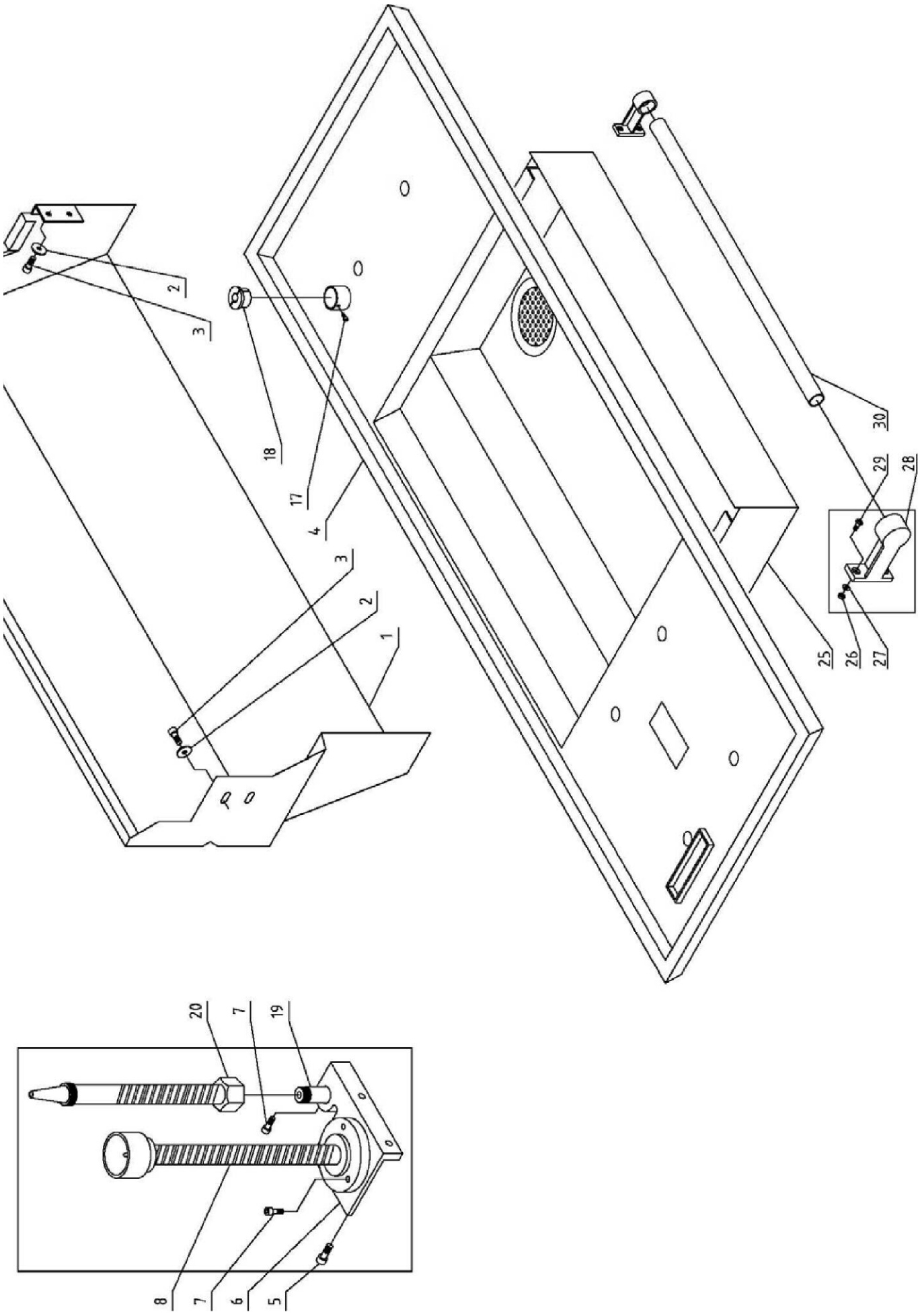
Index No	Part No	Description	Size	Qty
1	D330A-13401A-1	Cover		1
2	D330A-13402A-1	Cover		1
3	D330A-14220	Cover		1
4	D330A-11107	Trestle		1
5	GB/T97.1-10	Washer	10	5
6	GB/T5782-M10X30	Screw	M10X30	3
7	GB/T1096-8X35	Key	8X35	1
8	D330A-11106	Pulley		1
9	GB/T78-M6X8	Screw	M6X8	1
10		Motor		1
11	GB/T97.1-8	Washer	8	4
12	GB/T5782-M8X25	Screw	M8X25	4
13	GB/T6175-M8	Nut	M8	2
14	GB/T5782-M8X45	Screw	M8X45	2
15	GB/T70-M8X30	Hex Socket Cap Screw	M8X30	2
16	GB/T70-M12X35	Hex Socket Cap Screw	M12X35	2
17	GB/T97.1-12	Washer	12	4
18	GB/T5782-M12X30	Screw	M12X30	2
