Operating Instructions

Lathes

CNC lathes

With prismatic cast iron bed

D6000	D6000-C	CC-D6000
D6000 hs	D6000-C hs	CC-D6000 hs

WABECO

MASCHINENMANUFAKTUR seit 1885

Please read before putting into operation for the first time!

Every person that operates the machine, maintains or repairs it, must have read the operating instructions, and in particular, the safety notes prior to putting the machine into operation. Please store these documents for subsequent use.

Original version in German/translation in English
Status at 03/2021

Dear Customer!

With the purchase of the **WABECO machine** you have decided in favour of a quality tool. This machine has been manufactured with the greatest of care and subject to precise quality controls.

These operating instructions are designed to help you to use your new machine safely and correctly. For this reason, we ask you to read the appropriate notes through attentively and to take care to observe them.

After unpacking the tool, check whether any transportation damages have occurred. Complaints, whatever their nature, should be communicated immediately. Subsequent claims **cannot** be recognised.

For all queries and replacement part orders, please **always specify the machine number** (see type plate).

Disposing of the machine

The transportation and protective packaging is made of the following materials:

- Corrugated card
- Polystyrene without Freon
- Polyethylene foil
- Timber as single-use pallet (untreated)
- Euro pallet (multiple use packaging)

If you no longer need the items, or you do not want to reuse them, dispose of these items at the officially recognised recycling points.

The machine is manufactured in such a way that 98% of the used materials that can be recycled, for example, steel, cast iron, aluminum and only 2% are chemical materials, e.g. cable sleeves of electrical cables, PCBs.

If you have any difficulties in disposing of these parts properly, we would be happy to help: with prior agreement we will take back the machine in full and dispose of it. You must, however, cover the costs of sending it to us.

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Declaration of conformity

We hereby declare, in the name of the manufacturer

Walter Blombach GmbH

Werkzeug- und Maschinenfabrik
with headquarters in Remscheid and Neuerburg

D-42871 Remscheid	Postfach 12 01 61	Telephone: (02191) 597-0	Fax: (02191) 597-42
D-54673 Neuerburg	WABECO Str. 1-10	Telephone: (06564) 9697-0	Fax: (06564) 9697-25

that the following named

Universal lathe

Type:

D6000 – D6000 hs

in the serial version, meets the following relevant regulations

- **EU Machine Directive 2006/42 EG**
- **EMC Directive 2014/30/EU**
- **EU Low Voltage Directive 2014/35/EU**

In order to fulfill/implement the requirements of the directives named above, the already published and applicable standards were drawn upon:

EN ISO 12100:2010
DIN EN 60204-1:2007
DIN EN ISO 23125:2015

Proxy for the compilation of the technical documentation is the operational head of the above named manufacturer, Mr Christoph Schneider.

D-54673 Neuerburg 2021

Place and date of issue

Operational head Christoph Schneider

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that the following named

Universal lathe

Type:

D6000-C – D6000-C hs

in the serial version, meets the following relevant regulations

- **EU Machine Directive 2006/42 EG**
- **EMC Directive 2014/30/EU**
- **EU Low Voltage Directive 2014/35/EU**

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that the following named

Universal lathe

Type:

CC-D6000 – CC-D6000 hs

in the serial version, meets the following relevant regulations

- **EU Machine Directive 2006/42 EG**
- **EMC Directive 2014/30/EU**
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1. Important safety notes

1.1 Intended use

The lathes described in these operating instructions are designed for the processing of metal, plastic and timber only.

To ensure safe operation of the lathes, the regulations set out in the chapter: „Safety regulations“ must be observed.

1.2 Improper and incorrect use

The lathes described in these operating instructions have been developed and manufactured for the purpose named above. Walter Blombach GmbH accepts no responsibility for property damage and personal injury caused as a result of not intended and incorrect use of the lathes.

1.3 Modifications to the machine

For reasons of safety, it is forbidden for the user to make modifications of any type to the lathe.

Walter Blombach GmbH accepts no responsibility for property damage and personal injury caused as a result of any modifications to the lathe by the user that have not expressly been authorised by the company.

1.4 Safety regulations for proper use

The machine may represent a source of danger if it is not used correctly. For this reason, it is important that the following safety regulations are read attentively and observed carefully.

Every person that operates the machine, maintains or repairs it, must have read the operating instructions, and in particular, the safety notes prior to putting the machine into operation.

In order to fulfil these requirements, these operating instructions must accompany the machine throughout its entire lifetime and be available for research.

In the event that the machine changes owners, the operating instructions must thus be passed on to the new owner along with the machine

1. Important safety notes

1.4 Safety regulations for proper use

1. Only specially trained persons may operate the machine. The guarantee and warranty are voided if damages are caused by improper operation.
2. We remind you that no liability will be accepted for damages caused by not observing these operating instructions.
3. The operator of the machine is to ensure that at least one copy of the operating instructions is stored in the immediate vicinity of the machine and available to the people who work with the machine
4. The operator is to ensure that the safety and danger notifications on the machine are observed and that the signs are kept in a legible state.
5. Do not work without goggles.
6. Wear close fitting clothing and, if you have long hair, wear a hair net. Do not wear loose fitting or loose items (ties, shirt sleeves, jewellery etc.).
7. Gloves may not be worn.
8. In the event of an emission noise level as of 80 dB (A) at the workplace, ear defenders must be worn.
9. The machine may not operate without supervision.
10. Secure your machine in such a way that it cannot be switched on by children. Persons who have not been trained may not operate the machine.
11. Before using the machine, make sure it is in good working condition. Pay special attention to any damage to the grounded plug or the electrical connections. Never operate the machine with a defective, crushed or exposed cable.
12. Plug the grounded plug into a suitable socket for the machine. The cable for the machine may only be connected to a safety socket or a connection box. Have the safety socket or connection box checked by an electrical specialist before hand.
13. The safety socket or connection box must be close enough to the machine that the power cable is not under strain.
14. When carrying out maintenance and cleaning work, the machine must be switched off and the grounded plug pulled out.
15. Set-up work is only to be carried out with the machine switched off.
16. Do not reach into the operating machine.
17. Always switch the machine off when you are not using it.
18. Remain with the machine until it has come to a standstill.

1. Important safety notes

1.4 Safety regulations for proper use

19. Only have repairs carried out by a qualified specialist! Repair work may only be carried out by persons who are qualified for the relevant repairs and who are familiar with the appropriate health and safety requirements
20. Protect the machine from damp
21. Constantly check the machine for damages. Replace damaged parts only with original parts and have these replaced by a specialist. The guarantee and warranty is voided if accessories and replacement parts are use that are not designed for the machine.
22. To avoid insufficient lighting, we recommend setting up a light source that provides a value of at least 500 Lux at the tool‘s cutting edge.
23. Do not remove the generated shavings with your hand. Use the appropriate tools (hand-held sweeper, hook, brush).
24. Tools and workpieces may never be changed when the machine is running
25. Do not brake workpieces and bush using your hand or another object
26. Never leave the chuck key fitted (even when not in operation)
27. Pay attention to the spread of the lathe chuck.
28. The maximum revolution range specified on the lathe chuck may not be exceeded
29. The machine only operates when the chuck protection hood is folded over the lathe chuck. For safety reasons, it is not possible to switch the machine on when the chuck protection hood is up.
30. The generated shavings must be caught by the user with the help of a shaving protection device
31. Always keep the gear cover hood closed
32. The gear cover hood may only be opened by a trained person with a special key and when the grounded plug has been pulled out of the socket.
33. Turning steels must be firmly tensioned, at the correct height and as short as possible..
34. Do not measure at the rotating workpiece (risk of accident, measuring tools will be damaged)..
35. When working between the tips, check the locking lever of the tailstock for firm seating..
36. Despite the existing safety clutch, you should avoid reaching into the rotating hand wheel when the automatic feed is switched on
37. When working with the automatic feed, always pay attention to ensure that the tool slide does not come up against the lathe chuck or the tailstock
38. When wood turning use a lathe center point instead of the lathe chuck to carry the workpiece.

1. Important safety notes

1.5 Safety features

1.5.1 For all lathes

In order to enable you to work safely with our machines, we have incorporated the following safety mechanisms. These meet the relevant European safety requirements:

Chuck protection hood
The main spindle of the machine operates only with the chuck protection hood closed. For safety reasons, if the chuck protection hood is open, the machine cannot be switched on.

Gear cover hood
Always keep the gear cover hood closed. The gear cover hood may only be opened by a trained person with a special key and when the grounded plug has been pulled out of the socket.

ON/OFF switch with under-voltage trigger
The ON/OFF switch is fitted with an under-voltage trigger, thus, in the event of a power failure, the machine does not switch itself back on automatically. This prevents risks caused by the unexpected motion of the spindle.

Emergency off switch
The emergency off switch acts to quickly stop the machine.

Overload protection
The machine is fitted with an overload protection feature. This overload protection feature switches the main drive motor off automatically when the machine is overloaded. The machine can only then be switched on after a waiting period.

1.5.2 For lathes to be mounted to a CNC controller and CNC lathes

Machine safety cabin (optional)

In order for the machine to operate in CNC mode, the door to the machine **safety cabin must be closed**.

You can only work in CNC mode with the **doors closed**.

Work carried out in conventional mode is carried out with the door open. The mode switch must be switched to manual mode.

The main spindle can be switched on when the doors are closed or open.

Working in CNC mode without machine safety cabin may pose a serious risk to the machine operator and cause serious accidents.

1.5.3 For CNC lathes

Switch for operating modes (only for CNC machines)
The mode switch has 3 settings (CNC mode – Idle position – Manual mode) that can only be selecte with a key. After selecting the mode, the key can be removed in order to prevent a switching of the mode type by unauthorised persons.

1. Important safety notes

1.6 Explanations of the symbols

With a measured noise level of 80 dB (A) at the workplace the operator should wear Ear Protection.

Caution:
Always pull the power plug prior to any maintenance work!
Read the operating instructions prior to initial operation or maintenance work!

Caution:
Dangerous electric voltage!

2. Delivery and set up

The machine is packed with care at the factory.

The following should be checked after delivery:

1. Whether the packaging shows damages to be reported or
2. Whether the machine shows transportation damages to be reported If this is the case, we ask you to communicate this information immediately. Subsequent claims cannot be recognised.

The machine must be set up on a suitable, even and firm surface.

Suitable surfaces are, for example:

- A machine base cabinet (available optionally)
- A separate workbench with a level surface (spirit level) that is strong enough to carry the weight of the lathe without bending.
- A steel plate with a level surface (spirit level)

The machine must be screwed securely to the surface it is set up on. There are holes in the base of the machine that are designed for this purpose**. Good working results and low-vibration operation can only be ensured when the prerequisites for fixture as set out above are maintained.**

2. Delivery and set up

The place of set up should be selected in such a way that

- there is sufficient lighting.
- the electrical power supply with safety socket and earth are installed close enough to the machine that the power cable is not subject to any strain.
- the power cable should also be dimensioned in such a way that a multiple socket can be used, for example, to power a coolant unit.

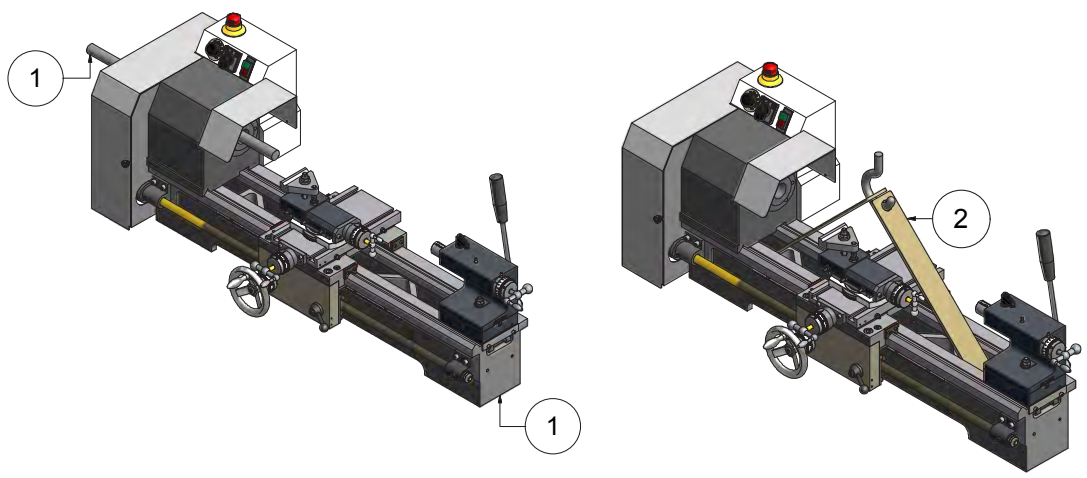
2.1 Transporting the machine

We recommend two people to lift the machine, using the positions shown (1).

To do this, a sufficiently dimensioned, at least Ø 20 mm steel rod is pushed through the main spindle. The machine should be carried and balanced by one person at the steel rod and by the other person, at the shown position on the opposite underside of the bed.

Due to the weight of the machine it is advisable to lift the machine by crane, if this is possible. To lift, wrap suitable lashing (2) as shown around the two outer struts of the ribbing of the machine bed

When lifting, pay attention to an ergonomic stance and sufficient safety!



In the delivered state, the machine feet have two transport straps attached. These secure the machine to the transportation pallet. They must be removed before setting the machine up.

3. Putting into operation

3.1 For all lathes

- Use a dry cloth to remove the corrosion protection that was applied to all exposed parts for transport.
- In the event of marine impregnation of exposed parts, it is recommended you spray them with oil, allow it to work, and then remove the impregnation with a dry cloth.
- Once set up properly (see the section on delivery and set up) connect the grounded plug directly to a safety socket and the 230 V 50/60 Hz (optional 110 V 60 Hz) mains power supply.
- Provision of sufficient coolant for the operation of a coolant unit (optional).
- Release the axis clamps and check the individual feed spindles for easy operation.
- Check all electronic control elements, for example, ON/OFF switch, emergency off switch, potentiometer, bush protection hood, etc. for functionality.

3.2 For CNC lathes

When putting CNC machines into operation for the first time, always read the start-up manual.

3.2.1 Setting up and connecting the control computer

When selecting a suitable control computer, pay attention to the system prerequisites of the control software. These are listed on the rear of the CD case sent with the machine.

Follow the instructions in the start manual of the software to install the control software on the computer. The start manual can be found in the CD case of the control software included with the machine.

In the next step, the software must be adapted to your machine. To do this, follow the instructions sent with the machine which detail the editing of the parameters.

When the software has been successfully installed on the control computer and all parameters have been adapted successfully, the control computer must be connected with the machine controller.

The machine controller communicates with the computer via the serial interface (COM port). In order to establish a connection between the machine controller and the computer, connect the end of the interface cable that is on the machine console to the COM port of the computer.

CAUTION:

The axis cable of the stepper motors and the serial interface cable may only be plugged or unplugged with the control switched off. Otherwise damages to the control, the machine or the control computer may occur!

4. Specifications regarding the machine

4.1 Identification of the model

The precise model designation of your machine can be found on the type plate attached to the machine.

4.2 D6000 – D6000 hs

4.2.1 Declaration of noise levels

Declaration of noise levels in accordance with DIN EN ISO 3744
Emission values in idle

	D6000	D6000 hs
Emission sound pressure level at the workplace		
at 50 %	= 73.1 dB (A	= 78.5 dB (A)
at 100 %	= 74.3 dB (A)	= 84.0 dB (A)
Sound power level		
at 50 %	= 82.5 dB (A)	= 88.1 dB (A)
at 100 %	= 84.8 dB (A)	= 92.9 dB (A)

At an emission sound pressure level from 80 dB (A) and above at the workplace ear protection is required.

4. Specifications regarding the machine

4.2 D6000 – D6000 hs

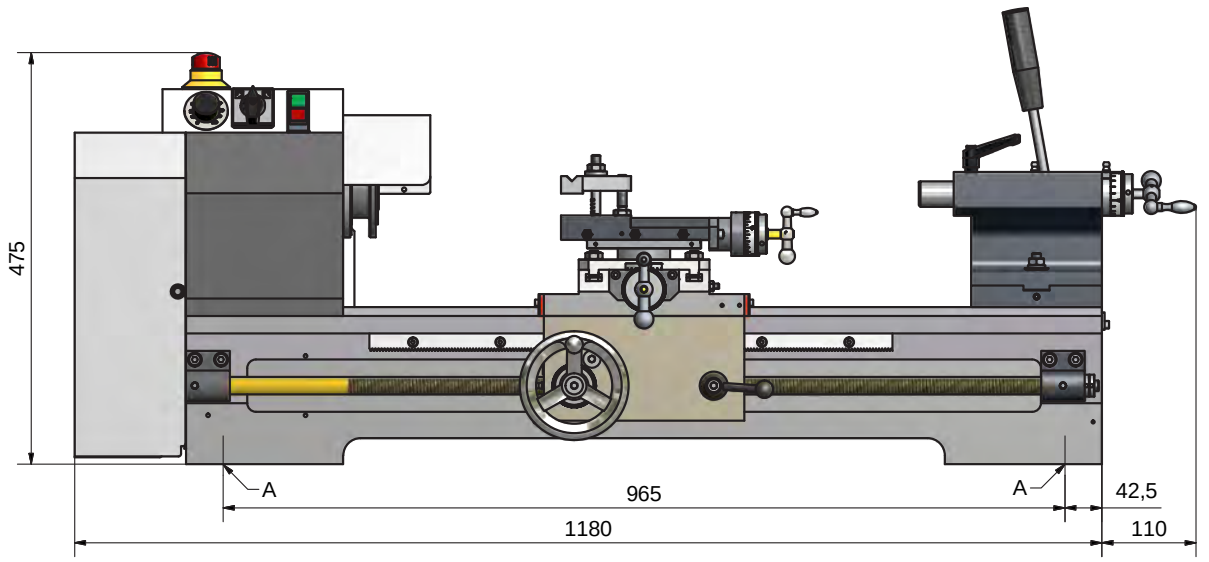
4.2.2 Technical data

	D6000	D6000 hs
Working range		
Center distance	600 mm	
Center height	135 mm	
Turning Ø above the guideways	270 mm	
Bed width	185 mm	
Main drive motor		
Nominal voltage	230 V	
Nominal frequency	50/60 Hz	
Nominal performance of the spindle motor	1.4 kW	2.5 kW
Spindle revolutions, infinite	30 - 2300 rpm	50 – 5000 rpm
Machine precision		
True running accuracy of spindle nose	0.005 mm	
Cylindrical turning to 100 mm cantilevered	0.01 mm	
Cylindrical turning with a finishing cut to 300 mm between the centers	0.015 mm	
Headstock		
Main spindle bore	Ø 20 mm	
Taper in main spindle	MT3	
Main spindle nose	according to DIN 6350	
Tool slide		
Travel of cross slide	140 mm	
Travel of longitudinal slide	60 mm	
Longitudinal slide can be swiveled through	360°	
Max. height of turning tools	20 mm	
Tailstock with quick adjustment		
Lateral adjustability of the tailstock upper part	± 10 mm	
Tailstock sleeve	with an internal MT2 morse taper	
Travel of tailstock sleeve	65 mm	
Scale ring read accuracy	0.1 mm	
Thread cutting		
Tumbler gear	for left- and right-hand thread	
2 automatic longitudinal feeds	0.085 and 0.16 mm/revolution	
Change gear set for thread cutting	metric 0.25 - 7.0 mm - inch 10 - 40 TPI	

4. Specifications regarding the machine

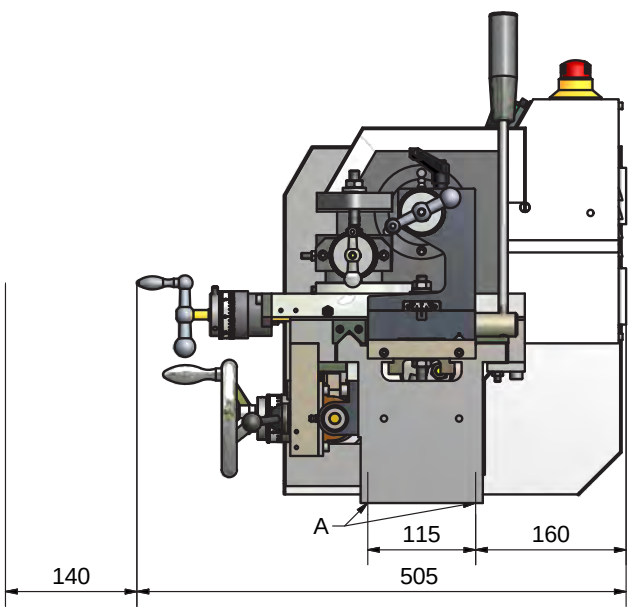
4.2 D6000 – D6000 hs

4.2.3 Dimensions of D6000 (1.4 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.2.4 Dimensions of D6000 (1.4 kW) with trapezoidal thread spindle side view

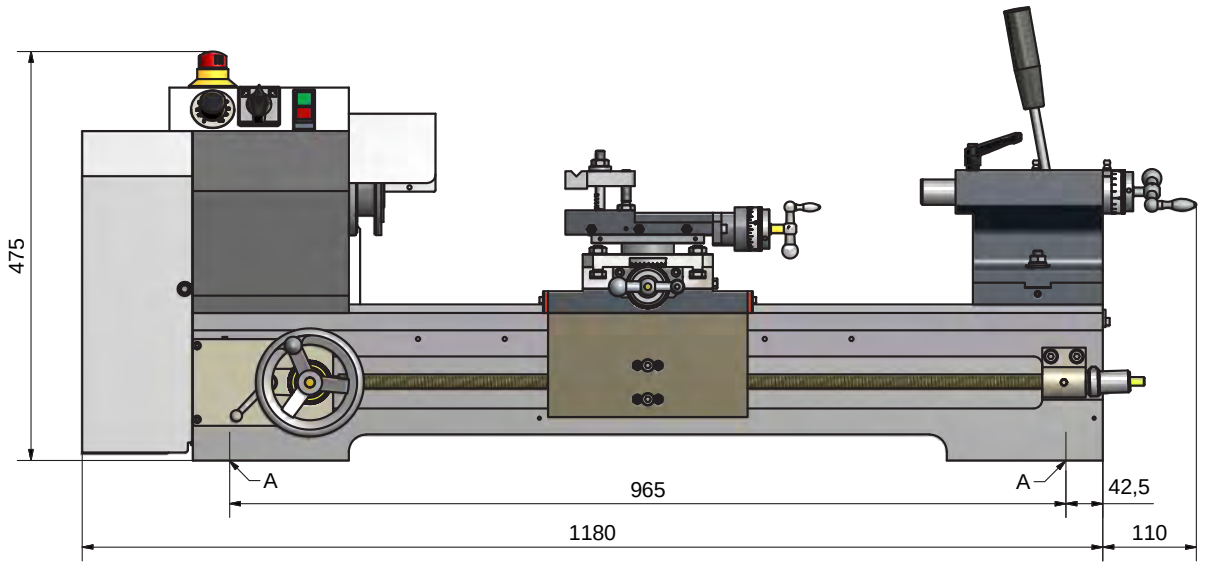


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

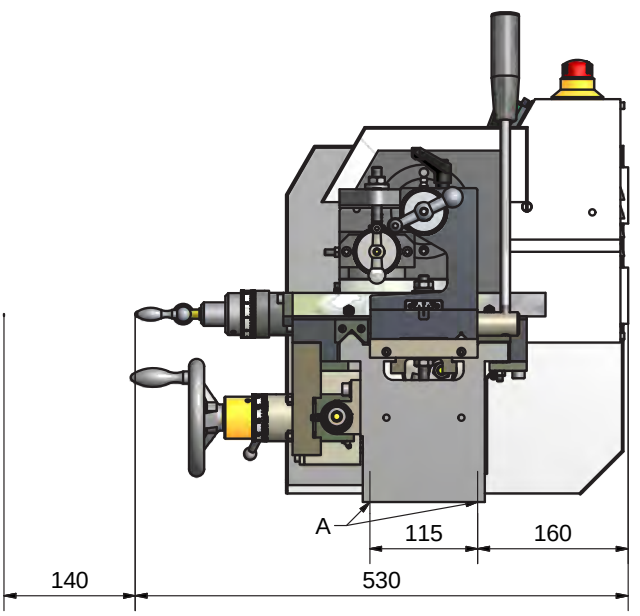
4.2 D6000 – D6000 hs

4.2.5 Dimensions of D6000 (1.4 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.2.6 Dimensions of D6000 (1.4 kW) with ball screws side view

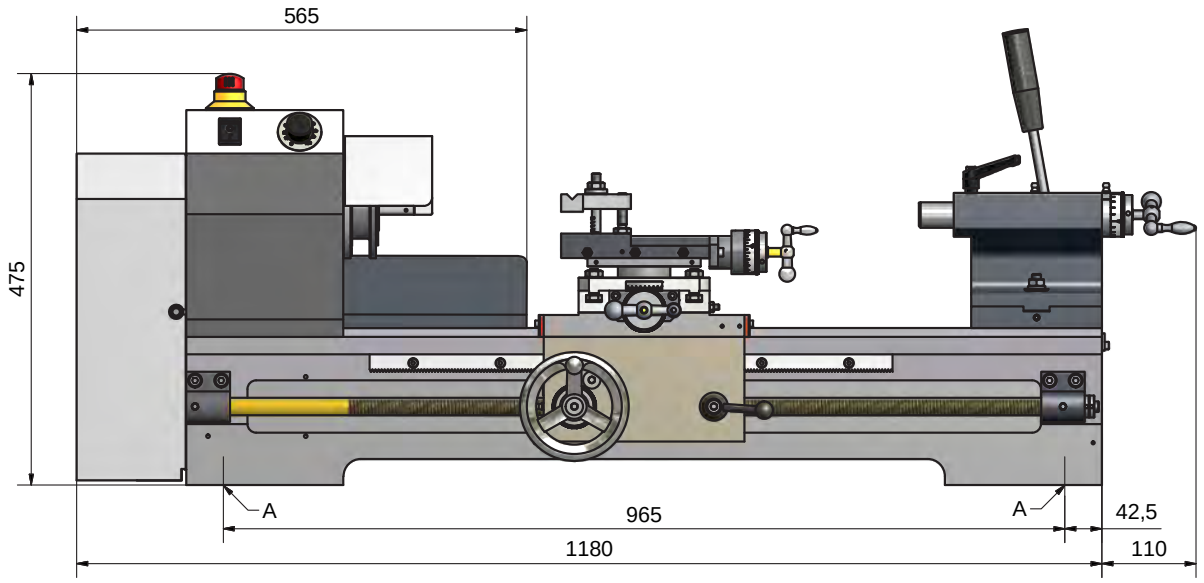


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

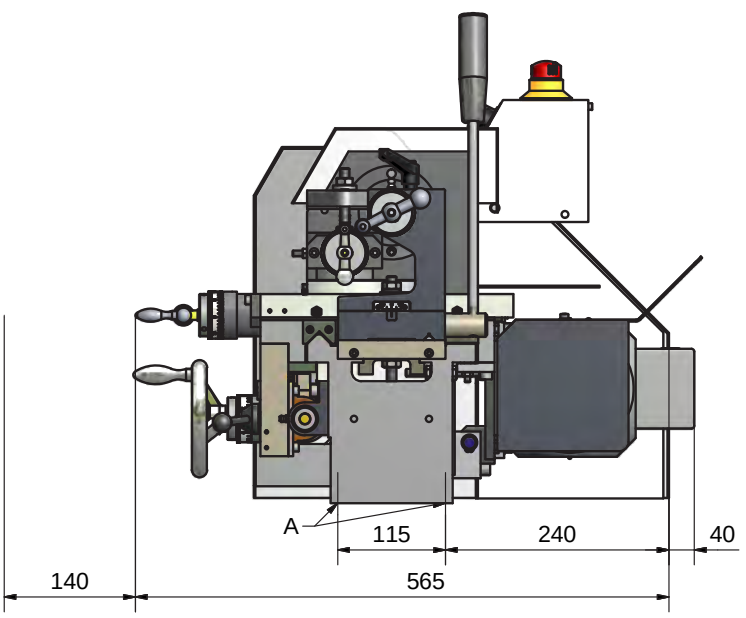
4.2 D6000 – D6000 hs

4.2.7 Dimensions of D6000 hs (2.5 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.2.8 Dimensions of D6000 hs (2.5 kW) with trapezoidal thread spindle side view

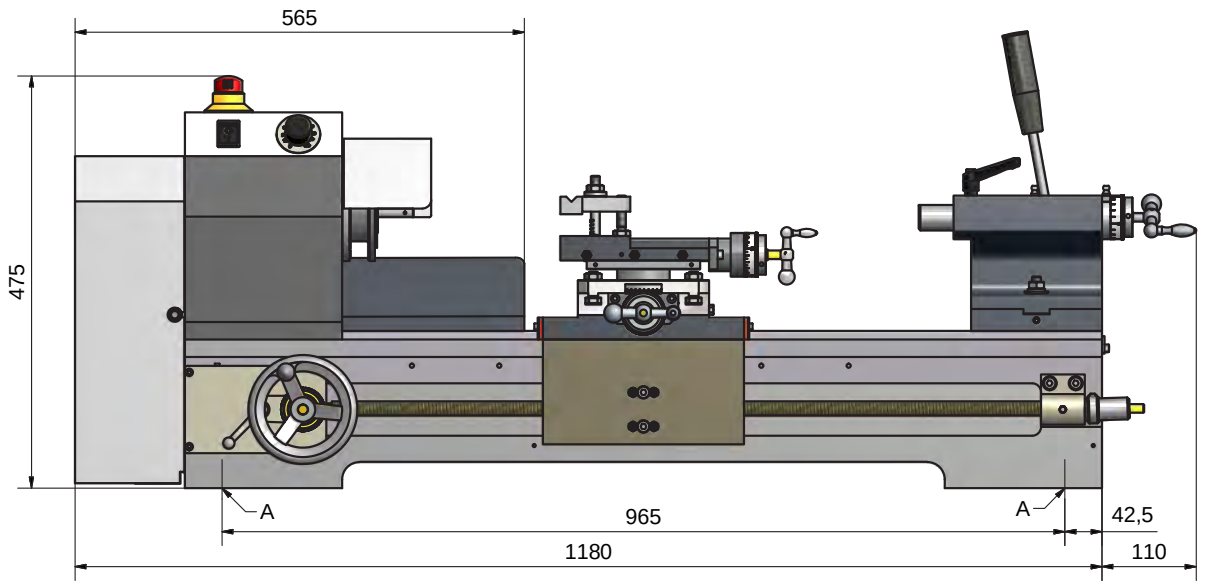


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

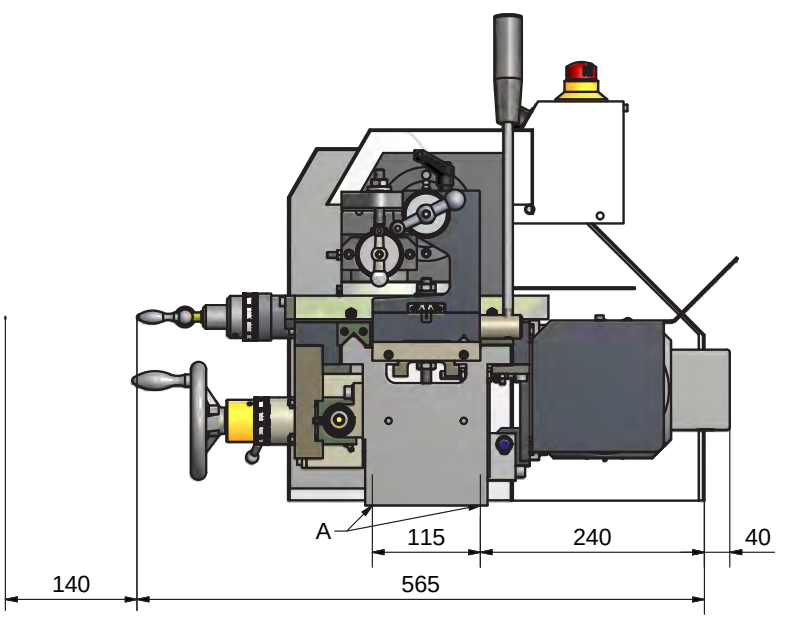
4.2 D6000 – D6000 hs

4.2.9 Dimensions of D6000 hs (2.5 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.2.10 Dimensions of D6000 (2.5 kW) with ball screws side view



A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

4.3 D6000-C – D6000-C hs

4.3.1 Declaration of noise levels

Declaration of noise levels in accordance with DIN EN ISO 3744
Emission values in idle

	D6000-C	D6000-C hs
Emission sound pressure level at the workplace		
at 50 %	= 73.1 dB (A	= 78.5 dB (A)
at 100 %	= 74.3 dB (A)	= 84.0 dB (A)
Sound power level		
at 50 %	= 82.5 dB (A)	= 88.1 dB (A)
at 100 %	= 84.8 dB (A)	= 92.9 dB (A)

At an emission sound pressure level from 80 dB (A) and above at the workplace ear protection is required.

4. Specifications regarding the machine

4.3 D6000-C – D6000-C hs

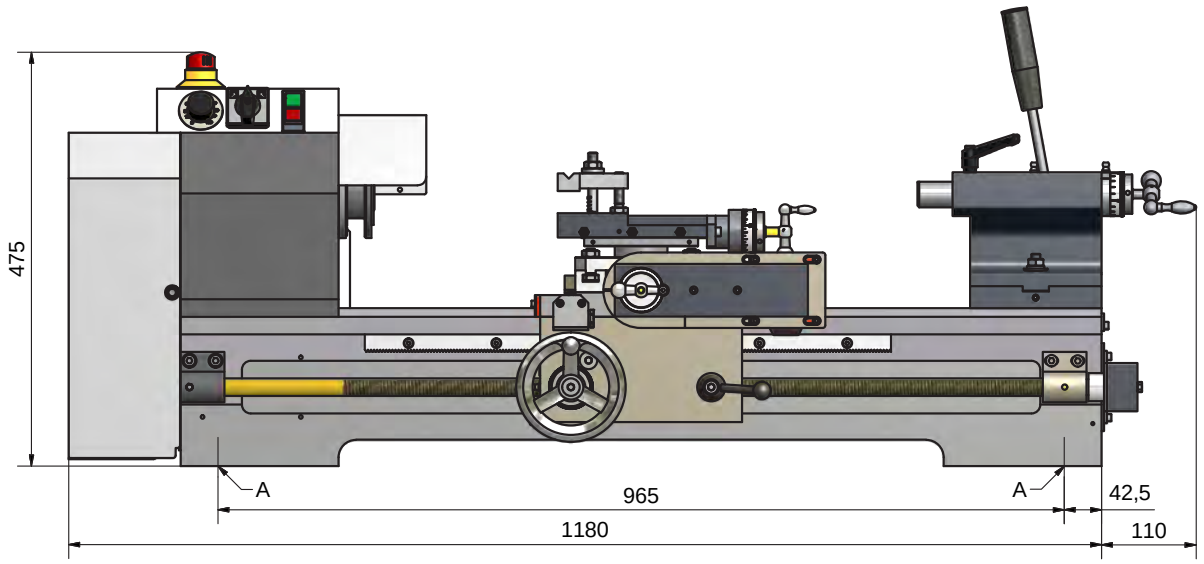
4.3.2 Technical data

	D6000-C	D6000-C hs
Working range		
Center distance	600 mm	
Center height	135 mm	
Turning Ø above the guideways	270 mm	
Bed width	185 mm	
Main drive motor		
Nominal voltage	230 V	
Nominal frequency	50/60 Hz	
Nominal performance of the spindle motor	1.4 kW	2.5 kW
Spindle revolutions, infinite	30 - 2300 rpm	50 – 5000 rpm
Machine precision		
True running accuracy of spindle nose	0.005 mm	
Cylindrical turning to 100 mm cantilevered	0.01 mm	
Cylindrical turning with a finishing cut to 300 mm between the centers	0.015 mm	
Headstock		
Main spindle bore	Ø 20 mm	
Taper in main spindle	MT3	
Main spindle nose	according to DIN 6350	
Tool slide		
Travel of cross slide	140 mm	
Travel of longitudinal slide	60 mm	
Longitudinal slide can be swiveled through	360°	
Max. height of turning tools	20 mm	
Tailstock with quick adjustment		
Lateral adjustability of the tailstock upper part	± 10 mm	
Tailstock sleeve	with an internal MT2 morse taper	
Travel of tailstock sleeve	65 mm	
Scale ring read accuracy	0.1 mm	
Thread cutting		
Tumbler gear	for left- and right-hand thread	
2 automatic longitudinal feeds	0.085 and 0.16 mm/revolution	
Change gear set for thread cutting	metric 0.25 - 7.0 mm - inch 10 - 40 TPI	

4. Specifications regarding the machine

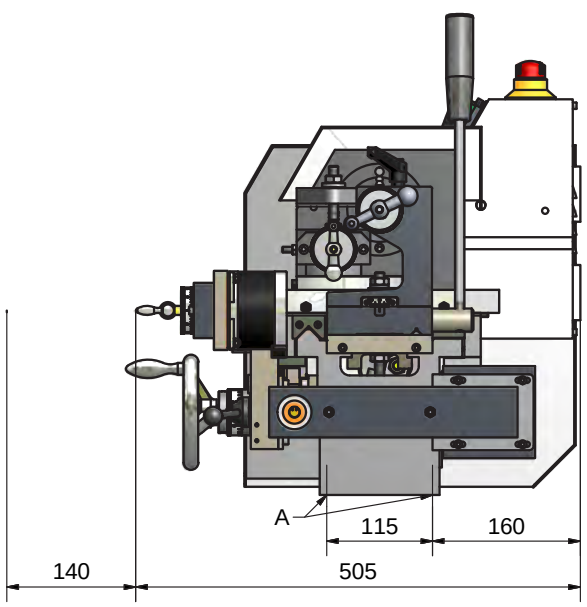
4.3 D6000-C – D6000-C hs

4.3.3 Dimensions of D6000-C (1.4 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.3.4 Dimensions of D6000-C (1.4 kW) with trapezoidal thread spindle front view

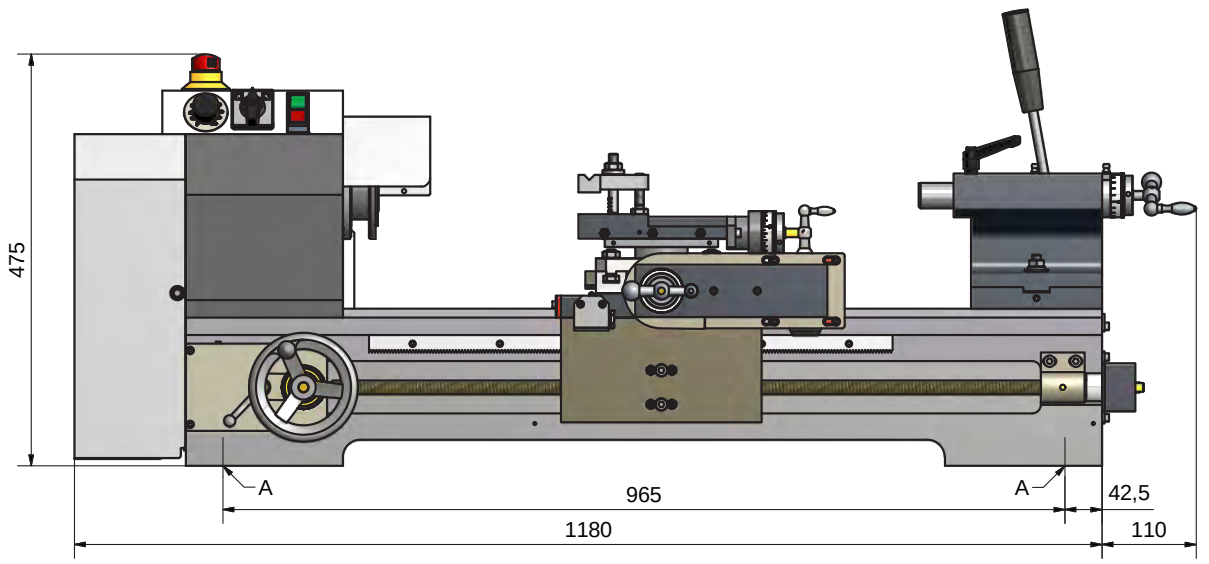


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

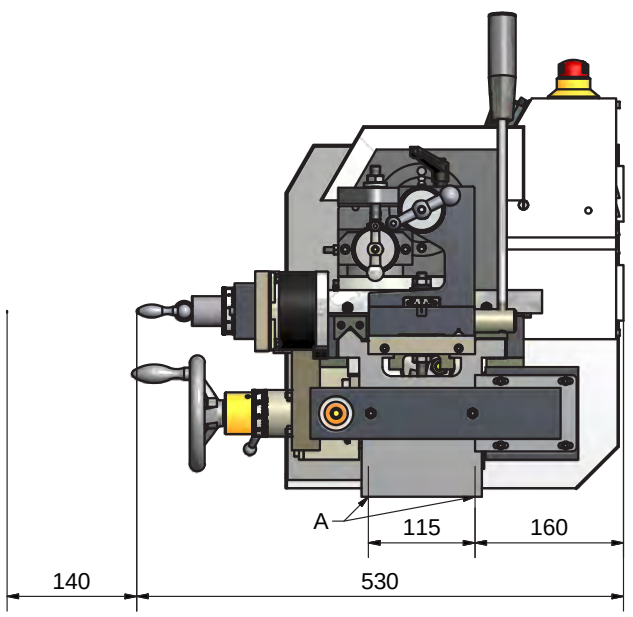
4.3 D6000-C – D6000-C hs

4.3.5 Dimensions of D6000-C (1.4 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.3.6 Dimensions of D6000-C (1.4 kW) with ball screws side view