19	GB/T70-M10X30	Hex Socket Cap Screw	M10X30	4
20	GB/T117-6X30	Taper Pin	6X30	2
21		V-Belt	A850	2
22	GB/T70-M5X8	Hex Socket Cap Screw	M5X8	8
23	GB/T97.1-5	Washer	5	9
24	GB/T97.1-4	Washer	4	6
25	GB818-M4X6	Screw	M4X6	2
26	GB818-M4X10	Screw	M4X10	4
27	D330A-71209	Bracket		1
28	GB/T6175-M4	Nut	M4	4
29		Switch-1	QKS8	1
30	GB/T70-M5X30	Hex Socket Cap Screw	M5X30	1
31	GB/T6175-M5	Nut	M5	2
32		Switch-2	QKS8	1
33	GB818-M4X30	Screw	M4X30	2
34		Washer		2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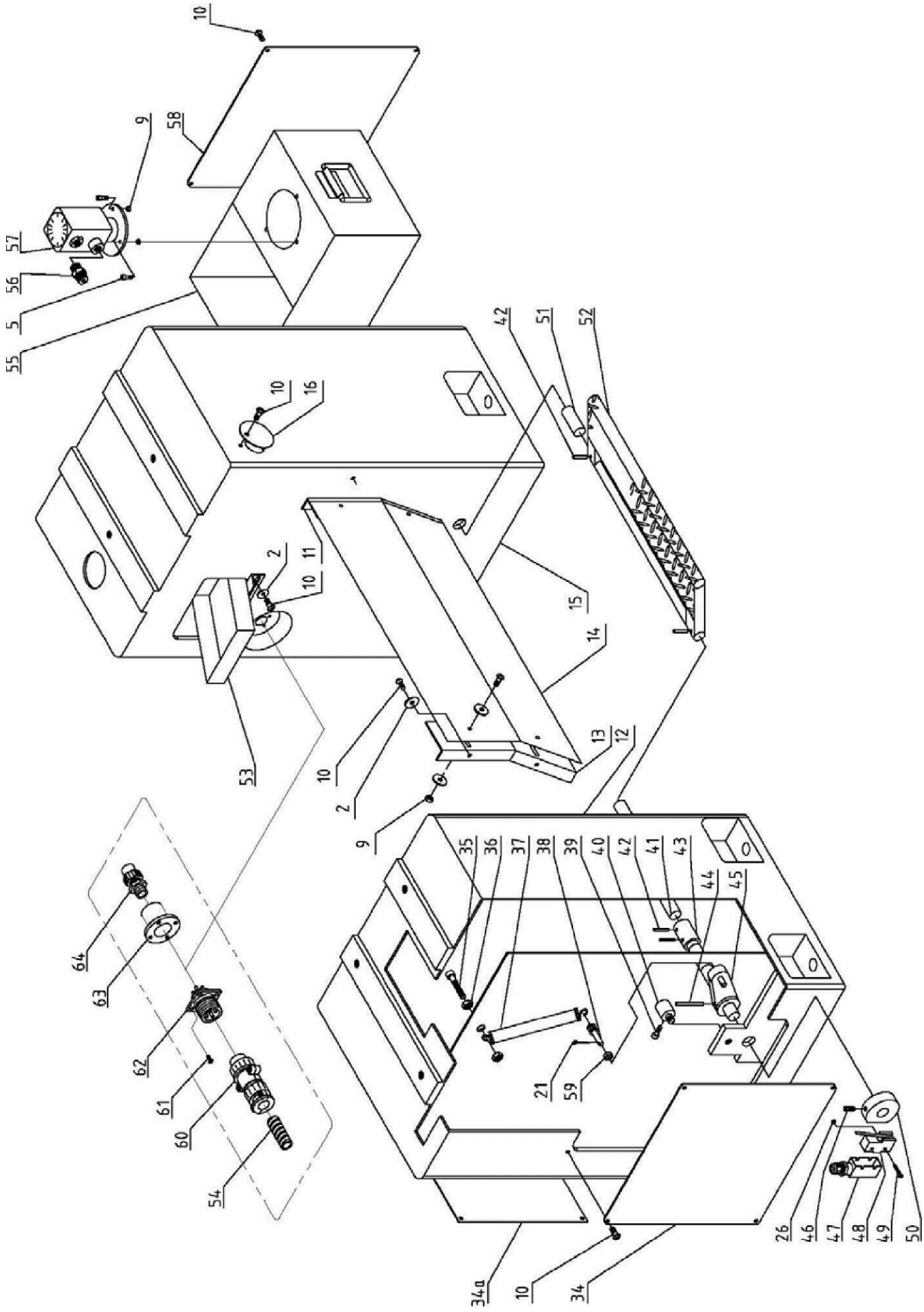
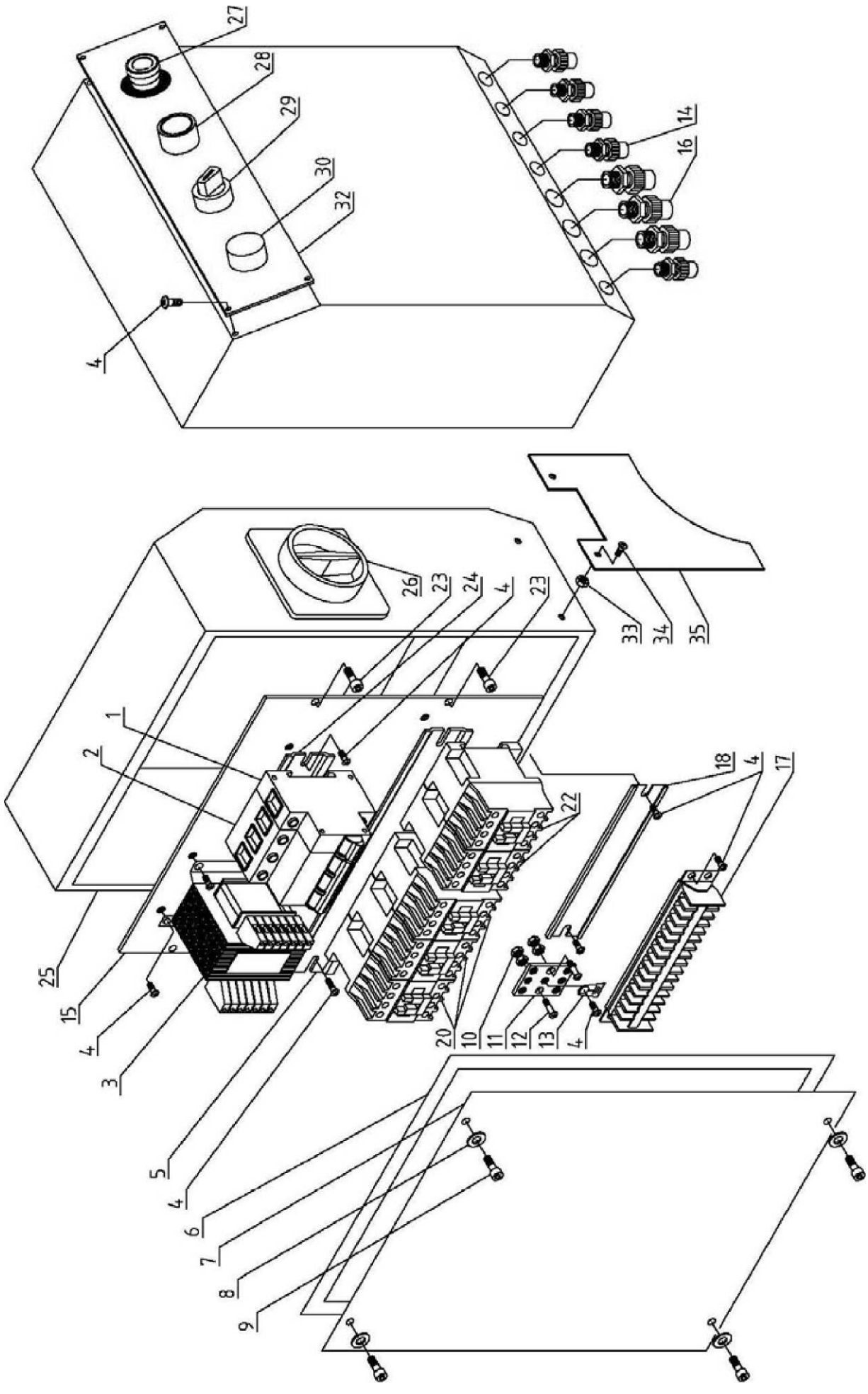