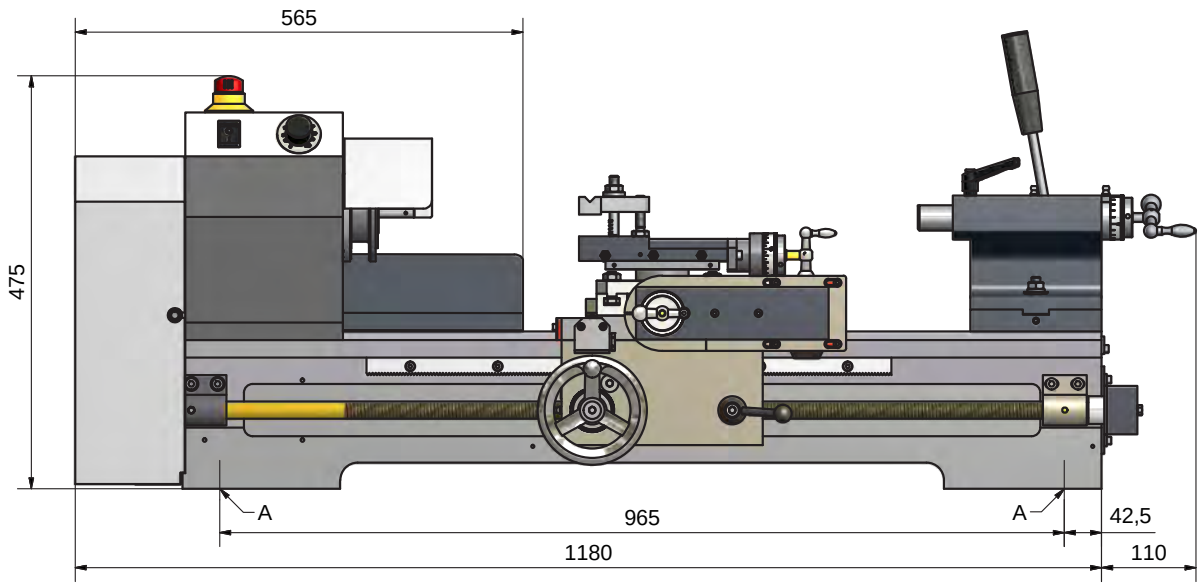


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

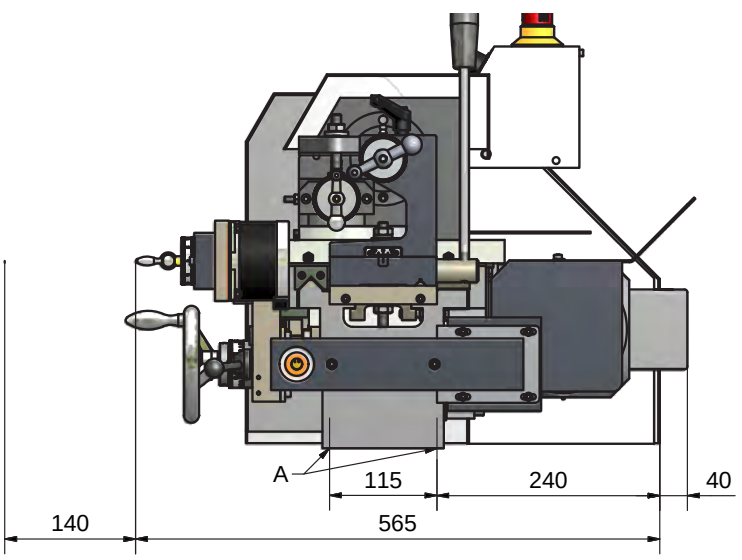
4.3 D6000-C – D6000-C hs

4.3.7 Dimensions of D6000-C hs (2.5 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.3.8 Dimensions of D6000-C hs (2.5 kW) with trapezoidal thread spindle side view



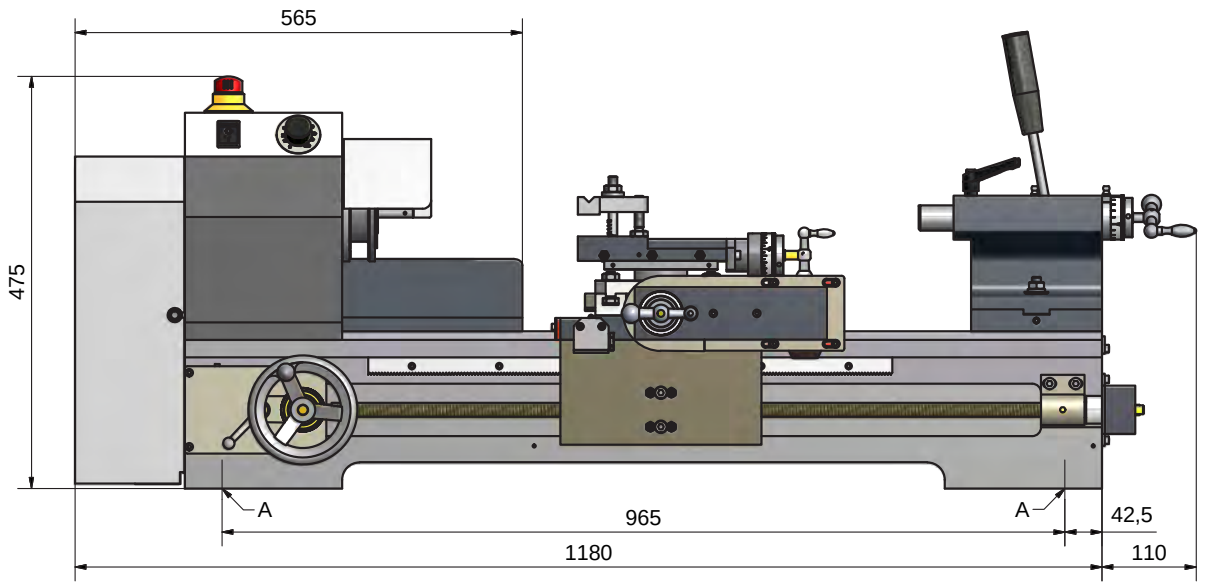
A 4 Befestigungsbohrungen M8 (20 tief)

A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

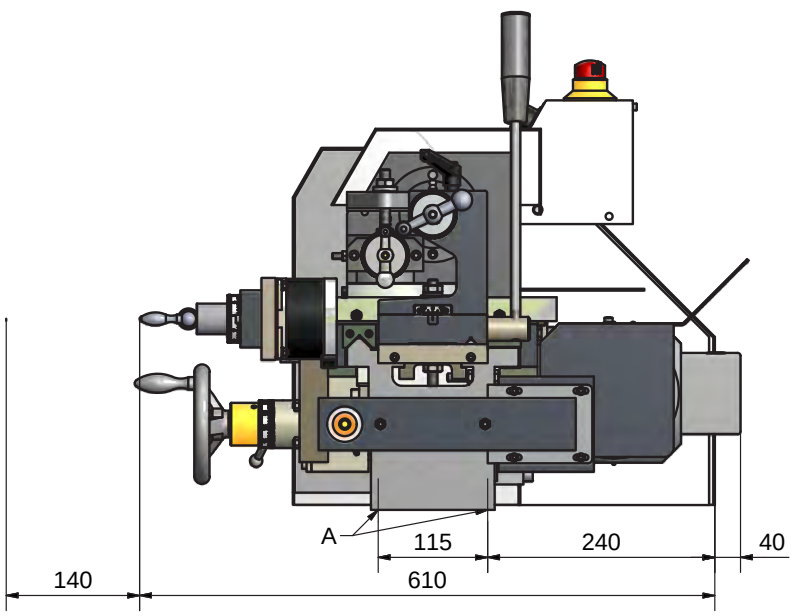
4.3 D6000-C – D6000-C hs

4.3.9 Dimensions of D6000-C hs (2.5 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.3.10 Dimensions of D6000-C hs (2.5 kW) with ball screws side view



A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

4.4 CC-D6000 – CC-D6000 hs

4.4.1 Declaration of noise levels

Declaration of noise levels in accordance with DIN EN ISO 3744

Emission values in idle

	CC-D6000	CC-D6000 hs
Emission sound pressure level at the workplace		
at 50 %	= 66.0 dB (A	= 68.0 dB (A)
at 100 %	= 66.3 dB (A)	= 73.6 dB (A)
Sound power level		
at 50 %	= 76.6 dB (A)	= 77.8 dB (A)
at 100 %	= 77.5 dB (A)	= 82.3 dB (A)

At an emission sound pressure level from 80 dB (A) and above at the workplace ear protection is required.

4. Specifications regarding the machine

4.4 CC-D6000 – CC-D6000 hs

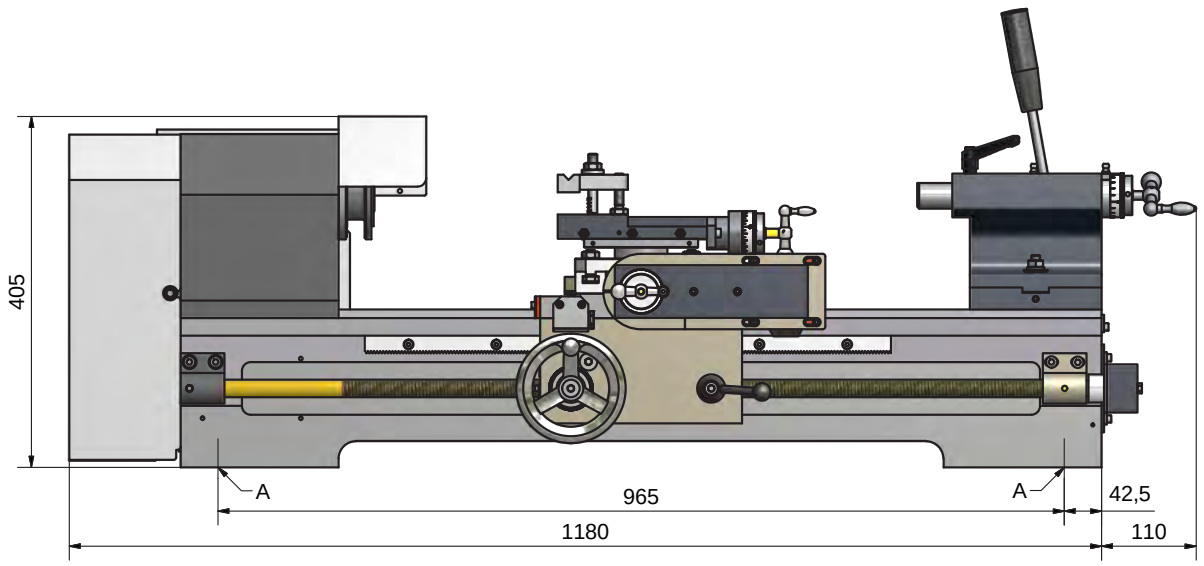
4.4.2 Technical data

	CC-D6000	CC-D6000 hs
Working range		
Center distance	600 mm	
Center height	135 mm	
Turning Ø above the guideways	270 mm	
Bed width	185 mm	
Main drive motor		
Nominal voltage	230 V	
Nominal frequency	50/60 Hz	
Nominal performance of the spindle motor	1.4 kW	2.5 kW
Spindle revolutions, infinite	30 - 2300 rpm	50 – 5000 rpm
Machine precision		
True running accuracy of spindle nose	0.005 mm	
Cylindrical turning to 100 mm cantilevered	0.01 mm	
Cylindrical turning with a finishing cut to 300 mm between the centers	0.015 mm	
Headstock		
Main spindle bore	Ø 20 mm	
Taper in main spindle	MT3	
Main spindle nose	according to DIN to DIN 6350	
Tool slide		
Travel of cross slide	140 mm	
Travel of longitudinal slide	60 mm	
Longitudinal slide can be swiveled through	360°	
Max. height of turning tools	20 mm	
Tailstock with quick adjustment		
Lateral adjustability of the tailstock upper part	± 10 mm	
Tailstock sleeve	with an internal MT2 morse taper	
Travel of tailstock sleeve	65 mm	
Scale ring read accuracy	0.1 mm	
Thread cutting		
Tumbler gear	for left- and right-hand thread	
2 automatic longitudinal feeds	0.085 and 0.16 mm/revolution	
Change gear set for thread cutting	metric 0.25 - 7.0 mm - inch 10 - 40 TPI	
Positioning accuracy	± 0.015 mm	
Travel speed (rapid traverse)		
With nccad basic		
X- and Y-axes	30 – 500 mm/min	
With nccad professional		
X- and Y-axes	30 – 1000 mm/min	

4. Specifications regarding the machine

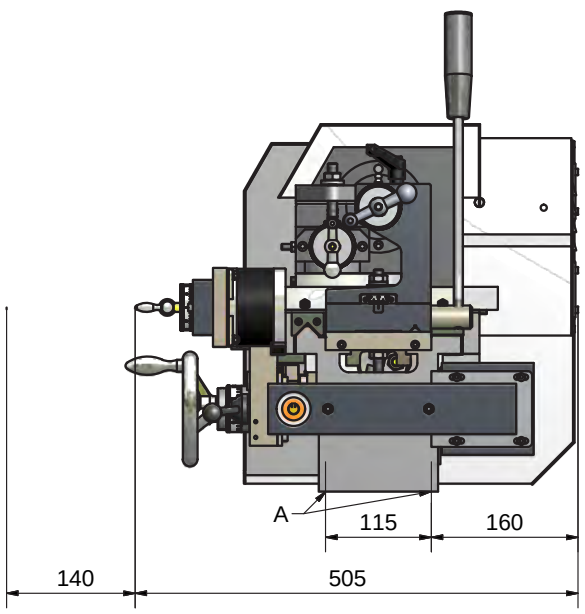
4.4 CC-D6000 – CC-D6000 hs

4.4.3 Dimensions of CC-D6000 (1.4 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.4.4 Dimensions of CC-D6000 (1.4 kW) with trapezoidal thread spindle side view

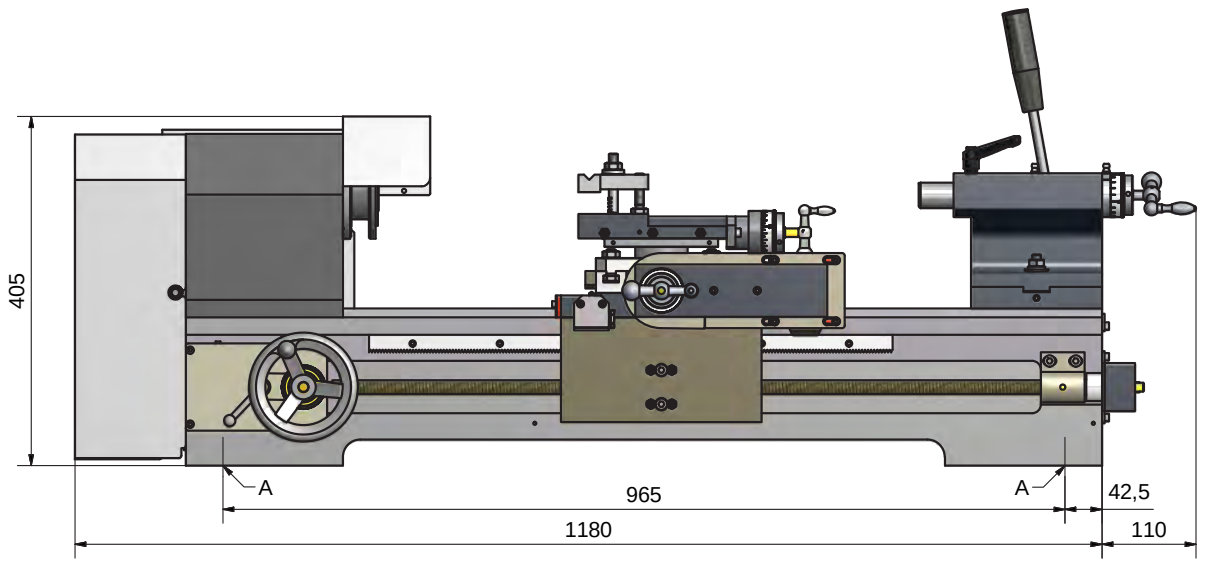


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

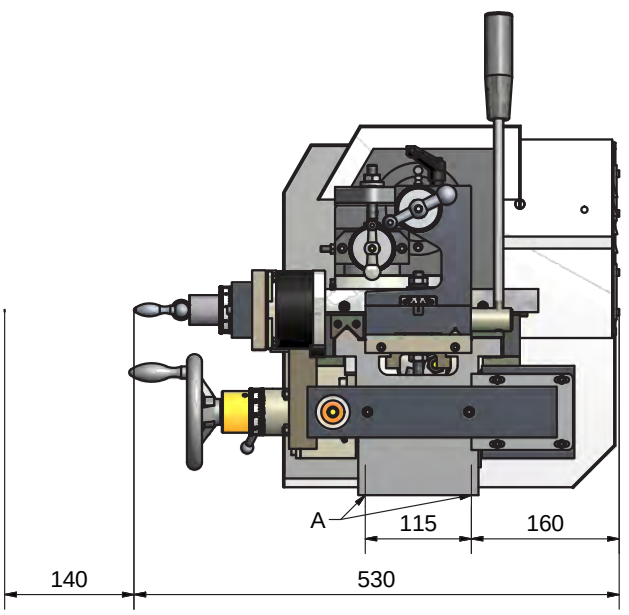
4.4 CC-D6000 – CC-D6000 hs

4.4.5 Dimensions of CC-D6000 (1.4 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.4.6 Dimensions of CC-D6000 (1.4 kW) with ball screws side view

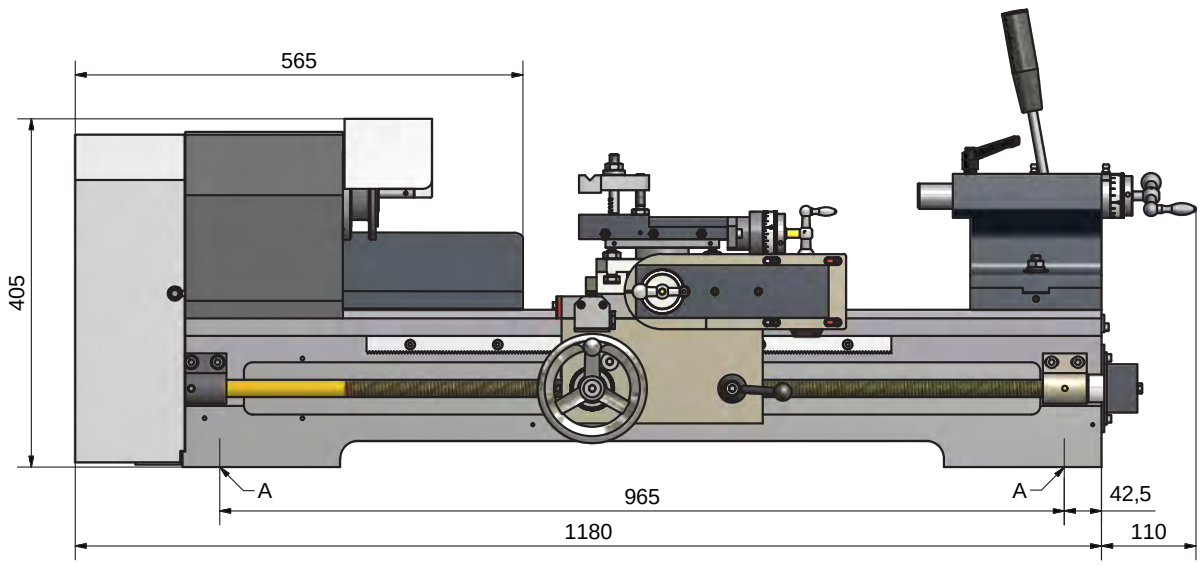


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

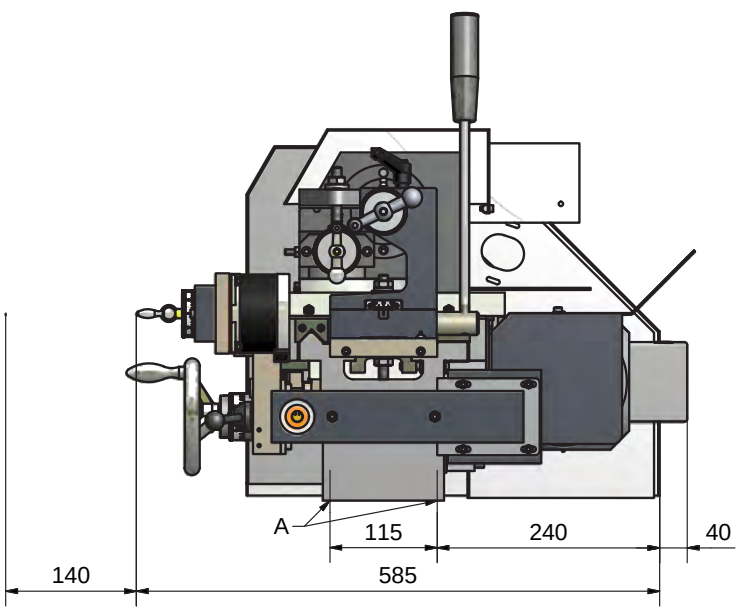
4.4 CC-D6000 – CC-D6000 hs

4.4.7 Dimensions of CC-D6000 hs (2.5 kW) with trapezoidal thread spindle front view



A 4 fixing holes M8 (20 mm deep)

4.4.8 Dimensions of CC-D6000 hs (2.5 kW) with trapezoidal thread spindle side view

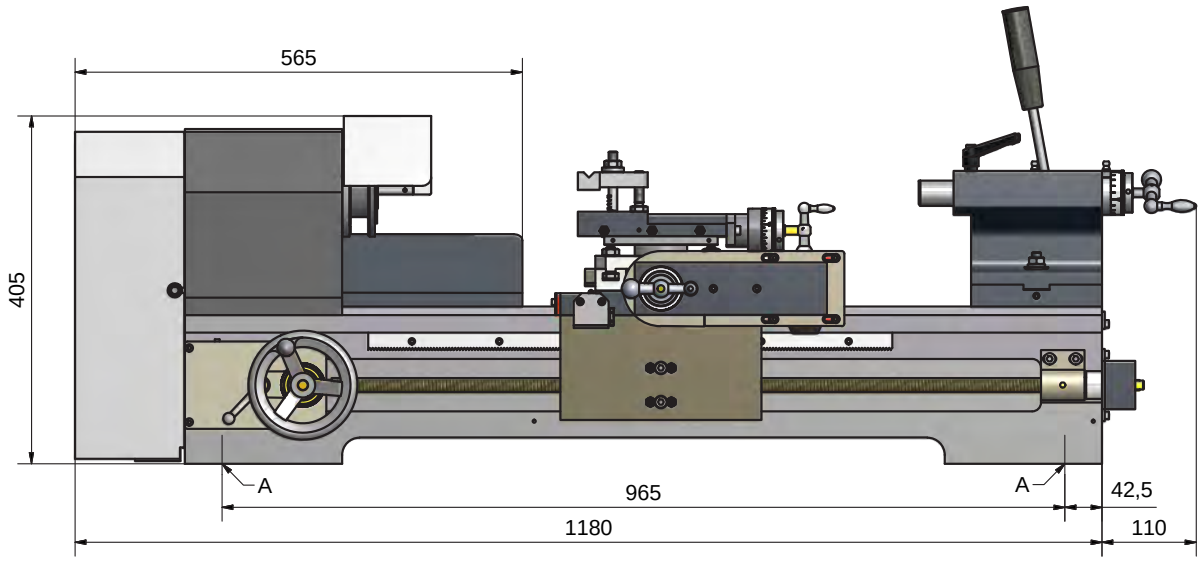


A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

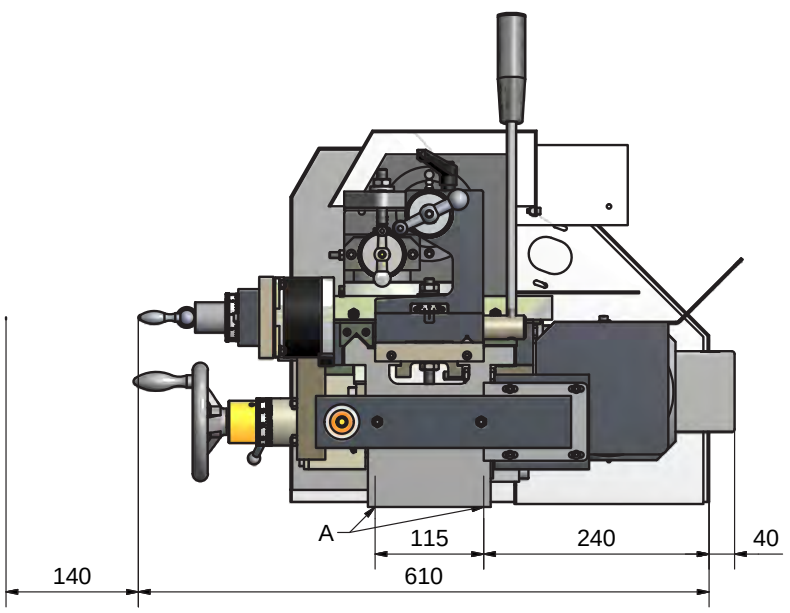
4.4 CC-D6000 – CC-D6000 hs

4.4.9 Dimensions of CC-D6000 hs (2.5 kW) with ball screws front view



A 4 fixing holes M8 (20 mm deep)

4.4.10 Dimensions of CC-D6000 hs (2.5 kW) with ball screws side view



A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

4.5 Revolution selection

Select the spindle revolutions according to the material type of workpiece diameter:

Small workpiece diameter ⟹ Relatively high revolutions
Large workpiece diameter ⟹ Low revolutions

Revolutions and diameter give the cutting speed.

In the event of a specified cutting speed, the required spindle revolutions can be calculated as follows:

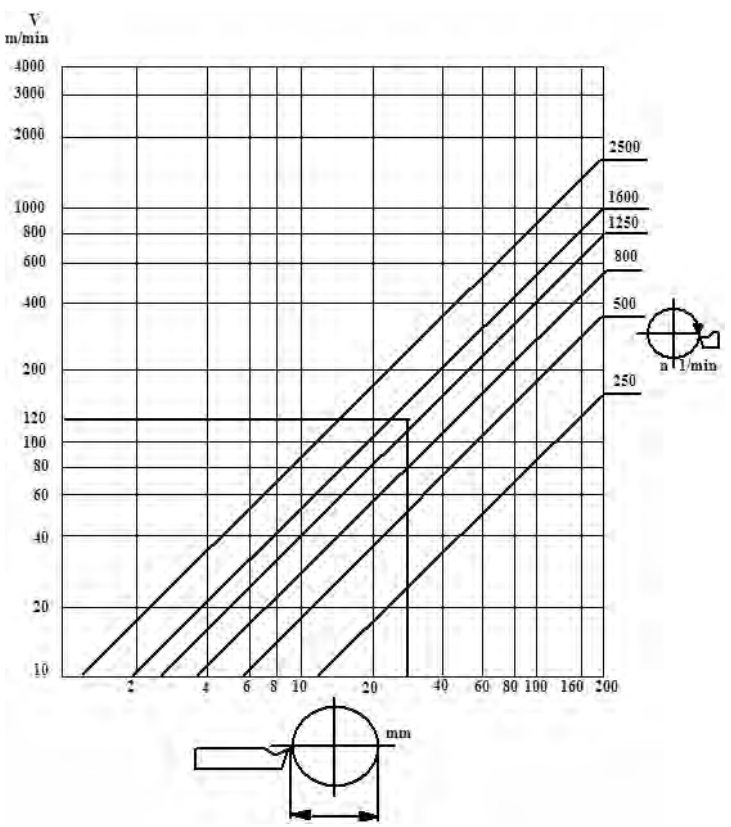
$$\text{Revolutions} = \frac{\text{Cutting speed (V) x 1000}}{\text{Workpiece diameter (d) x 3.14}}$$

Application example:
Thus, an aluminum workpiece with a Ø of 20 mm is to be turned with a cutting speed of 100 m/min.

$$\frac{100 \times 1.000}{20 \times 3.14} = \frac{100.000}{62.8} = 1592 \text{ rpm}$$

Now, select from the potential revolutions, the one that comes closest to the ideal of 1592 rpm.

4.6 Diagram for reading off the revolutions



4. Specifications regarding the machine

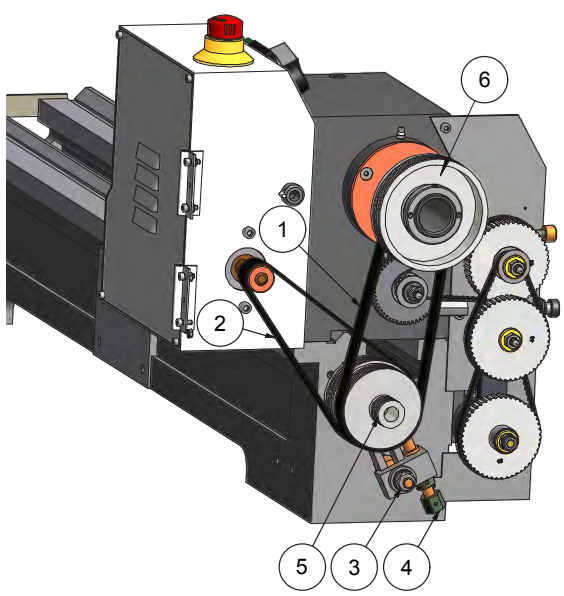
4.7 Revolution changer for 1.4 kW motor

The potentiometer can be used to infinitely adjust the revolutions of the working spindle from 150-2300 rpm (2nd setting = preset at the factory).

If the lower revolutions of 30-490 rpm (1st setting) are required, the drive belt must be applied. To do this, proceed as follows:

1. Open the gear cover hood by undoing the safety screw with the supplied special key
2. Undo the hexagonal nut (3) and this loosen the drive belt (1 + 2)
3. Turn the clamping screw (4) anti-clockwise in such a way that the drive belt (1) can be placed on the other transmission setting of the belt pulley (5 + 6)
4. To tension the drive belt (1 + 2) tighten the clamping screw (4) in a clockwise direction in such a way that the drive belt (1 + 2) cannot slip on the belt pulley
5. Tighten the hexagonal nut (3) back up again
6. Close the drive cover hood again and secure with the safety screw

Setting on the potentiometer	1st setting rpm	2nd setting rpm
0%	30	150
10%	35	155
20%	50	220
30%	90	450
40%	150	850
50%	200	1050
60%	290	1500
70%	350	1900
80%	400	2050
90%	460	2200
100%	490	2300



4. Specifications regarding the machine

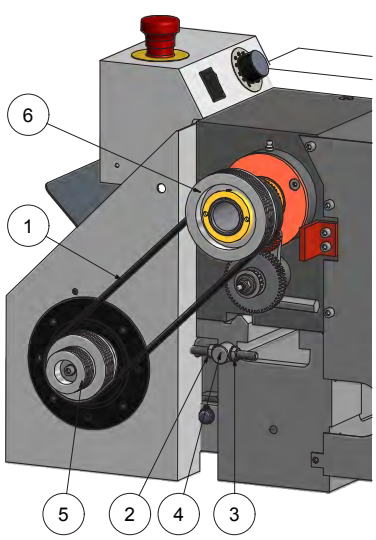
4.8 Revolution changer for 2.5 kW motor

The potentiometer can be used to infinitely adjust the revolutions of the working spindle from 100-5000 rpm (2nd setting = preset at the factory).

If the lower revolutions of 50-2500 rpm (1st setting) are required, the drive belt must be applied. To do this, proceed as follows:

1. Open the gear cover hood by undoing the safety screw with the supplied special key.
2. Undo the hexagonal nut (2), this undoes the second hexagonal nut (3) and the drive belt (1) is loosened.
3. Place the drive belt (1) on the other transmission setting of the belt pulley (5 + 6).
4. To tension the drive belt (1) turn the hexagonal nut (2) clockwise in such a way that the drive belt (1) cannot slip on the belt pulley (5 + 6).
5. Tighten the hexagonal nuts (3) on the holding bolt (4) to tension the drive belt.
6. Close the drive cover hood again and secure with the safety screw.

Setting on the potentiometer	1st setting rpm	2nd setting rpm
0%	50	100
10%	200	370
20%	470	900
30%	725	1400
40%	970	1900
50%	1225	2400
60%	1470	2900
70%	1725	3400
80%	2000	4000
90%	2280	4500
100%	2500	5000



4. Specifications regarding the machine

4.9 Electrical equipment 1.4 kW motor

The main drive motor (single phase series-wound motor) is supplied already installed.

- The main spindle drive has an ON/OFF switch with under-voltage trigger.
- In order for the machine to start, the turn switch for forwards-reverse must be set to the required direction of rotation.
- Then switch on at the ON/OFF switch.
- The ON/OFF switch must also be switched on again after the power is interrupted.
- To change the direction of rotation of the main drive motor, the turn switch must briefly rest at the 0 position to allow the relays on the control board enough time to switch.
- In the event of the main drive motor being overloaded, it will switch itself off automatically. The main drive motor can only be switched back on again after a short waiting period.

4.10 Electrical equipment 2.5 kW motor

The frequency-regulated main drive motor is delivered already installed.

- The machine has a switch with three settings (1=right or clockwise rotation - 0=zero position - 2=left or anti-clockwise rotation).
- The under-voltage trigger is integrated in the electronics of the motor .
- In order for the machine to start or restart after a power interruption, the 3 setting switch must first be switched to 0=zero position.
- In 0=zero position, the switch must rest for about 5 seconds so that the motor is able to reset.
- To change the direction of rotation of the main drive motor, the 3 setting switch must rest at the 0 position for approximately 1 second to allow the relays on the control board enough time to switch.
- In the event of the main drive motor being overloaded, it will switch itself off automatically. The main drive motor can only be switched back on again after a short waiting period.

5. Achieving optimum results and avoiding incorrect usage

- Use of suitable processing tools.
- Adaptation of revolution setting and feed to the material, workpiece and tool.
- Tension tools as far into the tool holder as possible (short projecting length).
- Tension turning element as far into the chuck as possible (short projecting length).
- Support length pieces with a tailstock or stay.
- The use of coolant and lubrication to increase the durability of the tool, improve surface quality and accuracy.
- Clamp processing tools and turning elements on a clean clamping surface.
- Lubricate machine sufficiently.
- Set the bearing clearance and guides correctly.

Longitudinal turning

- For longitudinal turning, the turning steel moves parallel to the axis of the workpiece.
- To rough, it is advantageous to use straight or curved turning steels.
- To finish, use sharp or wide turning steels.

Face turning

- The processing of end planes is referred to as face turning.
- When face turning, the turning steel is moved at right angles to the rotating axis of the turning element. The tool slide should be locked when doing so.
- The main cutting edge of the turning steel is to be set precisely to the center so that the turning element center has no nose.
- The curved turning steel is used for face turning.

5. Achieving optimum results and avoiding incorrect usage

Curved lathe chisel right (2) and left (1)

- For longitudinal and face turning
- This is designed to remove as much material as possible in a short time (without paying attention to the surface created on the workpiece).

Offset lateral lathe chisel (3)

- For longitudinal and face turning
- Is used for finishing (creating a clean surface).

External thread lathe chisel (4)

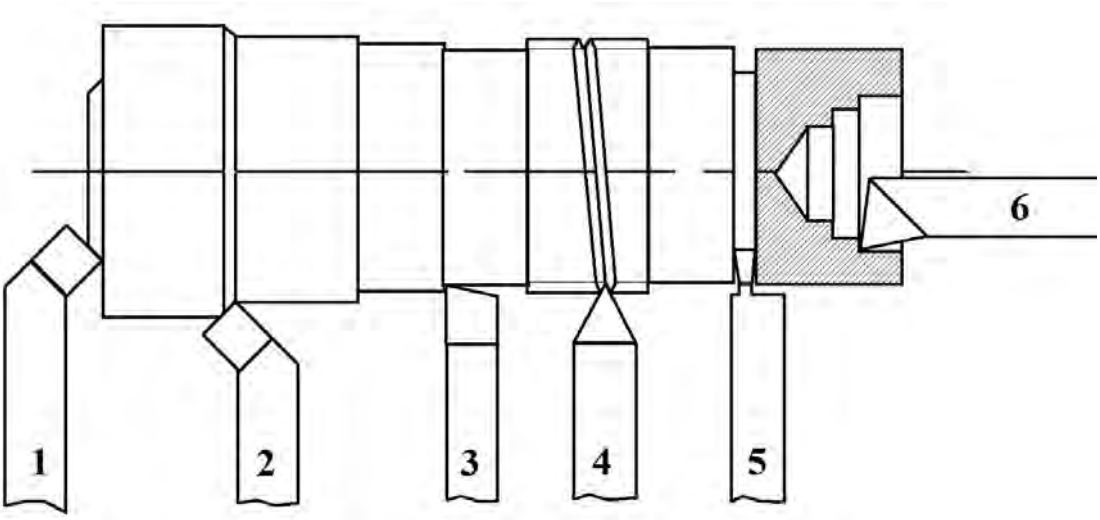
- Is used for cutting external threads.

Narrow square-nose cutting tool (5)

- Is used to cut grooves and cut off workpieces.
- Attention should be paid to the precise height of the center of the turning steel.
- Work with low revolutions and cool the tool (cooling via drilling oil or emulsion: acts as lubrication and removal of shavings).
- The cutting steel is to be tensioned as short as possible and at a right angle to the rotational axis.

Inner lathe chisel (6)

- Is used for hollowing out drilled holes.
- Tension as short as possible to prevent the occurrence of turning steel vibrations (untidy surface).
- As a result of the forces exerted on the turning steel, the steel must be short and secured firmly.
- If the lever arm is too long, the lathe chisel will bend and spring back.
- The cutting edge will penetrate the workpiece unevenly and result in a bumpy surface.
- The turning steel is to be aligned with the center of the turning element
- The checking of the height to the center of the workpiece is carried out with the help of the turning center point in the tailstock. The height position of the turning steel is achieved by adding even sheets.

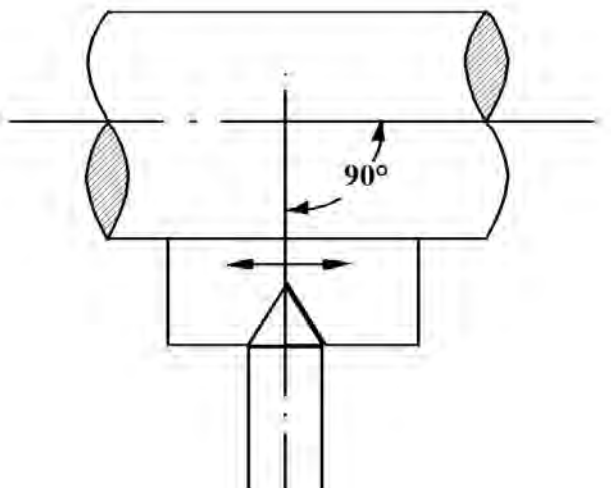


6. Thread cutting and automatic feed

6.1 Thread cutting

- The thread turning steel is a moulded turning steel with the profile of the thread to be cut.
- It is ground according to templates (Figure 1) and must be set precisely to the center of the workpiece otherwise there will be a distortion in the thread profile.
- In order to obtain the correct position of thread flanks to the workpiece axis, place the grinding gauge up against the workpiece and use it to set the turning steel (Figure 1). To do this, push the gauge up to both flanks of the turning steel, one after another.

Figure 1: Setting the thread turning steel



- The feed of the thread turning steel is carried out via the lead screw and must match the thread gradient.
- The change gears belonging to the accessories create the connection between the feed drives and the lead screw.
- By fitting different toothed wheel combinations, it is possible to cut metric and inch right- and left-hand threads.
- The different axis intervals of the toothed wheels can be set by swiveling the quadrant and adjusting the quadrant bolt.

Feed:

- The feed is switched on using the switch lever on the lock plate.
- The feed must always be switched on in order for the turning steel to return to the same position when carrying out multiple cutting procedures.
- After completing the cut, bring the turning steel with the cross slide out of the inroad otherwise the flanks and cutting edges will be damaged.
- Then return the turning steel to the starting position by changing the direction of rotation of the motor via the turn switch for forwards-reverse.
- It is good if the thread end has a 4-5 mm wide clearance milled in order to better remove the thread steel out of the way.