Index No	Part No	Description	Size	Qty
1	D330A-14205A-1	Chip guard		1
2	GB/T97.1-6	Washer	6	16
3	GB/T70-M6X10	Hex Socket Cap Screw	M6X10	4
4	D330A-14203A-1	Oil pan		1
5	GB/T70-M6X20	Hex Socket Cap Screw	M6X20	5
6	D330A-71206-2	Bracket		1
7	GB/T70-M5X15	Hex Socket Cap Screw	M5X15	4
8		Working lamp		1
9	GB/T6175-M6	Nut	M6	6
10	GB/T818-M6X10	Screw	M6X10	26
11	D330B-14206-1	Right bracket		1
12	D330A-14201A	Left cabinet		1
13	D330B-14206	Left bracket		1
14	D330A-14207-1	Back plate		1
15	D330A-14202A	Right cabinet		1
16	D330D-14208B	Cover		4
17	GB/T70-M4X6	Hex Socket Cap Screw	M4X6	1
18		Bracket		1
19	D330A-92202	Collar		1
20		Liquid nozzle		1
21		Pin	3X16	1
25	D330A-14204A-1	Oil pan		1
26	GB/T6175-M4	Nut	M4	6
27	GB/T97.1-4	Washer	4	4
28		Bracket		2
29	GB/T818-M4X10	Screw	M4X10	4
30		Shaft		1
34	D330A-14209A	Cover		1
34a	D330A-14210A	Cover		1
35	GB/T70-M10X30	Hex Socket Cap Screw	M10X30	1
36	GB/T6175-M10	Nut	M10	2
37	D330A-11237	Drawspring		1
38	D330A-11236	Pin		1
39	GB/T70-M6X40	Hex Socket Cap Screw	M6X40	1
40	D330A-11242	Shaft		1
41	D330B-14215-1	Shaft		1
42	GB/T879-5X28	Pin	5X28	4
43	D330A-11238-3	Washer		1
44	GB/T879-5X40	Pin	5X40	1
45	D330A-11235	Rocker		1