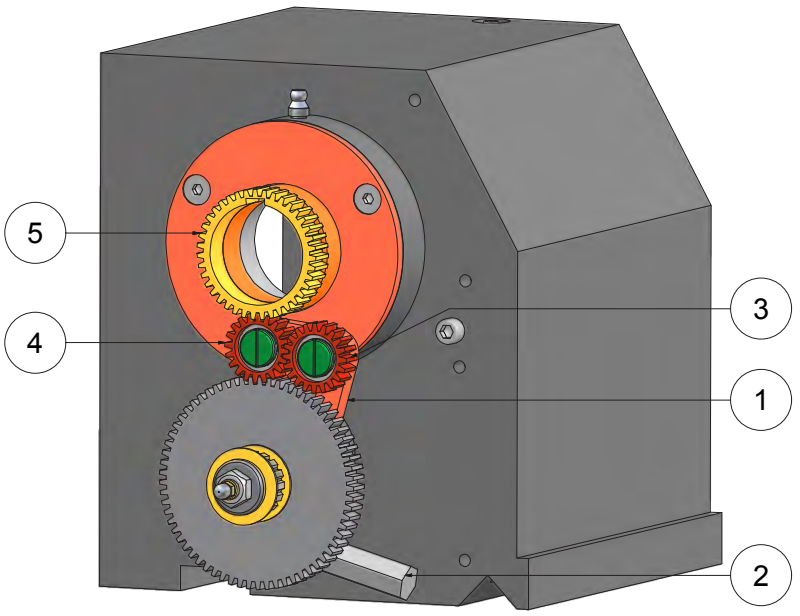
In the event of a long thread diameter, the turning center point should always be used to prevent the workpiece from pushing away.

6. Thread cutting and automatic feed

6.2 Tumbler gear drive

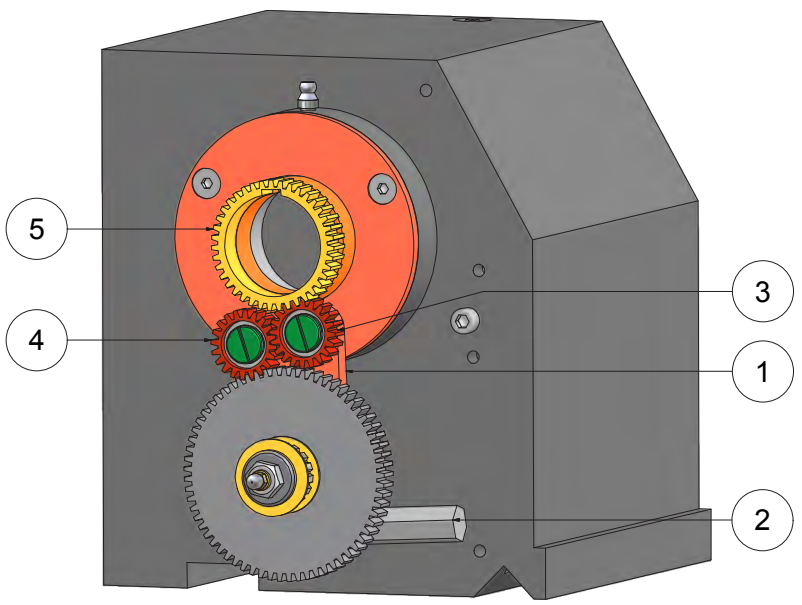
Setting for right-hand thread and longitudinal feed (factory preset)

- The toothed wheel (4) on the tumbler gear (1) is in contact with the toothed wheel (5) of the main spindle, thus, when the spindles rotate ant-clockwise (seen from the point of view of the lathe chuck), the tool slide moves towards the lathe chuck.



Setting for left-hand thread

- Undo the clamping screw (2).
- Swivel the tumbler gear (1) to the left so that the toothed wheel (3) comes into contact with the toothed wheel (5) of the main spindle.
- With the main spindle in the same direction of rotation, the skid moves away from the lathe chuck and towards the tailstock.



6. Thread cutting and automatic feed

6.3 Use of change gears

For automatic longitudinal turning, there are two feeds available with 0.085 and 0.16 mm per revolution (the wheels are set at the factory for feed with 0.085 mm per revolution).

Fitting various toothed wheel combinations enables metric thread cutting from 0.10-7 mm and inch threads with gradients of 10/1“-40/1“.

Table for thread cutting * = Special accessories
The toothed wheels that belong to the scope of delivery are identified according to the number of teeth.
e.g. 48 stands for 48 teeth
To thread cut as of a gradient of 0.4 mm, B1 and B2 must be removed completely.

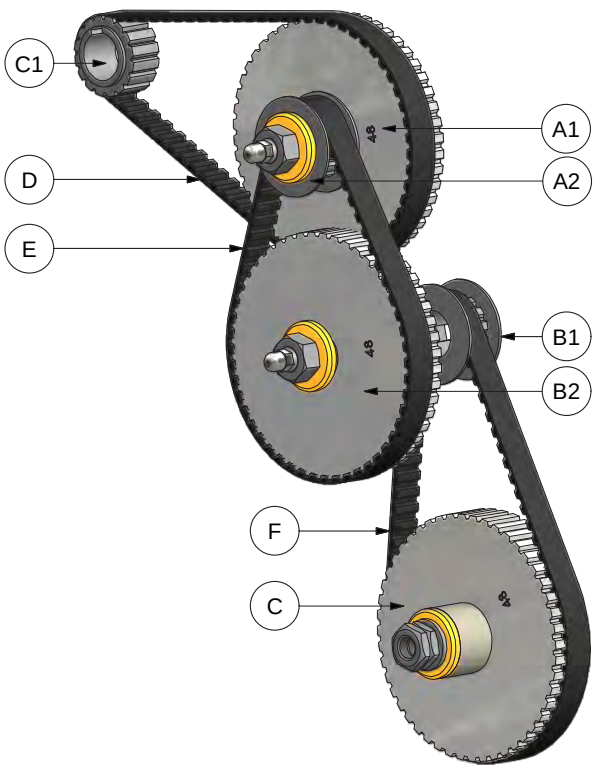


Table for automatic longitudinal feed

mm/σ	0.085	0.16
A1	48	48
A2	14	18
B1	14	20
B2	48	48
C	48	48
C1	16	16
D	140	140
E	120	120
F	140	140

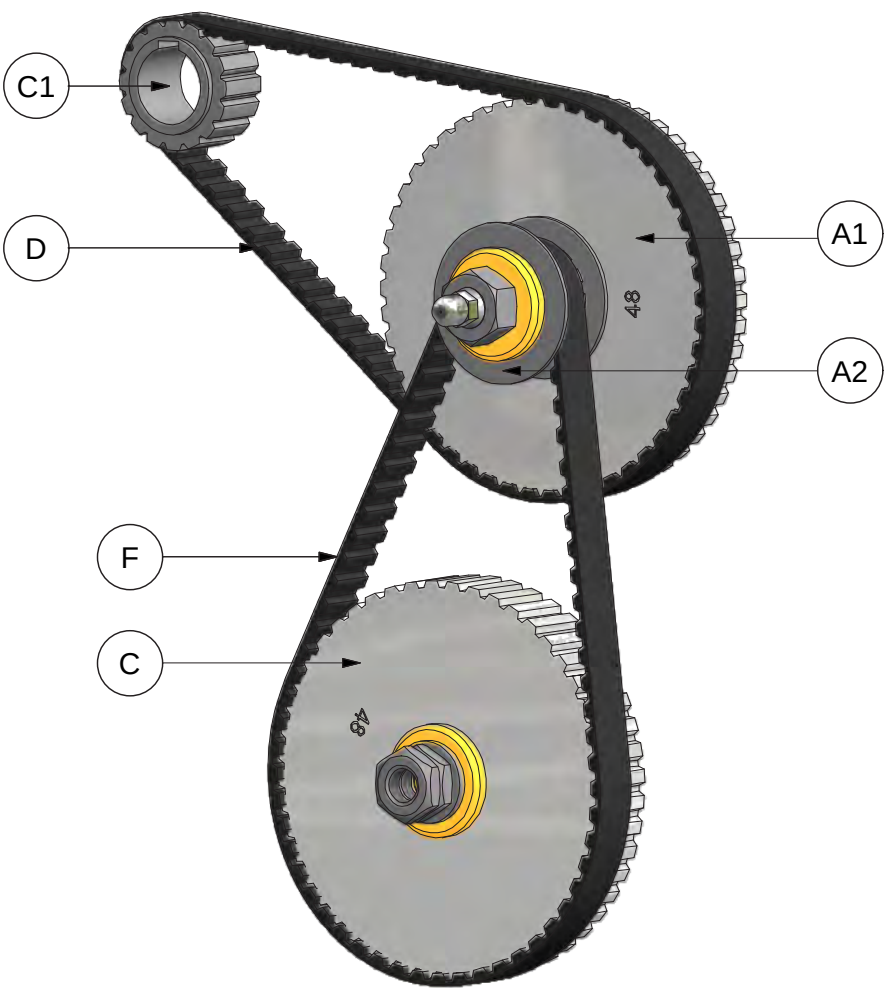
6. Thread cutting and automatic feed

6.3 Use of change gears

Table for cutting threads with a gradient of less than 0.4 mm.

To do this, B1 and B2 are required as in automatic feed.

mm	0.10	0.12	0.22	0.24	0.25
A1	48	48	48	48	48
A2	14	14	24	24	24
B1	14	18	18	18	18
B2	48	48	40	36	48
C	48	48	48	48	36
C1	20	20	14	14	16
D	140	140	140	140	140
E	120	120	120	120	130*
F	140	140	140	140	120



6. Thread cutting and automatic feed

6.3 Use of change gears

mm	0.4	0.5	0.7	0.75	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	5.0	7.0
A1	48	48	48	48	48	48	48	48	48	48	48	48	24	24	24	24
A2	16	20	14	18	16	14	20	36	28	40	40	48	28	40	40	28
C	40	40	20	24	20	14	16	24	16	20	16	16	16	20	16	16
C1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32
D	140	140	140	140	140	140	140	140	140	140	140	140	120	120	120	120
F	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	120*

Z/1“	10	11	12	13	14	16	18	19	20	24	26	28	32	36	40
A1	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
A2	36	36	36	36	36	36	14	34*	18	24	18	18	18	14	18
C	20	22	24	26*	28	32	14	36	20	32	26*	28	32	28	40
C1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
D	120	120	120	140	140	140	120	140	120	120	120	120	120	120	120
F	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140

7. Maintenance

A long lifetime of the machine will depend on the appropriate care and maintenance.

- **All maintenance and repair tasks may only be carried out with the grounded plug pulled.**
- The machine must be cleaned after each use.
- If the machine is set up in a wet room, all exposed parts must be oiled after each use to prevent corrosion.
- Always lubricate all moving parts well.
- In the event of bearing or skid play, immediately adjust in order to prevent it from destroying the bearing or skid guide.

Approximately every 100 operating hours

- clean the carbon brushes and collector of the drive motor (1.4 kW) with a piece of coarse sandpaper.
- remove approximately 0.1 mm from the collector, then smooth out the contact surface with fine sandpaper.
- check the tension of the poly V and gear belt and adjust if necessary.
- check the play in the guides and feed spindles and set if necessary.

8. Lubrication of the machine

The lubrication process:

- reduces wear and friction.
- increases the lifetime.
- protects metal surfaces from corrosion.

We recommend:

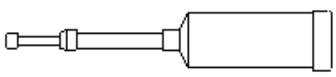
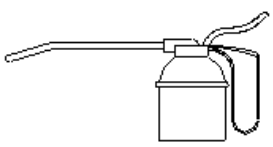
- a class 2NLGI multi-purpose grease for lubrication.
- a lubrication oil with a viscosity of 100 mm ²/s for oiling.

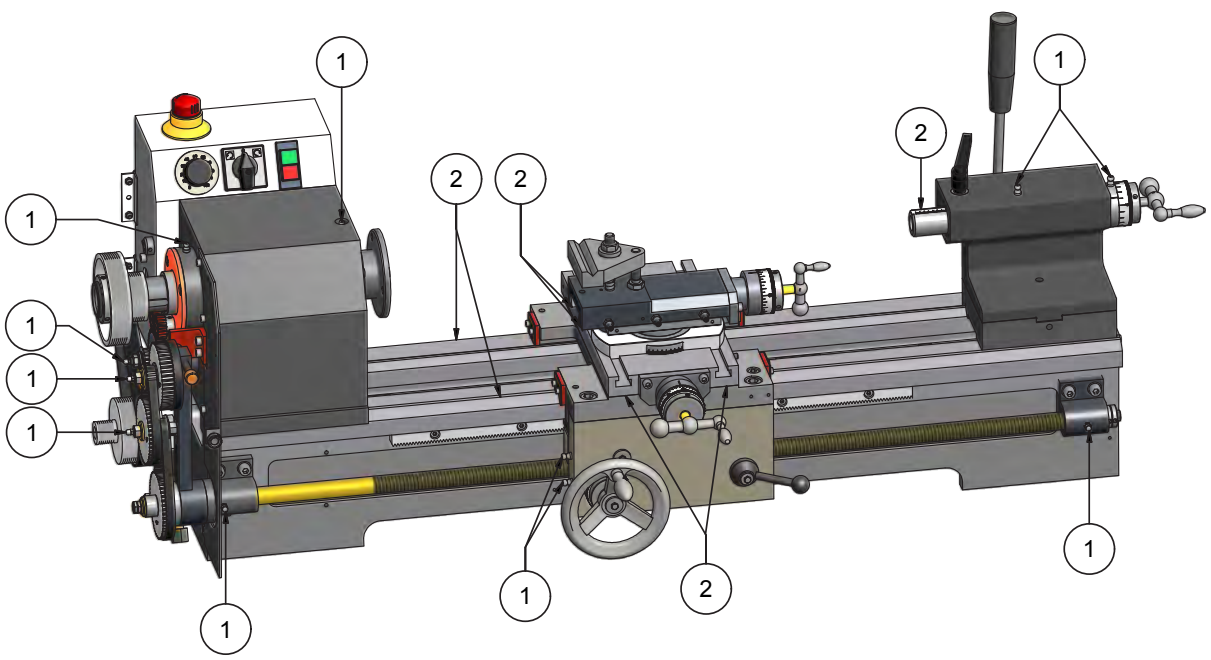
The lathe is to be lubricated every 8 hours of operation in accordance with the lubrication plan. The lubrication points

- Bed guide
- Dovetail guide, cross slide
- Tailstock sleeve

are lubricated with the help of an oil can and an ordinary lubrication oil by moving the skid or sleeve backwards and forwards.

All other lubrication points are lubricated with a grease press at the designated lubrication nipples.

1		Every 8 hours of operation
2		Every 8 hours of operation

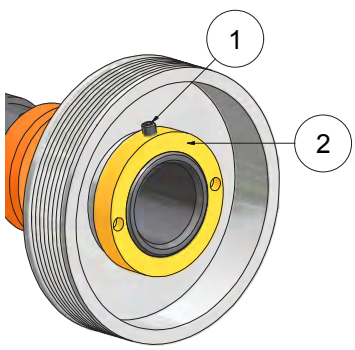


9. Re-adjusting the main spindle

The headstock is screwed to the lathe bed. The headstock contains the main spindle with two adjustable precision tapered roller bearings.

If adjustment is required, proceed as follows:

1. Open the gear cover hood by undoing the safety screw with the supplied special key.
2. Undo the stud screw (1) in the setting nut (2).
3. The setting nut (2) is located at the rear end of the main spindle.
4. Rotate the setting nut (2) clockwise until the bearings run free again (it must be possible to rotate the main spindle by hand easily).
5. Tighten the stud screw (1) back up again.
6. **If the tapered roller bearings are set too tightly they will quickly become unusable.**
7. Close the gear cover hood by tightening the safety screw with the supplied special key.



10. Overload clutch

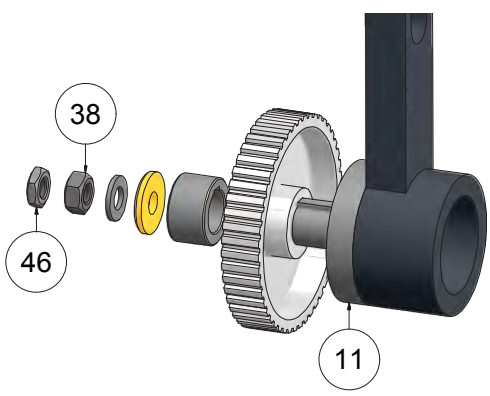
In order to prevent risks to the user and damage to the machine, an overload clutch has been fitted to the lead screw.

The overload clutch (11) is effective:

- When the feed is overloaded.
- When contact is made with a limit switch in the longitudinal direction.

If adjustment is required, proceed as follows:

1. The overload clutch (11) is set using the hexagonal nut (38) and countered with the nut (46).



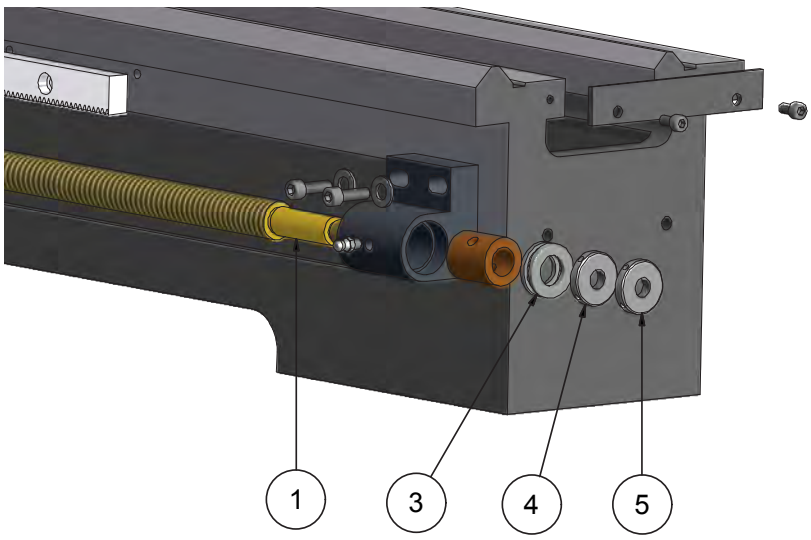
11. Re-adjustment of the bearing clearance of the lead screw

On the right side, the lead screw is axial mounted. This mount enables the lead screw (1) to be set without play:

If adjustment to the mount is required, please proceed as follows:

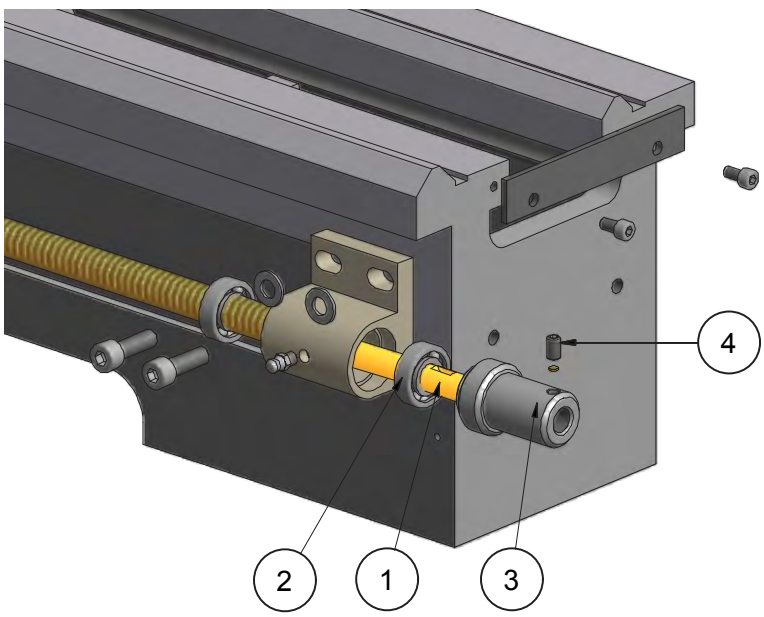
Trapezoidal thread spindle

1. Undo the outer of the two capstan nuts (5).
2. Turn the inner capstan nut (4) clockwise against the axial bearing (3) until the lead screw (1) has no more axial play.
3. Then counter the outer capstan nut (5) against the inner capstan nut (4).



Ball screws

1. Undo the threaded pin (4).
2. Turn the setting nut (3) clockwise against the ball bearing (2) until the lead screw (1) has no more axial play.
3. Then tighten the threaded pin (4) securely.



12. Tool slide – cross slide

The tool slide is positioned, at the front, on a prismatic guide and, at the rear, on a flat guide. The skid is held onto the bed from below with the guide bar (9) and can be set to without play using the setting bar (12).

If adjustment to the setting bar (12) is required, please proceed as follows:

1. Undo the hexagonal nuts (11).
2. Using an Allen key, tighten the threaded pins (10) in such a way that the skid is still able to move easily.
3. After setting, tighten the hexagonal nuts (11) back up again.

Clamping for face turning and cutting work.

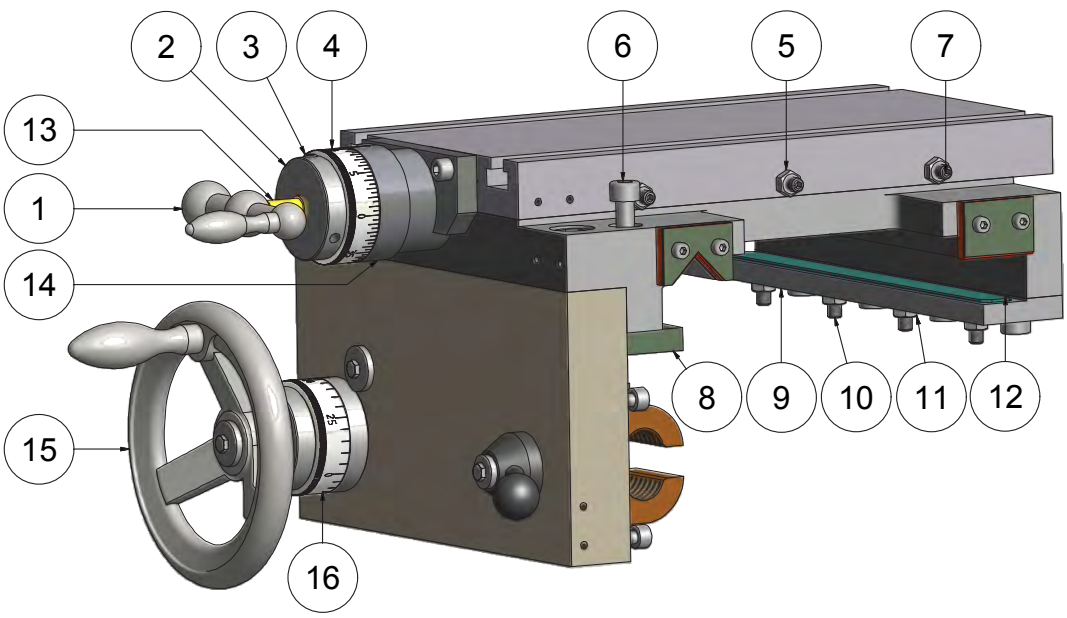
1. Use the Allen head screw (6) to clamp the clamping piece (8) against the underside of the prismatic guide. The tool slide can no longer be moved in the longitudinal direction.

The dovetail guide of the cross slide can be adjusted.
If adjustment is required, please proceed as follows:

1. Undo the hexagonal nuts (5).
2. Using an Allen key, tighten the threaded pins (7) in such a way that the skid can still be moved easily using the ball crank (1).
3. After adjustment, tighten the hexagonal nuts (5) back up again.

Any axial play of the spindle (13) in the spindle bearing (14) that may occur, can be adjusted. If adjustment is required, please proceed as follows:

1. Undo the threaded pins (3).
2. Rotate the dial (2) clockwise in such a way that no axial play remains.
3. Tighten the threaded pins (3) back up again.
4. After adjustment, the spindle (13) should still be easy to turn.

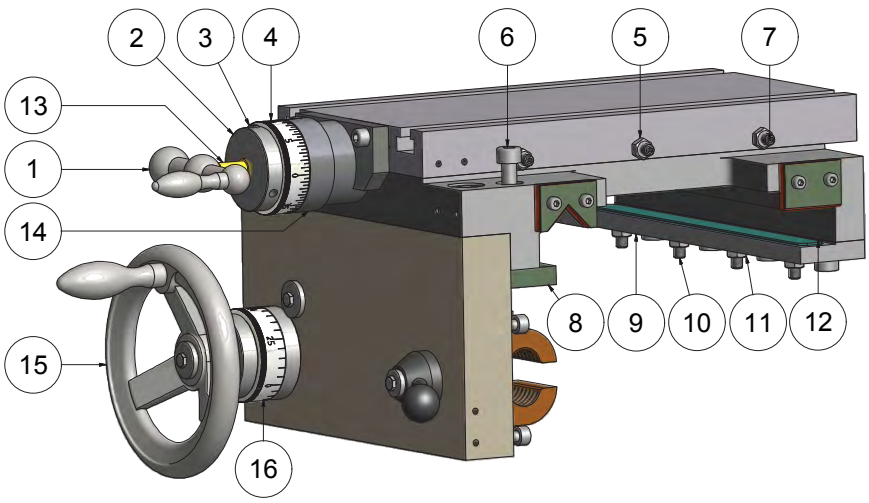


12. Tool slide – cross slide

There are scale rings fitted to enable you to read of the distances

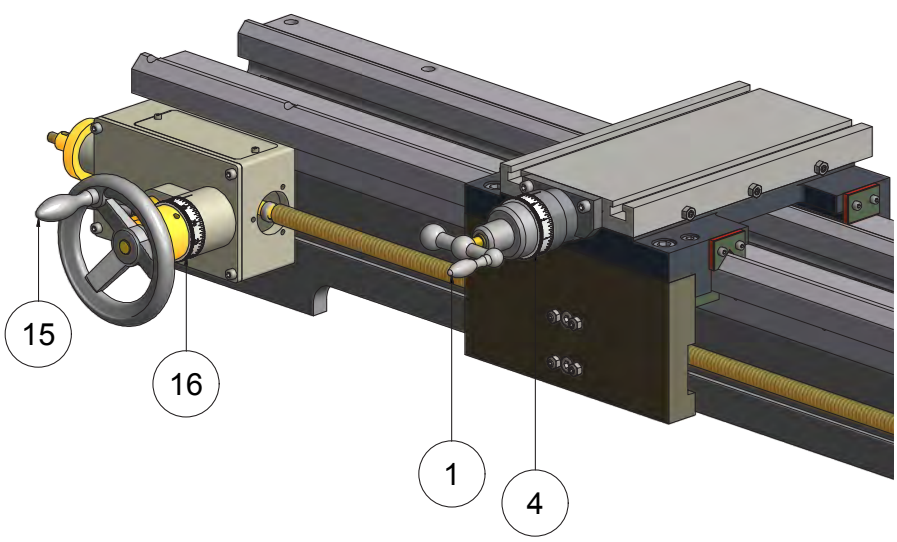
Trapezoidal thread spindles

- One interval on the scale ring (4) of the cross slide represents a 0.05 mm distance, which corresponds to the same chip removal on the workpiece, thus in reality the skid is only adjusted by 0.025 mm but the workpiece diameter changes by 0.05 mm.
- One turn of the ball crank (1) on the cross slide corresponds to 2 mm of travel, but a change of 4 mm to the diameter of the workpiece.
- One scale mark on the scale ring (16) of the tool slide represents a distance of 1 mm. One turn of the hand wheel (15) corresponds to a distance of 30 mm.



Ball screws

- One interval on the scale ring (4) of the cross slide represents a 0.05 mm distance, which corresponds to the same chip removal on the workpiece, thus in reality the skid is only adjusted by 0.025 mm but the workpiece diameter changes by 0.05 mm.
- One turn of the ball crank (1) corresponds to 5 mm of travel, but a change of 10 mm to the diameter of the workpiece.
- One scale mark on the scale ring (16) of the tool slide represents a distance of 0.05 mm. One turn of the hand wheel (15) corresponds to a distance of 5 mm



13. Tool slide – longitudinal slide

- The longitudinal slide is secure to the cross slide upper section with the clamping ring (3).
- After undoing the two hexagonal nuts (5) the longitudinal slide can be slid or turned on the cross slide.
- The rotation is, for example, suitable for turning short tapers.
- In order to accurately read this setting, a scale is engraved on the guide ring (4).
- The zero mark is located on the cross slide upper section.

The dovetail guide of the longitudinal slide can be adjusted.

If adjustment is required, please proceed as follows:

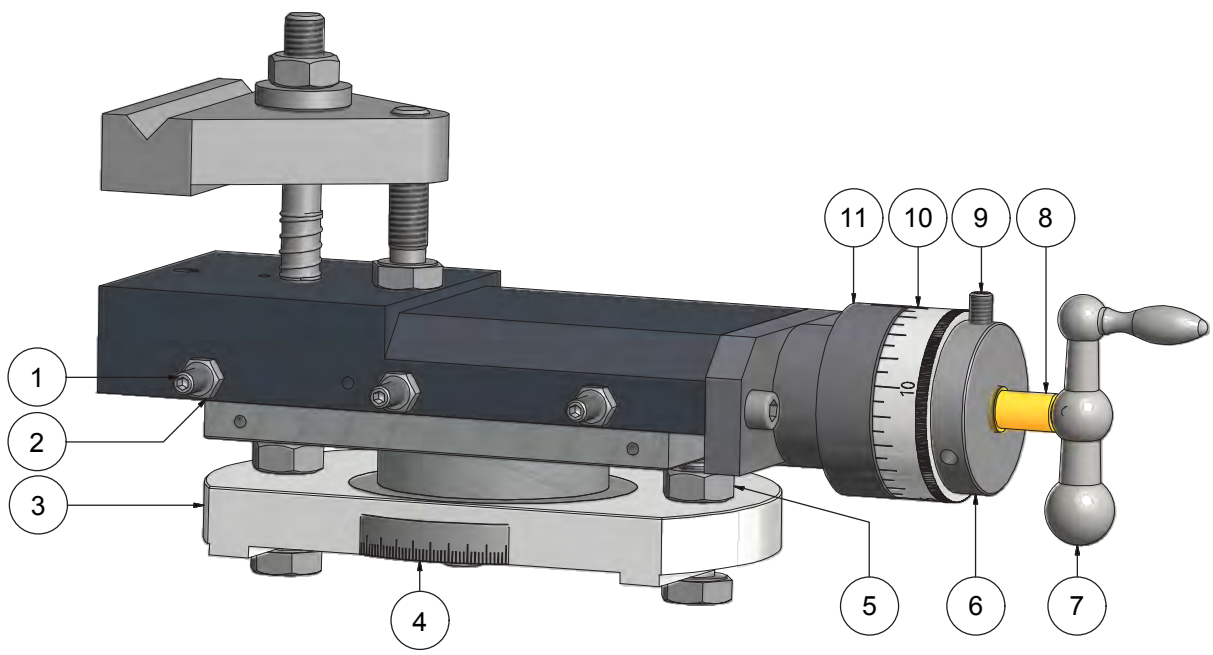
1. Undo the hexagonal nuts (2).
2. Using an Allen key, tighten the threaded pins (1) in such a way that the skid can still be moved easily using the ball crank (7).
3. After setting, tighten the hexagonal nuts (2) back up again.

Any axial play of the spindle (8) in the spindle bearing (11) that may occur, can be adjusted.
If adjustment is required, please proceed as follows:

1. Undo the threaded pins (9).
2. Rotate the dial (6) clockwise in such a way that no axial play remains.
3. Tighten the threaded pins (9) back up again.
4. **After adjustment, the spindle (8) should still be easy to turn.**

To read off the distance of travel of the longitudinal slide, there is a scale ring (10)

- One mark on the scale corresponds to an adjustment of 0.05 mm. Since the longitudinal slide does not work with diameters, this 0.05 mm corresponds to the actual distance.
- One turn of the ball crank (7) corresponds to a distance of 2 mm.



14. Tailstock

- The tailstock can be moved on the lathe bed.
- By moving the clamping lever (3), the tailstock can easily be secured in any position.
- The tailstock is made up of an upper and lower section.
- The upper section can be moved by a maximum of ±10 mm in order to turn long, slim tapers.

To do this, proceed as follows:

1. Undo the hexagonal nut (6).
2. With the help of both threaded pins (8), slide the upper section into the required direction.

- The central position of the tailstock is shown by the scale mark (7).
- Turn a sample to see whether the workpiece is cylindrical, correct the tailstock setting if necessary.

Tailstock sleeve

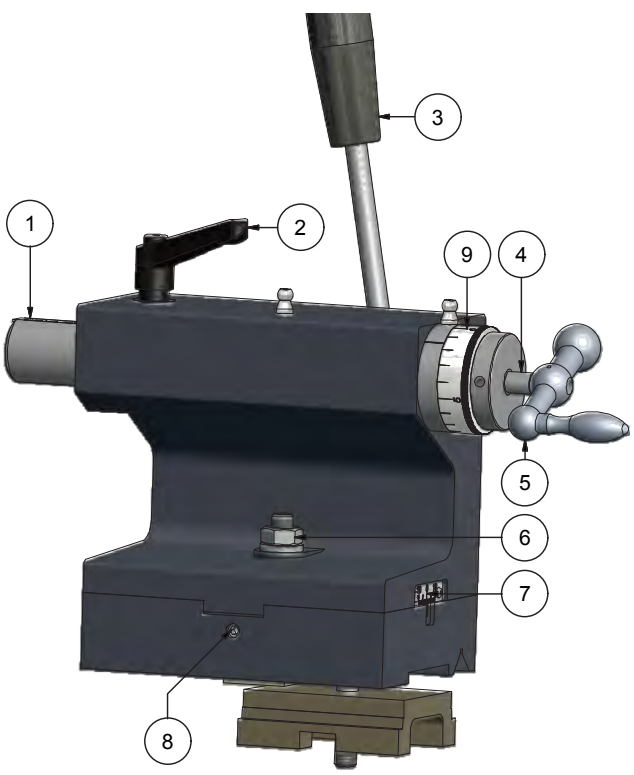
- The solid tailstock sleeve has a millimetre scale.

To read off the distance of travel of the tailstock sleeve, there is a scale ring (9)

- One mark on the scale corresponds to an adjustment of 0.1 mm.
- One turn of the ball crank (5) corresponds to a distance of 2 mm.
- Center point, drill or drill chucks are automatically ejected when turning back.

Tool holder

- There is an **inside cone MK** 2 which is designed to hold tools and is incorporated in the sleeve (1).
- Tightening the clamping lever (2) ensures that the sleeve may be easily clamped in any position.
- The sleeve is moved axially by the hand crank (5) by way of the threaded spindle (4).



15. 3- and 4-jaw lathe chuck

The 3-jaw lathe chuck

Is used to tension circular, three and six edged workpiece centrally to the spindle axis.

The 4-jaw lathe chuck

Is used to tension square workpieces centrally to the spindle axis.

Risk of accidents

- **Do not attempt to clamp workpieces that are over the permitted clamping range. The clamping force is thus too low and the jaws may come undone.**
- **The maximum revolution range specified on the lathe chuck may not be exceeded.**

Mounting the jaws:

1. The jaws and guides are numbered from 1 - 3 or 1 – 4.
2. Open the lathe chuck with the key in such a way that the drilling jaws are released (sequence: 3, 2, 1 or 4, 3, 2, 1).
3. Insert turning jaw 1 into guide 1.
4. Push turning jaw 1 in the direction of the chuck center point and, at the same time, turn the chuck key clockwise.
5. When the coil has caught turning jaw 1, insert turning jaw 2 into guide 2.
6. Repeat the procedure with jaws 2, 3 and 4 (for a four jaw lathe chuck).
7. Then visually check the positions of the jaws. These must meet centrally.

Mounting the drilling jaws:

1. If you wish to use the drilling jaws again, the process is the repeated in the same order.
2. Three jaw lathe chuck: First jaw 1, then 2, then 3
3. Four jaw lathe chuck: First jaw 1, then 2, then 3, then 4

16. Operational faults and the elimination of such

Operational faults	Possible cause	Remedy
Machine cannot be switched on	230V voltage is not present	Plug is not fitted correctly
		Check the fuse for the socket
	The chuck protection hood is not closed	Close the chuck protection hood
	Emergency off switch not unlocked	Unlock the emergency off switch
	Direction of rotation has not been selected	For machines with 1.4 kW Select the direction of rotation at the turn switch
		For machines with 2.5 kW Select using the 3 setting switch
	Vibrations (e.g. by transportation) have caused the plugged contacts of the drive motor (1.4 kW) board to come undone	Pull the power plug! Remove the cover sheet of the electronic housing and check all plugged contacts
Main spindle motor no longer starts after the unlocking of the emergency off switch	Motor controller must be unlocked	For machines with a 1.4 kW drive motor, the motor must be switched on again using the ON/OFF switch after the emergency off switch is unlocked. After unlocking, wait approximately 5 seconds before switching the machine on.
		For machines with a 2.5 kW drive motor, the 3 setting switch must first be set to STOP after the emergency off switch is unlocked. In this position, wait approximately 5 seconds before switching the machine on. After this, the motor may be switched on as usual.

16. Operational faults and the elimination of such

Operational faults	Possible cause	Remedy
The drive motor (1.4 kW) experiences „skips“ during operation	Carbon brushes and collector of the drive motor are contaminated	Clean the carbon brushes and collector of the drive motor with a piece of coarse sandpaper (See „Maintenance“ section)
	Carbon brushes are worn	Replace carbon brushes with new ones
Tool slide cannot be moved or can only be moved with considerable force	Clamping of the tool slide is on	Open the clamping
	Guide play is set too narrowly	Adapt the guide play
Transverse or longitudinal slide cannot be moved or can only be moved with considerable force	Guide play is set too narrowly	Adapt the guide play
	Play of the trapezoidal-threaded nut is set too narrowly (only cross slide)	Adapt the play of the trapezoidal-threaded nut
Rust on workpieces of machine parts when using coolant lubrication	Wrong coolant set	Check the mixing ratio of the coolant and correct if required (never cool with water alone!)
Tool holder cannot be inserted into the main spindle (reducing sleeve of the main spindle)	An incorrect tool taper of the tool holder has been used in combination with the reducing sleeve	Only use the appropriate tool holders for the machine
	Inner cone of the reducing sleeve or outer cone of the tool holder is contaminated	Reduce the revolutions
Tool overheated	Revolutions too high	Reduce the revolutions
	Feed too high	Reduce the feed
	Working without coolant	Use coolant
	Insufficient coolant feed at the cutting edge	Align the coolant hose correctly
	Tool blunt	Sharpen tool or use a new tool

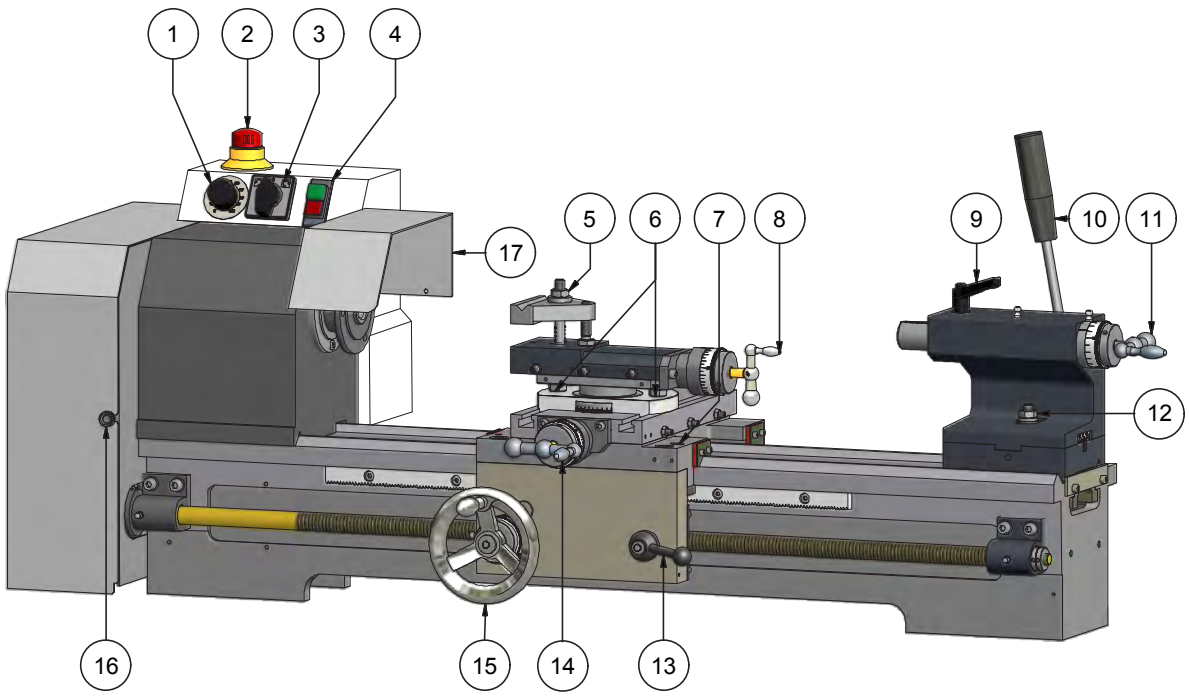
16. Operational faults and the elimination of such