Index No	Part No	Description	Size	Qty
46	GB/T78-M6X12	Screw	M6X12	1
47		Cover		1
48		Switch	YBLXW-5/11N1	1
49	GB/T818-M4X40	Screw	M4X40	2
50	D330DV-11210	Brake dollop		1
51	D330B-14216	Shaft		1
52	D330A-14212-1	Brake pedal		1
53	D330D-14213B	Funnel		1
54		Screw Lose		2
55	D330B-14401	Water tank		1
56	D330A-92203	Connecting		1
57		Pump		1
58	D330B-14211A	Cover		1
59	D330DV-11211	Washer		1
60		Aviation Pluy	P20K6Q	2
61	GB/T818-M3X10	Screw	M3X10	8
62		Socket	P20K6Q	2
63	D330A-92205	Connecting		2
64		Locker Connecting	M16X1.5	2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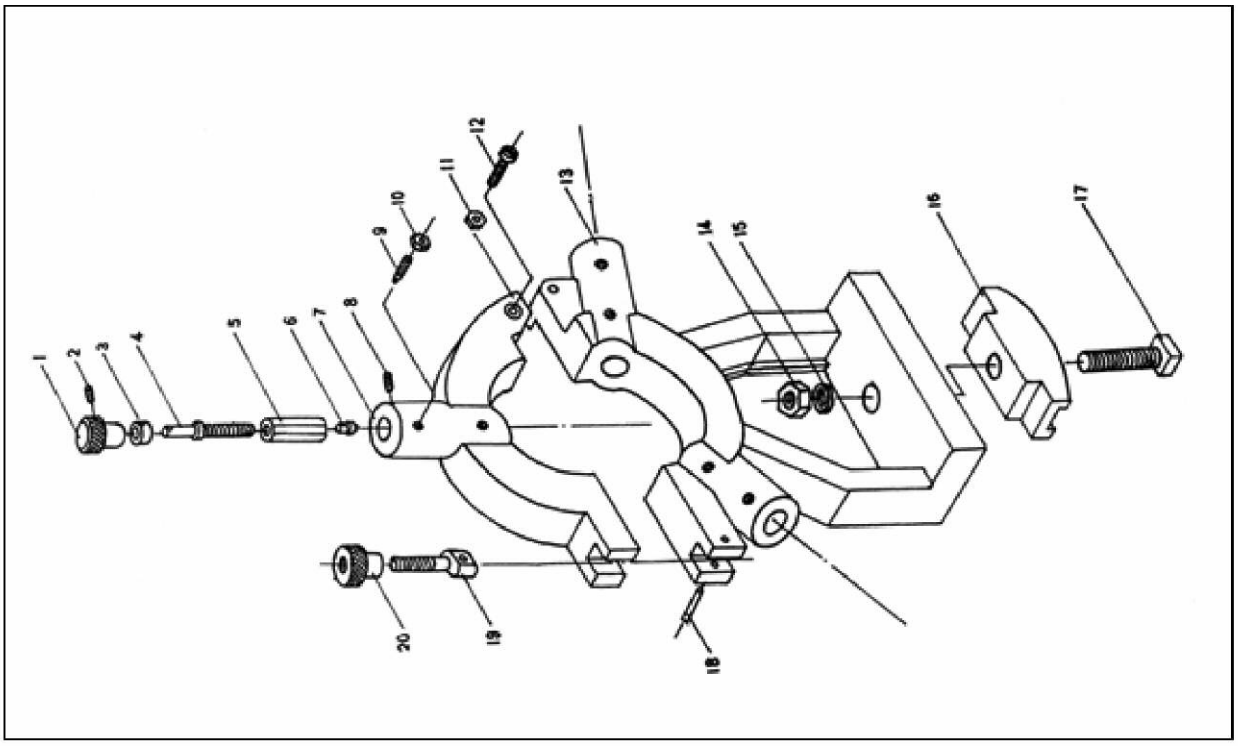
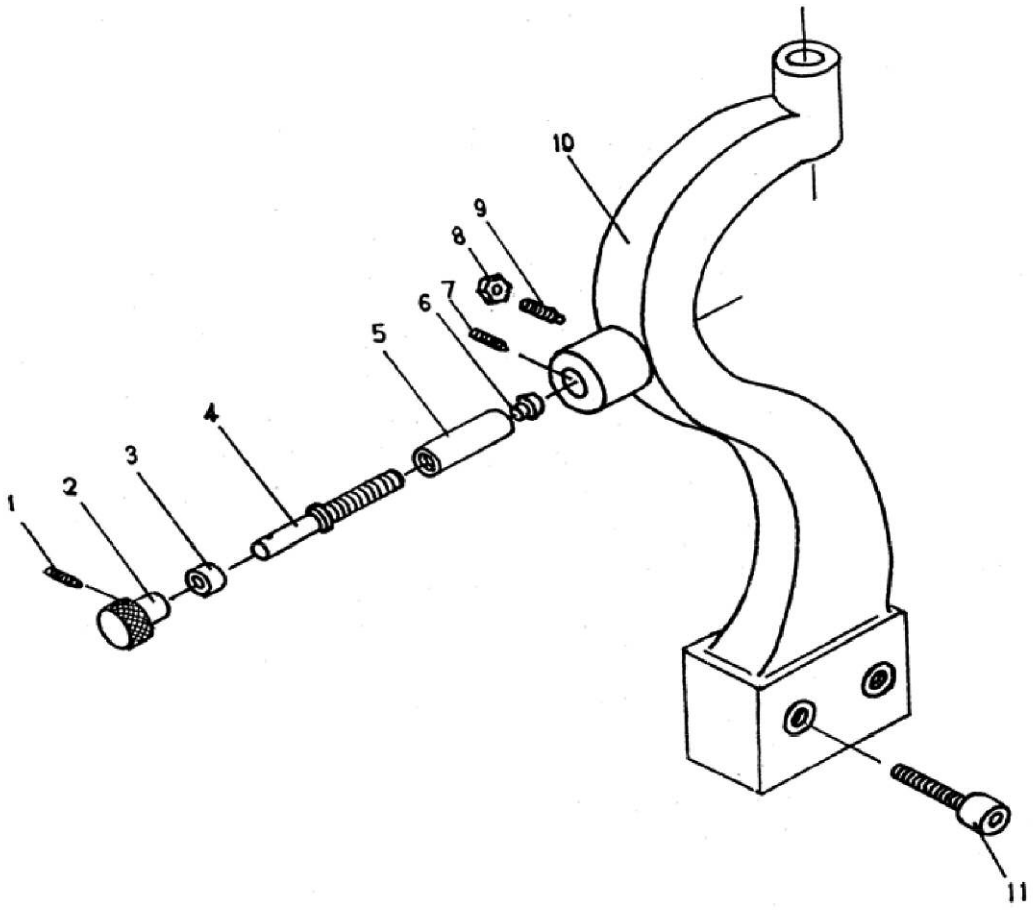
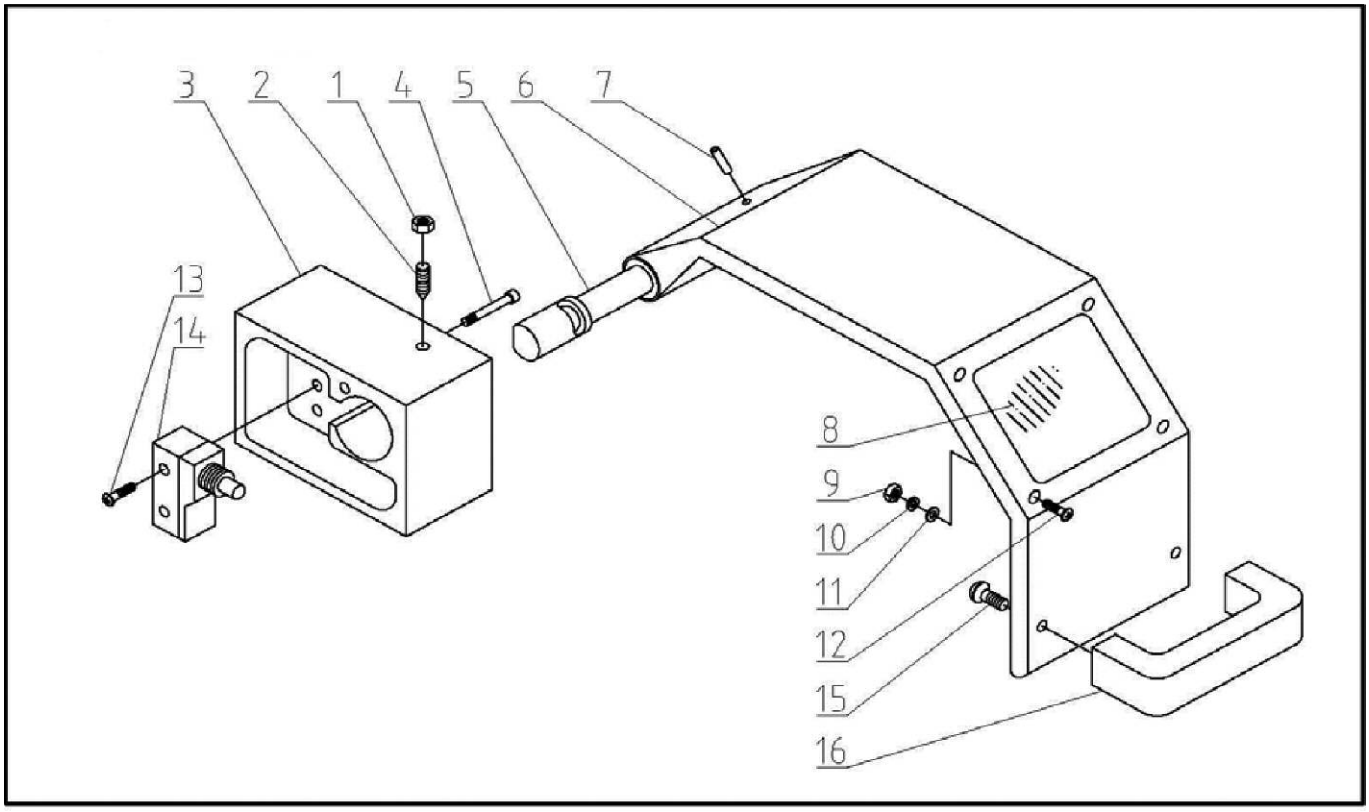
Index No	Part No	Description	Size	Qty
1		Protective circuit breaker	DZ47-63C3 1P	1
2		Protective circuit breaker	DZ47-63C6 3P	1
3		Transformer	JBK5-100VA-TH	1
4	GB/T818-M4X6	Screw	M4X6	19
5		Fixing Rail Clip		1
6		Rubber Cushing		4
7	D330A-14102	Cover		1
8	GB97.1-4	Washer	4	4
9	GB/T70- M4×10	Hex Socket Cap Screw	M4×10	4
10	GB6170- M5	Nut	M5	4
11	D330A-71401	Sheet Copper		1
12	GB818-M4X12	Screw	M4X12	2
13		Earth Sign Plate		1
14		Locker Connecting	M16X1.5	5
15	D330A-14103	Base		1
16		Locker Connecting	M20X1.5	3
17		Junction Box		1
18		Fixing Rail Clip		1
20		AC Contactor	CJX2 0901-24V	3
22		Contactor Relay	JZC4-40-24V	2
23	GB/T70- M5X12	Hex Socket Cap Screw	M5X12	4
24		Fixing Rail Clip		1
25	D330A-14101A	Electric Box		1
26		Power Switch	LW26-20	1
27		Knob	XB2-BS545	1
28		Fast-Stop Knob	LAY5-22D/23	1
29		Button switch	LAY3-11/2	1
30		Indication Light	AD62-22D/S 23/24V	1
32		Plate		1
33	GB6170- M4	Nut	M4	2
34	GB/T818-M4X12	Screw	M4X12	2
35	D330B-14220A	CoVer		1