Operational faults	Possible cause	Remedy
Tool overheated	Increased friction caused by shaving build up in the tensioning groove of the tool (drilling work)	Remove the shavings from the hole more frequently (withdraw)
		Use a coated tool
		Wash the processing area with coolant
	Unsuitable tool chosen for the material to be processed	Only use the suitable tool for the relevant material
Tool cannot be removed from the tailstock sleeve	Tailstock sleeve is not fully cranked back	Fully crank back the tailstock sleeve to automatically eject tools with ejector lugs
	Use tool without ejector lugs	Place a soft and sufficient wide inlay between the tool and tailstock front. Now crank the tailstock sleeve back to push the tool out. (Use of tools without ejector lugs is possible by screwing a suitable threaded pin into place which extends the length of the tool backwards)

17. Control elements

17.1 D6000-D6000 hs

17.1.1 D6000 (1.4 kW) with trapezoidal thread spindle

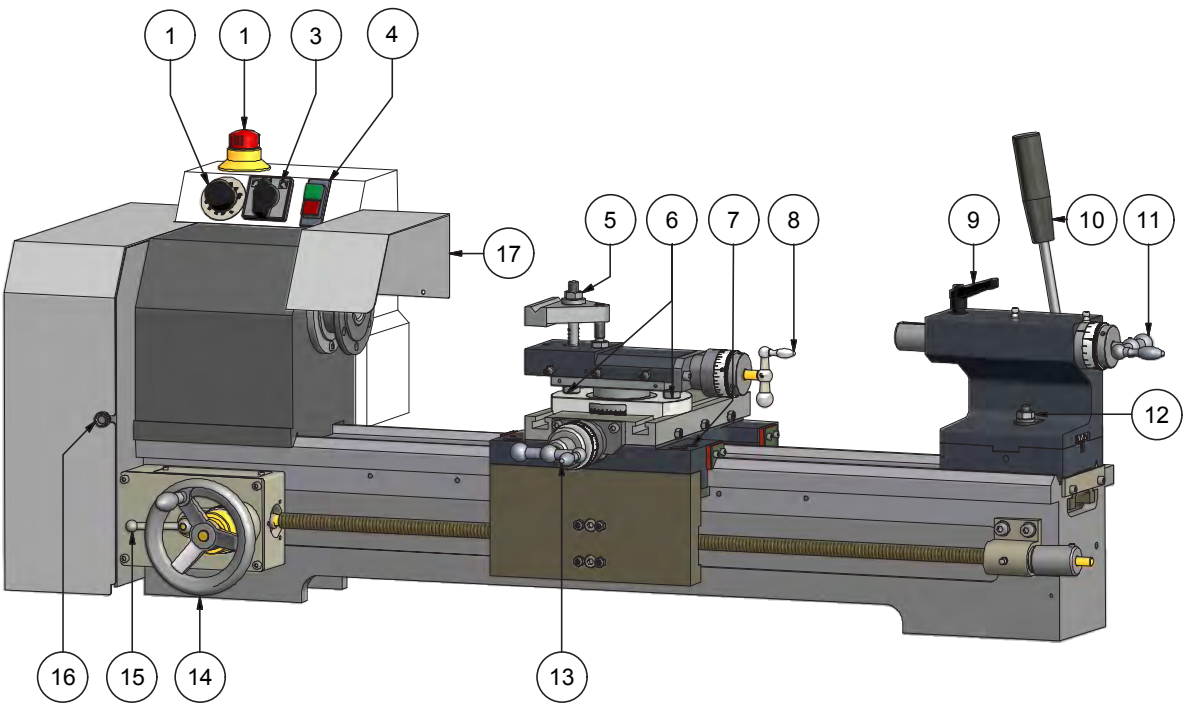


1. Potentiometer rotating knob for speed selection of the electrical drive motor
2. Emergency off switch
3. Turn switch for forwards-reverse - main spindle
4. ON/OFF switch with low voltage trigger
5. Tensioning nut for tool clamping plate
6. Holding screw for longitudinal slide
7. Clamping screw for clamping the tool slide
8. Ball crank for adjusting the longitudinal slide
9. Clamping lever for securing the tailstock sleeve
10. Clamping lever for tailstock quick tensioning
11. Ball crank for adjusting the tailstock sleeve
12. Tensioning nut for securing the tailstock to the guides
13. Switch lever for opening and closing the clasp nut
14. Ball crank for adjusting the cross slide
15. Hand wheel for quickly adjusting the tool slide
16. Safety screw for the drive protection hood
17. Chuck protection hood

17. Control elements

17.1 D6000-D6000 hs

17.1.2 D6000 (1.4 kW) with ball screws

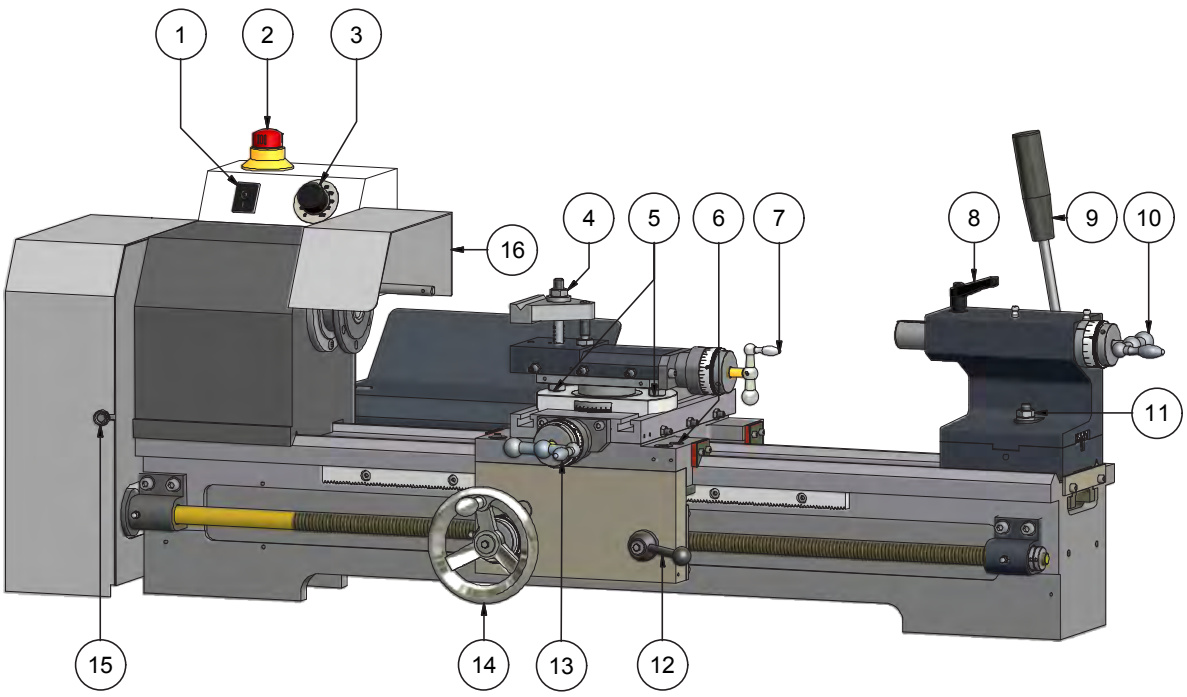


1. Potentiometer rotating knob for speed selection of the electrical drive motor
2. Emergency off switch
3. Turn switch for forwards-reverse - main spindle
4. ON/OFF switch with low voltage trigger
5. Tensioning nut for tool clamping plate
6. Holding screw for longitudinal slide
7. Clamping screw for clamping the tool slide
8. Ball crank for adjusting the longitudinal slide
9. Clamping lever for securing the tailstock sleeve
10. Clamping lever for tailstock quick tensioning
11. Ball crank for adjusting the tailstock sleeve
12. Tensioning nut for securing the tailstock to the guides
13. Ball crank for adjusting the cross slide
14. Hand wheel for quickly adjusting the tool slide
15. Switch lever for switching the automatic feed on and off
16. Safety screw for the drive protection hood
17. Chuck protection hood

17. Control elements

17.1 D6000-D6000 hs

17.1.3 D6000 hs (2.5 kW) with trapezoidal thread spindle

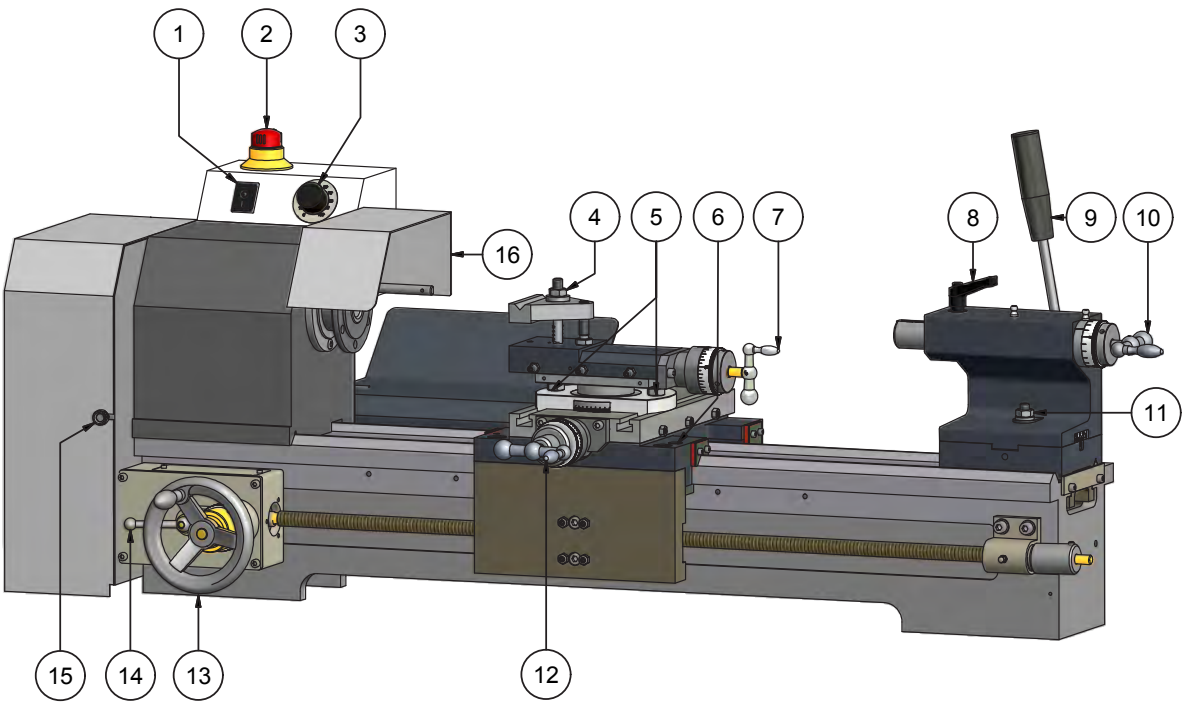


1. Turn switch for forwards-reverse - main spindle
2. Emergency off switch
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. Tensioning nut for tool clamping plate
5. Holding screw for longitudinal slide
6. Clamping screw for clamping the tool slide
7. Ball crank for adjusting the longitudinal slide
8. Clamping lever for securing the tailstock sleeve
9. Clamping lever for tailstock quick tensioning
10. Ball crank for adjusting the tailstock sleeve
11. Tensioning nut for securing the tailstock to the guides
12. Switch lever for opening and closing the clasp nut
13. Ball crank for adjusting the cross slide
14. Hand wheel for quickly adjusting the tool slide
15. Safety screw for the drive protection hood
16. Chuck protection hood

17. Control elements

17.1 D6000-D6000 hs

17.1.4 D6000 hs (2.5 kW) with ball screws

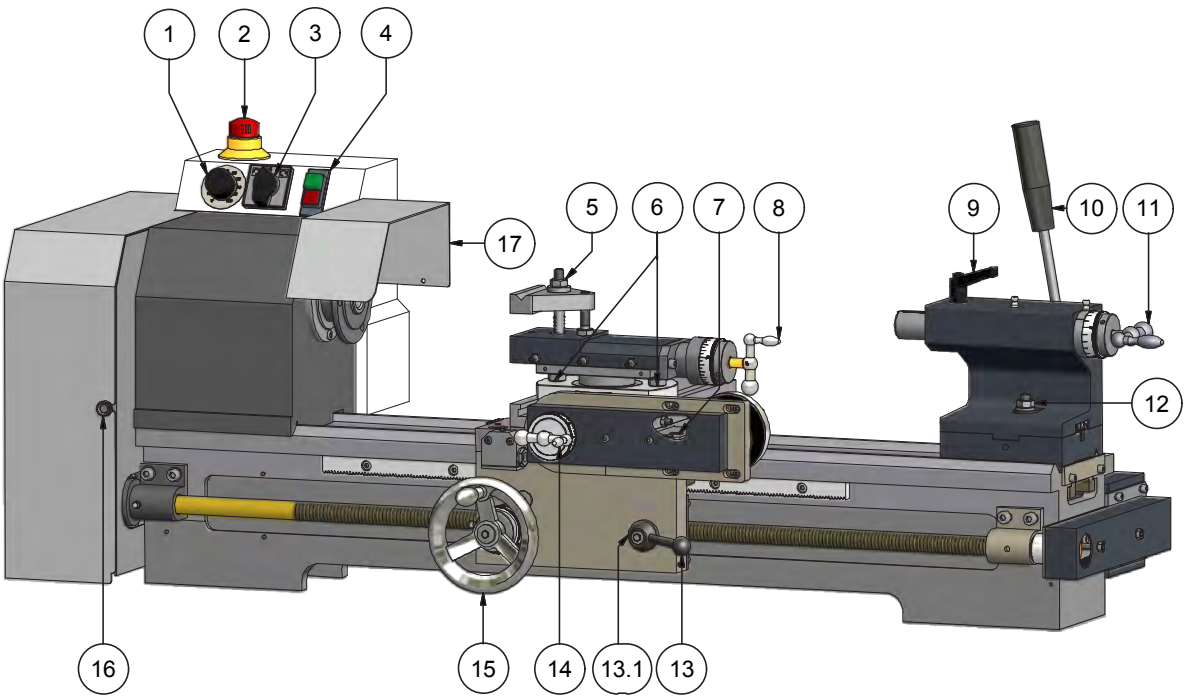


1. Turn switch for forwards-reverse - main spindle
2. Emergency off switch
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. Tensioning nut for tool clamping plate
5. Holding screw for longitudinal slide
6. Clamping screw for clamping the tool slide
7. Ball crank for adjusting the longitudinal slide
8. Clamping lever for securing the tailstock sleeve
9. Clamping lever for tailstock quick tensioning
10. Ball crank for adjusting the tailstock sleeve
11. Tensioning nut for securing the tailstock to the guides
12. Ball crank for adjusting the cross slide
13. Hand wheel for quickly adjusting the tool slide
14. Switch lever for switching the automatic feed on and off
15. Safety screw for the drive protection hood
16. Chuck protection hood

17. Control elements

17.2 D6000-C - D6000-C hs

17.2.1 D6000-C (1.4 kW) with trapezoidal thread spindle



1. Potentiometer rotating knob for speed selection of the electrical drive motor
2. Emergency off switch
3. Turn switch for forwards-reverse - main spindle
4. ON/OFF switch with low voltage trigger
5. Tensioning nut for tool clamping plate
6. Holding screw for longitudinal slide
7. Clamping screw for clamping the tool slide
8. Ball crank for adjusting the longitudinal slide
9. Clamping lever for securing the tailstock sleeve
10. Clamping lever for tailstock quick tensioning
11. Ball crank for adjusting the tailstock sleeve
12. Tensioning nut for securing the tailstock to the guides
13. Switch lever for opening and closing the clasp nut

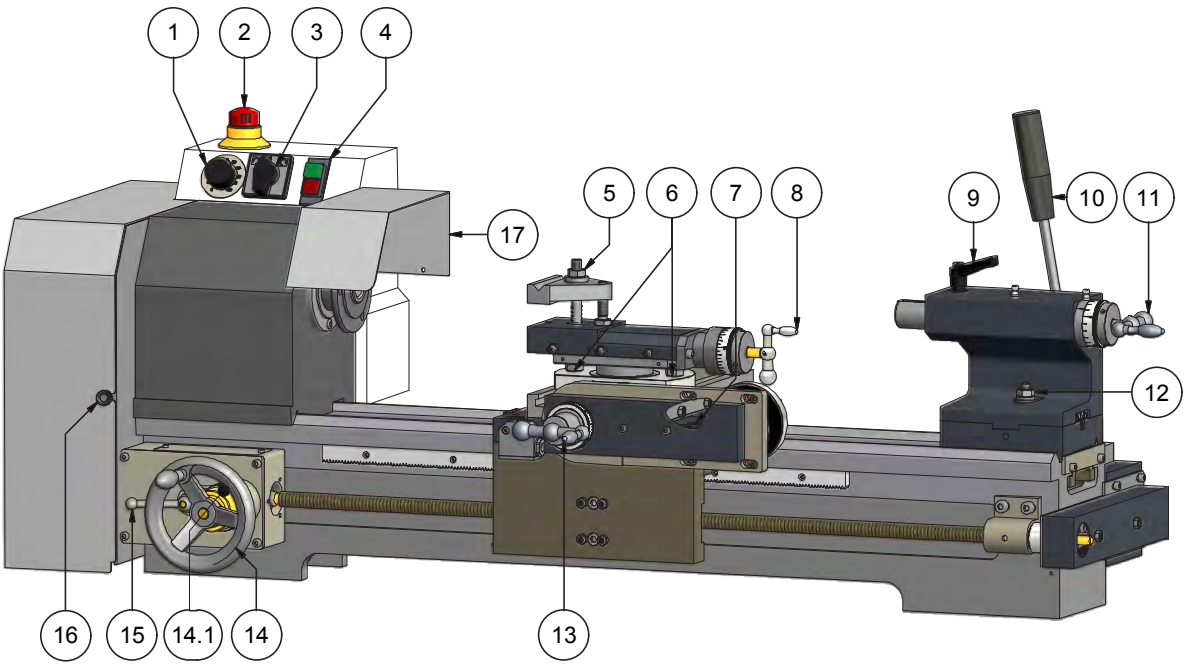
13.1 Threaded pin for securing the switch lever in CNC mode

14. Ball crank for adjusting the cross slide
15. Hand wheel for quickly adjusting the tool slide
16. Safety screw for the drive protection hood
17. Chuck protection hood

17. Control elements

17.2 D6000-C - D6000-C hs

17.2.2 D6000-C (1.4 kW) with ball screws



1. Potentiometer rotating knob for speed selection of the electrical drive motor
2. Emergency off switch
3. Turn switch for forwards-reverse - main spindle
4. ON/OFF switch with low voltage trigger
5. Tensioning nut for tool clamping plate
6. Holding screw for longitudinal slide
7. Clamping screw for clamping the tool slide
8. Ball crank for adjusting the longitudinal slide
9. Clamping lever for securing the tailstock sleeve
10. Clamping lever for tailstock quick tensioning
11. Ball crank for adjusting the tailstock sleeve
12. Tensioning nut for securing the tailstock to the guides
13. Ball crank for adjusting the cross slide
14. Hand wheel for quickly adjusting the tool slide