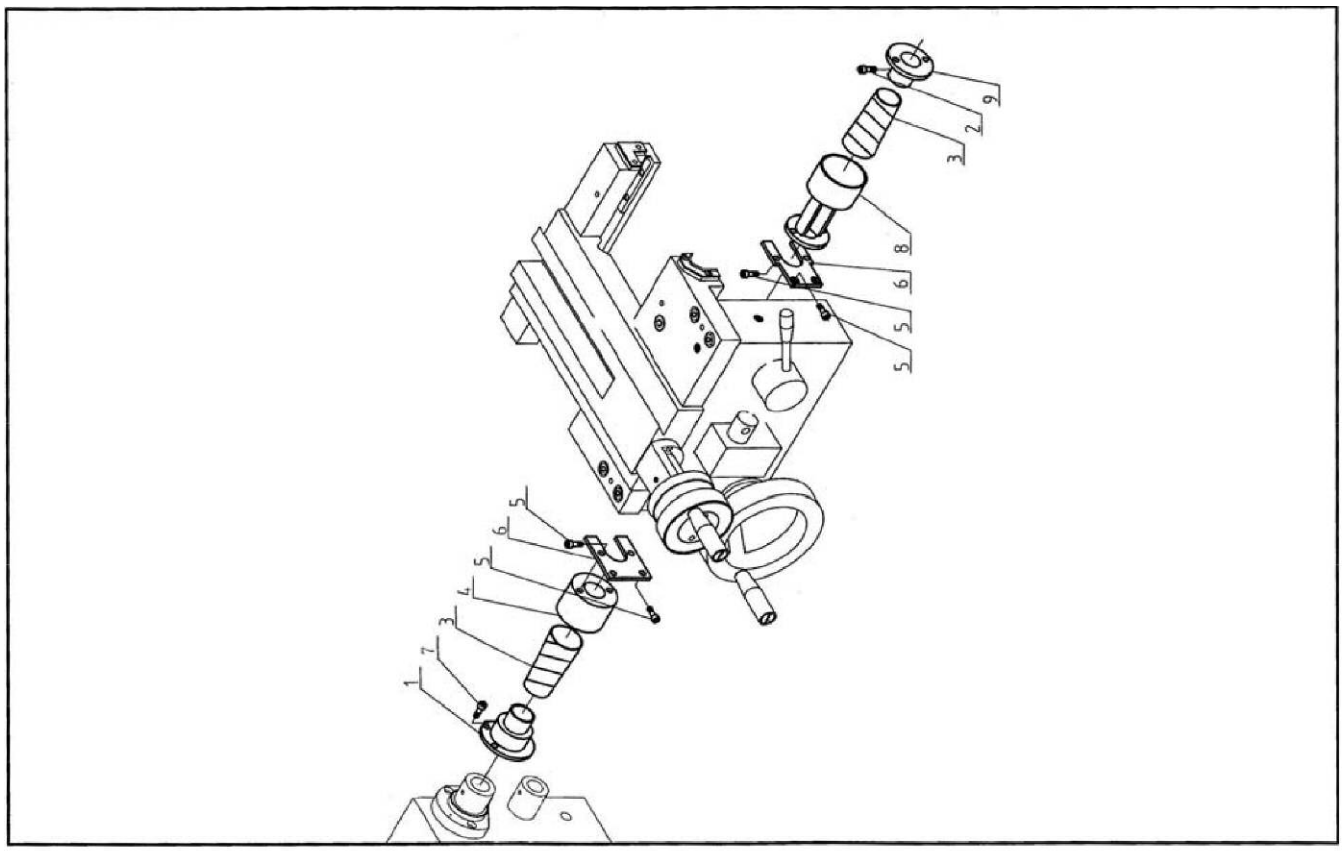
Index No	Part No	Description	Size	Qty
1	D330A-8205	Knob		3
2	GB/T78-M6X8	Screw	M6X8	3
3	D330A-8207	Collar		3
4	D330A-8206	Pressing Lever		3
5	D330A-8208	Pressing Collar		3
6	D330A-8209	Pressing Base		3
7	D330A-8202	Upper Body		1
8	GB/T78-M6X10	Screw	M6X10	3
9	GB/T79-M6×16	Screw	M6×16	3
10	GB/T6175-M6	Nut	M6	3
11	GB/T6175-M6	Nut	M6	1
12	GB/T65-M6×25	Screw	M6×25	1
13	D330A-8201	Base Body		1
14	GB/T6175-M12	Nut	M12	1
15	GB/T97.1-12	Washer	12	1
16	D330A-8210	Pressing Plate		1
17	GB/T821-M12×60	Square Ad Bolt	M12×60	1
18	GB/T879-4×25	Pin	4×25	1
19	D330A-8203	Locking lever		1
20	D330A-8204	Locking screw nut		1



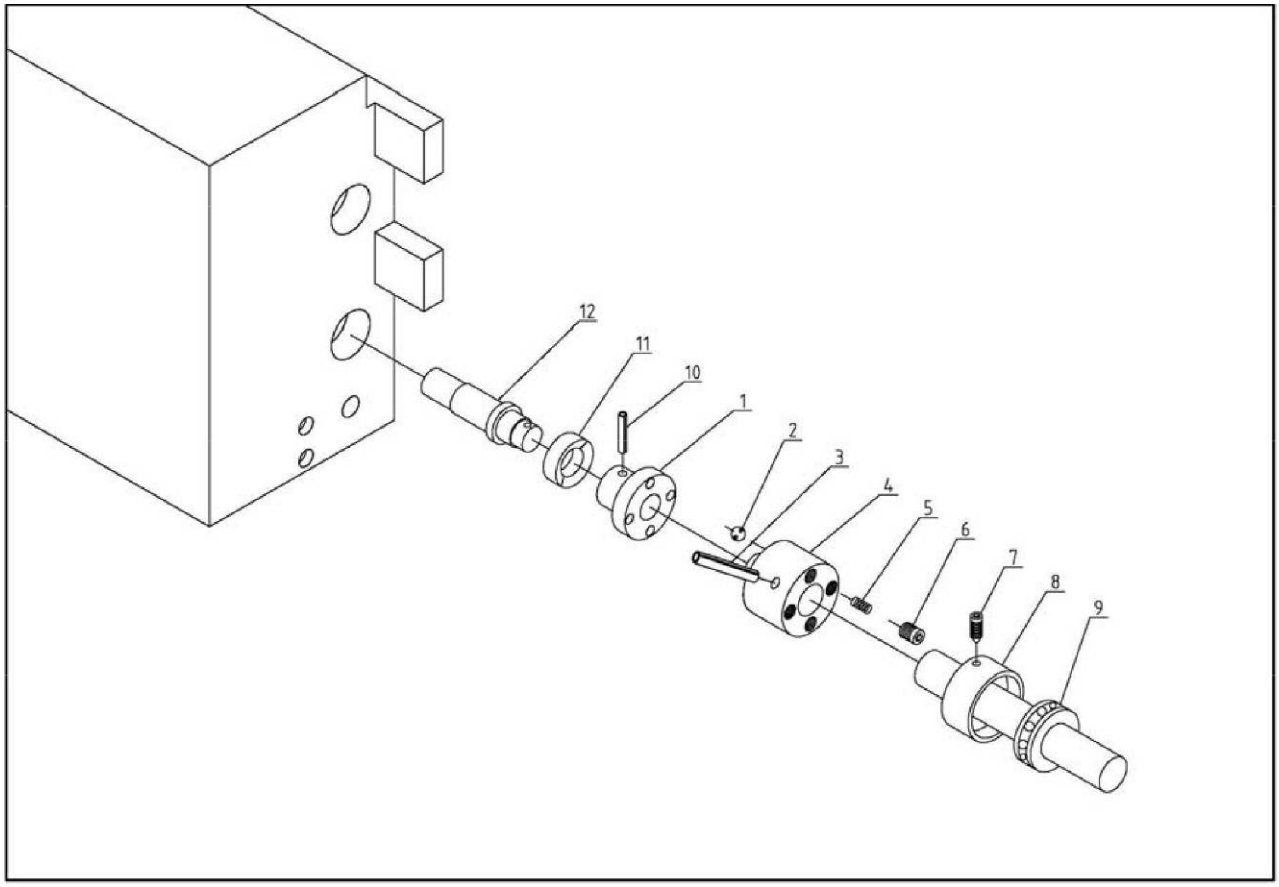
Index No	Part No	Description	Size	Qty
1	GB/T78-M6X6	Screw	M6X6	2
2	D330A-8205	Knob		2
3	D330A-8207	Collar		2
4	D330A-8304	Pressing Lever		2
5	D330A-8303	Pressing Collar		2
6	D330A-8209	Pressing Base		2
7	GB/T78-M6X10	Screw	M6X10	2
8	GB/T6175-M6	Nut	M6	2
9	GB/T79-M6×16	Screw	M6×16	2
10	D330A-8301	Body		1
11	GB/T70-M8×40	Hex Socket Cap Screw	M8×40	2



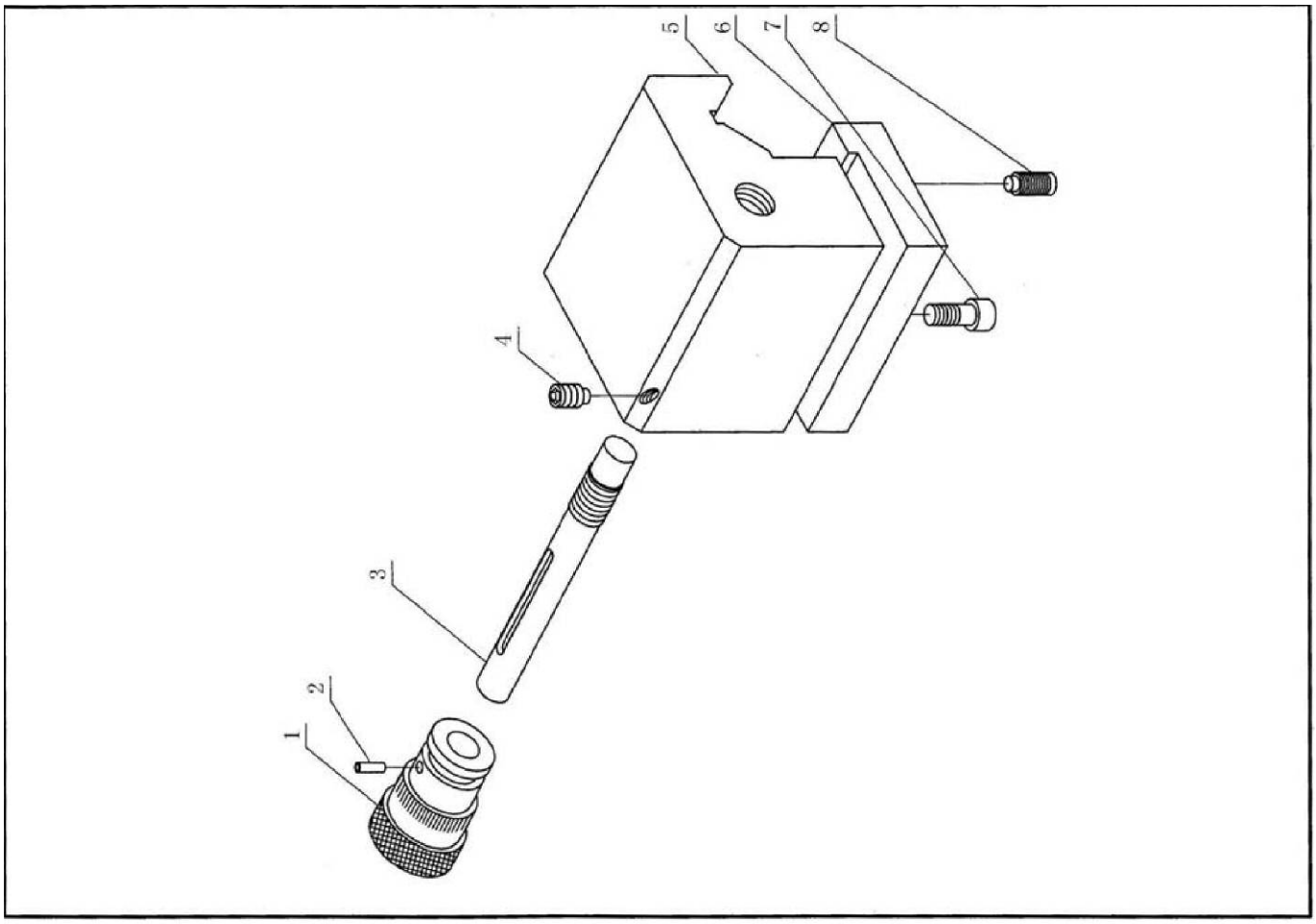
Index No	Part No	Description	Size	Qty
1	GB/T6170-M6	Nut	M6	1
2	GB/T79-M6 ×16	Screw	M6 ×16	1
3	D330A-71101	Switch box		1
4	GB/T70-M6× 45	Hex Socket Cap Screw	M6× 45	2
5	D330A-71203	Shaft		1
6	D330A-71204A	Protecting Cover		1
7	GB/T879-4X25	Pin	4X25	1
8	D330A-71402	Cover		1
9	GB/T6175-M3	Nut	M3	4
10	GB/T93-3	Washer		4
11	GB/T97.1-3	Washer	3	4
12	GB/T818-M3X12	Screw	M3X12	4
13	GB/T818-M4X25	Screw	M4X25	2
14		Switch	LXW5-11M	1
15	GB/T818-M6X8	Screw	M6X8	2
16		Handle		1



Index No	Part No	Description	Size	Qty
1	D330A-1030	Bracket		1
2	GB/T70-M5×10	Hex Socket Cap Screw	M5×10	2
3	D330A-F7001	Spring cover		2
4	D330A-1034	Left bracket		1
5	GB/T70-M6×12	Hex Socket Cap Screw	M6×12	8
6	D330A-1033	Bracket		2
7	GB/T70-M4×10	Hex Socket Cap Screw	M4×10	2
8	D330B-1029G	Bracket		1
9	D330A-1031	Bracket		1



Index No	Part No	Description	Size	Qty
1	D330A-3013S/01A	Clutch		1
2	GB/T308-6	Steel ball	6	4
3	GB/T879-4X42	Pin	4X42	1
4	D330A-3020D-1	Clutch		1
5	GB/T1358-6X1X25	Spring	6X1X25	4
6	GB/T77-M8X8	Screw	M8X8	4
7	GB/T78-M6X10	Screw	M6X10	1
8	D330A-CS004	Cover		1
9	GB/T301-51104	Bearing		1
10	GB/T879-5X25	Pin	5X25	1
11	GB/T9877.1-18X30X10	Oil seal	18X30X10	1
12	CQ6230-3013D	Shaft		1



Index No	Part No	Description	Size	Qty
1	D330A-DC003	Index ring		1
2	GB/T879-3X6	Pin	3X6	1
3	D330A-DC004	Shaft		1
4	GB/T79-M6X10	Screw	M6X10	1
5	D330A-DC001	Casting body		1
6	D330A-DC002	Plate		1
7	GB/T70-M6X10	Hex Socket Cap Screw	M6X10	2
8	GB/T79-M5X12	Screw	M5X12	2

13. Declaration of conformity

13.1 Standard 165 D

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bernardo@pwa.at www.bernardo.at

EG - KONFORMITÄTSERKLÄRUNG

Declaration of Conformity

nach

EG-Maschinenrichtlinie 2006/42/EG, Anhang II Teil 1A

according to

Directive 2006/42/EC, Annex II Part 1 A

Hiermit erklären wir, dass die nachfolgend bezeichnete Maschinen aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung sämtlichen, grundlegenden Sicherheits- und Gesundheitsanforderungen folgender EG-Richtlinien entsprechen: 2006/42/EG, 2006/95/EG und 2004/108/EG. Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.
Hereby we declare that the following machines meet all essential health and safety requirements of the following EC Directives: 2006/42/EC, 2006/95/EC, 2004/108/EC. Any by us unauthorized changes of the machine cause losing of the declaration validity.

Die Technische Dokumentation wird verwaltet von: *The technical documentation is managed by:*	PWA HandelsgmbH Nebingerstraße A-4020 Linz
Bezeichnung der Maschine: *Product:*	Leit- u. Zugspindeldrehmaschine *Precision lathe*
Maschinentype/typen: *Type/Types:*	Standard 165 D
Baujahr: *Year of manufacture:*	ab Jänner 2015
Angewandte harmonisierte Normen: *Applied harmonized European standards:*	EN ISO 12100: 2013 EN 60204-1: 2009, AC2 2011 EN ISO 13850: 2008 EN ISO 23125: 2012
Ort / Datum:	Linz, 07.01.2015
	PWA HandelsgmbH **Nebingerstraße 7a, A-4020 Linz**
Name und Funktion des zu Unterzeichnenden: *Name and Function of the Signatory:*	Bernhard Pindeus, Geschäftsführer *Bernhard Pindeus, Manager*

13.2 Standard 165 TOP

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EG - KONFORMITÄTSERKLÄRUNG

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