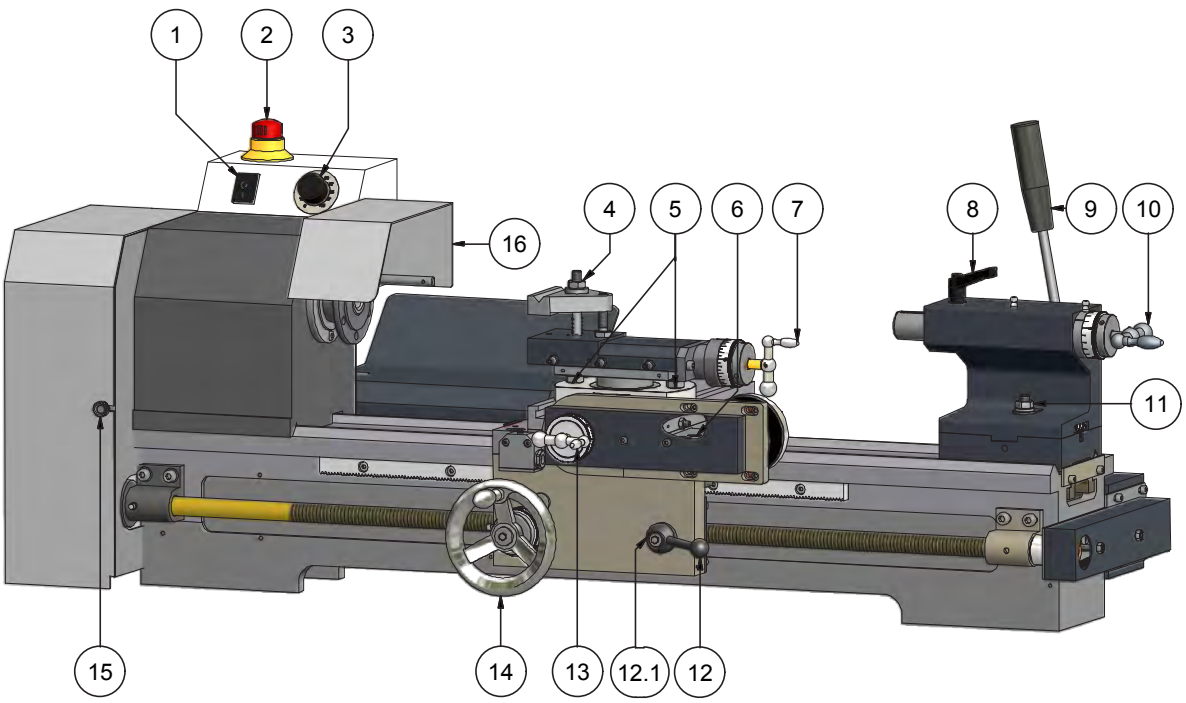
14.1 Threaded pin for securing the hand wheel in manual mode

15. Switch lever for switching the automatic feed on and off
16. Safety screw for the drive protection hood
17. Chuck protection hood

17. Control elements

17.2 D6000-C - D6000-C hs

17.2.3 D6000-C hs (2.5 kW) with trapezoidal thread spindle

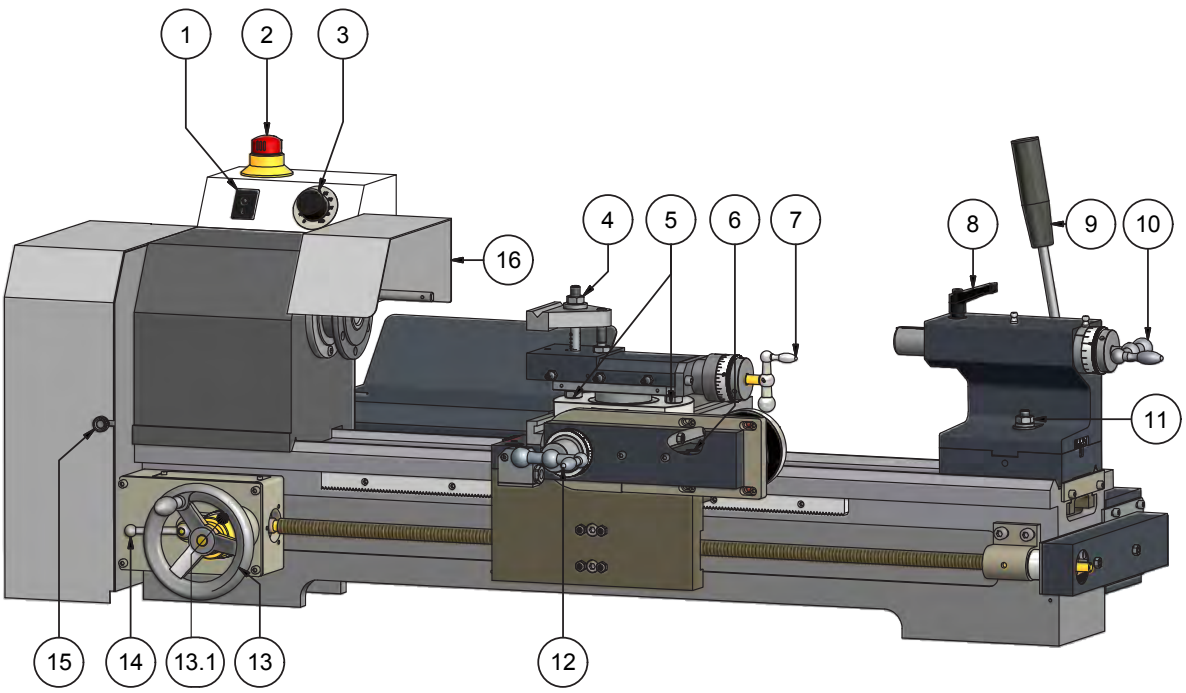


1. Turn switch for forwards-reverse - main spindle
2. Emergency off switch
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. Tensioning nut for tool clamping plate
5. Holding screw for longitudinal slide
6. Clamping screw for clamping the tool slide
7. Ball crank for adjusting the longitudinal slide
8. Clamping lever for securing the tailstock sleeve
9. Clamping lever for tailstock quick tensioning
10. Ball crank for adjusting the tailstock sleeve
11. Tensioning nut for securing the tailstock to the guides
12. Switch lever for opening and closing the clasp nut
13. Threaded pin for securing the switch lever in CNC mode
14. Ball crank for adjusting the cross slide
15. Hand wheel for quickly adjusting the tool slide
16. Safety screw for the drive protection hood
17. Chuck protection hood

17. Control elements

17.2 D6000-C - D6000-C hs

17.2.4 D6000-C hs (2.5 kW) with ball screws



1. Turn switch for forwards-reverse - main spindle
2. Emergency off switch
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. Tensioning nut for tool clamping plate
5. Holding screw for longitudinal slide
6. Clamping screw for clamping the tool slide
7. Ball crank for adjusting the longitudinal slide
8. Clamping lever for securing the tailstock sleeve
9. Clamping lever for tailstock quick tensioning
10. Ball crank for adjusting the tailstock sleeve
11. Tensioning nut for securing the tailstock to the guides
12. Ball crank for adjusting the cross slide
13. Hand wheel for quickly adjusting the tool slide

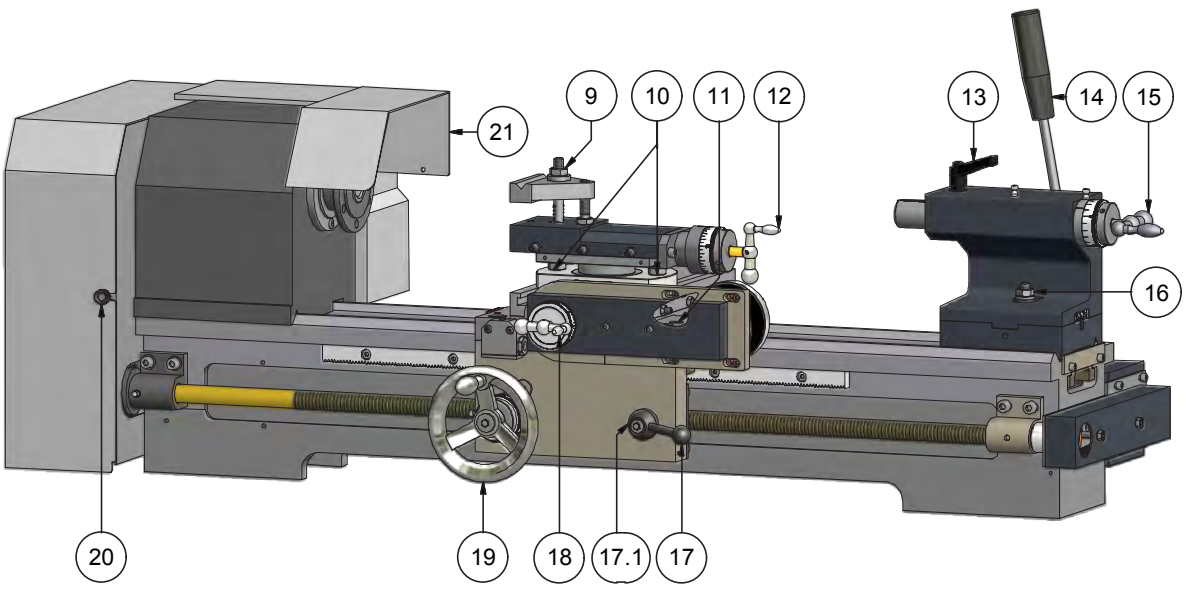
13.1 Threaded pin for securing the hand wheel in manual mode

14. Switch lever for switching the automatic feed on and off
15. Safety screw for the drive protection hood
16. Chuck protection hood

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

17.3.1 CC-D6000 (1.4 kW) with trapezoidal thread spindle



9. Tensioning nut for tool clamping plate
10. Holding screw for longitudinal slide
11. Clamping screw for clamping the tool slide
12. Ball crank for adjusting the longitudinal slide
13. Clamping lever for securing the tailstock sleeve
14. Clamping lever for tailstock quick tensioning
15. Ball crank for adjusting the tailstock sleeve
16. Tensioning nut for securing the tailstock to the guides
17. Switch lever for opening and closing the clasp nut

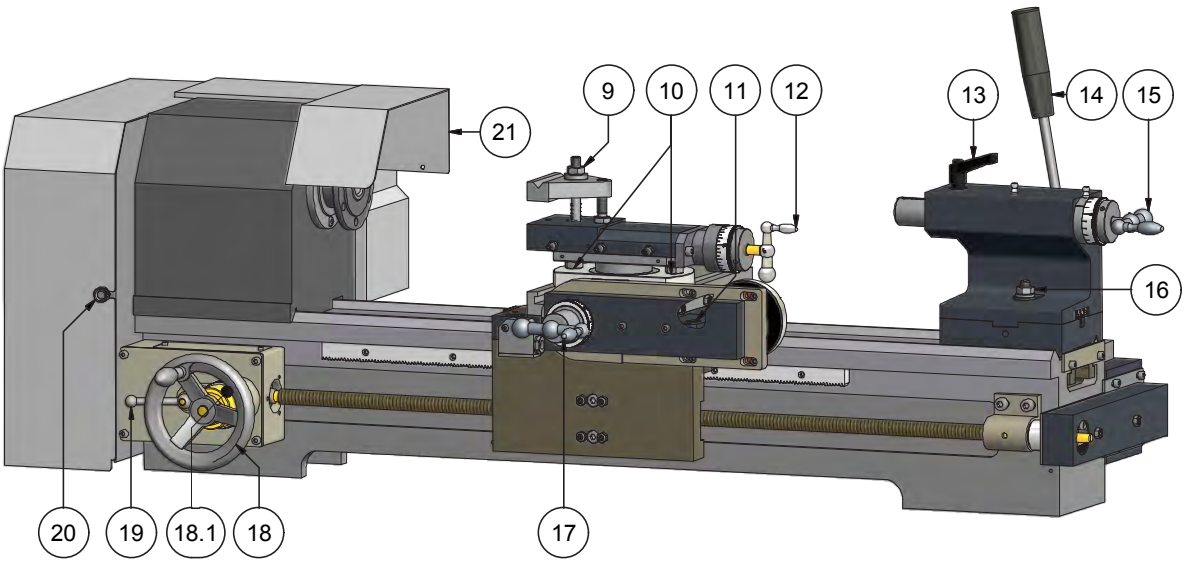
17.1 Threaded pin for securing the switch lever in CNC mode

18. Ball crank for adjusting the cross slide
19. Hand wheel for quickly adjusting the tool slide
20. Safety screw for the drive protection hood
21. Chuck protection hood

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

17.3.2 CC-D6000 (1.4 kW) with ball screws



9. Tensioning nut for tool clamping plate
10. Holding screw for longitudinal slide
11. Clamping screw for clamping the tool slide
12. Ball crank for adjusting the longitudinal slide
13. Clamping lever for securing the tailstock sleeve
14. Clamping lever for tailstock quick tensioning
15. Ball crank for adjusting the tailstock sleeve
16. Tensioning nut for securing the tailstock to the guides
17. Ball crank for adjusting the cross slide
18. Hand wheel for quickly adjusting the tool slide

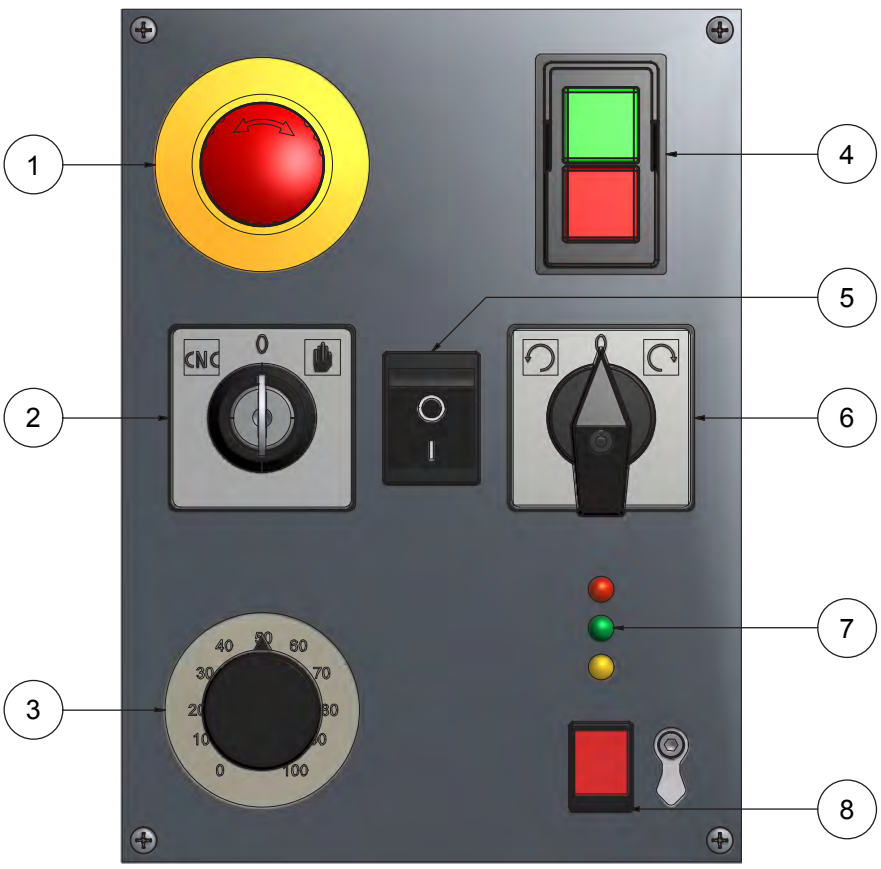
18.1 Threaded pin for securing the hand wheel in manual mode

19. Switch lever for switching the automatic feed on and off
20. Safety screw for the drive protection hood
21. Chuck protection hood

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

17.3.3 Switch cover on CNC control panel for CC-D6000 lathes with 1.4 kW motor

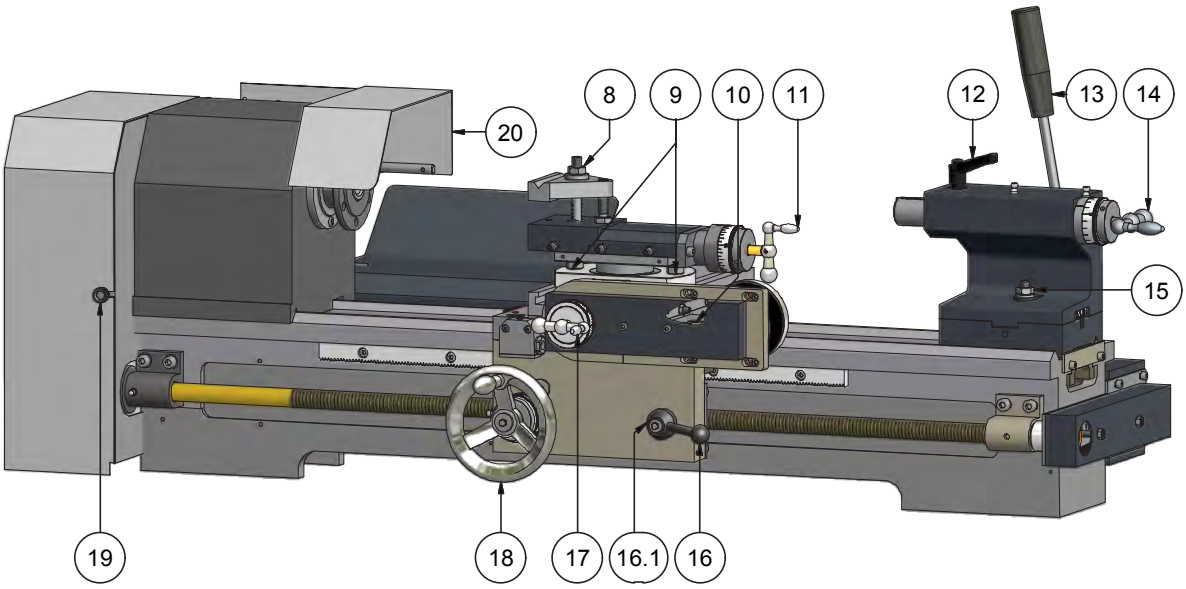


1. Emergency off switch
2. Mode selection switch (CNC operation) (Idle position) (Set-up mode)
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. ON/OFF switch with low voltage trigger
5. Coolant ON/OFF (if coolant pump is connected)
6. Turn switch for forwards-reverse - main spindle
7. Diodes to display the status of the controller
8. Reset switch for controller

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

17.3.4 CC-D6000 hs (2.5 kW) with trapezoidal thread spindle



8. Tensioning nut for tool clamping plate
9. Holding screw for longitudinal slide
10. Clamping screw for clamping the tool slide
11. Ball crank for adjusting the longitudinal slide
12. Clamping lever for securing the tailstock sleeve
13. Clamping lever for tailstock quick tensioning
14. Ball crank for adjusting the tailstock sleeve
15. Tensioning nut for securing the tailstock to the guides
16. Switch lever for opening and closing the clasp nut

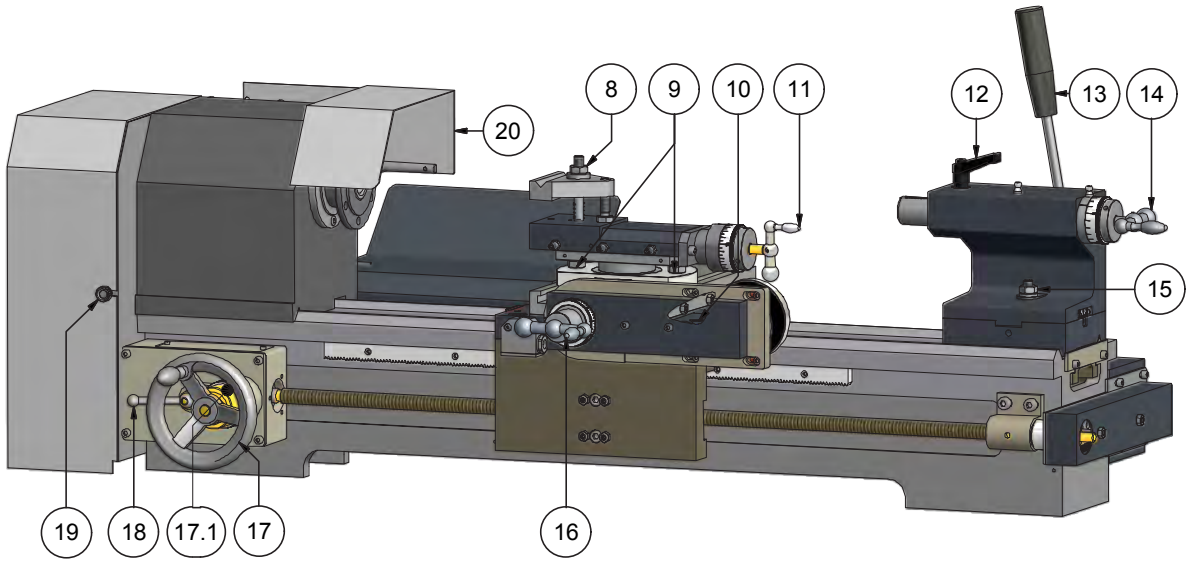
16.1 Threaded pin for securing the switch lever in CNC mode

17. Ball crank for adjusting the cross slide
18. Hand wheel for quickly adjusting the tool slide
19. Safety screw for the drive protection hood
20. Chuck protection hood

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

17.3.5 CC-D6000 hs (2.5 kW) with ball screws



8. Tensioning nut for tool clamping plate
9. Holding screw for longitudinal slide
10. Clamping screw for clamping the tool slide
11. Ball crank for adjusting the longitudinal slide
12. Clamping lever for securing the tailstock sleeve
13. Clamping lever for tailstock quick tensioning
14. Ball crank for adjusting the tailstock sleeve
15. Tensioning nut for securing the tailstock to the guides
16. Ball crank for adjusting the cross slide
17. Hand wheel for quickly adjusting the tool slide

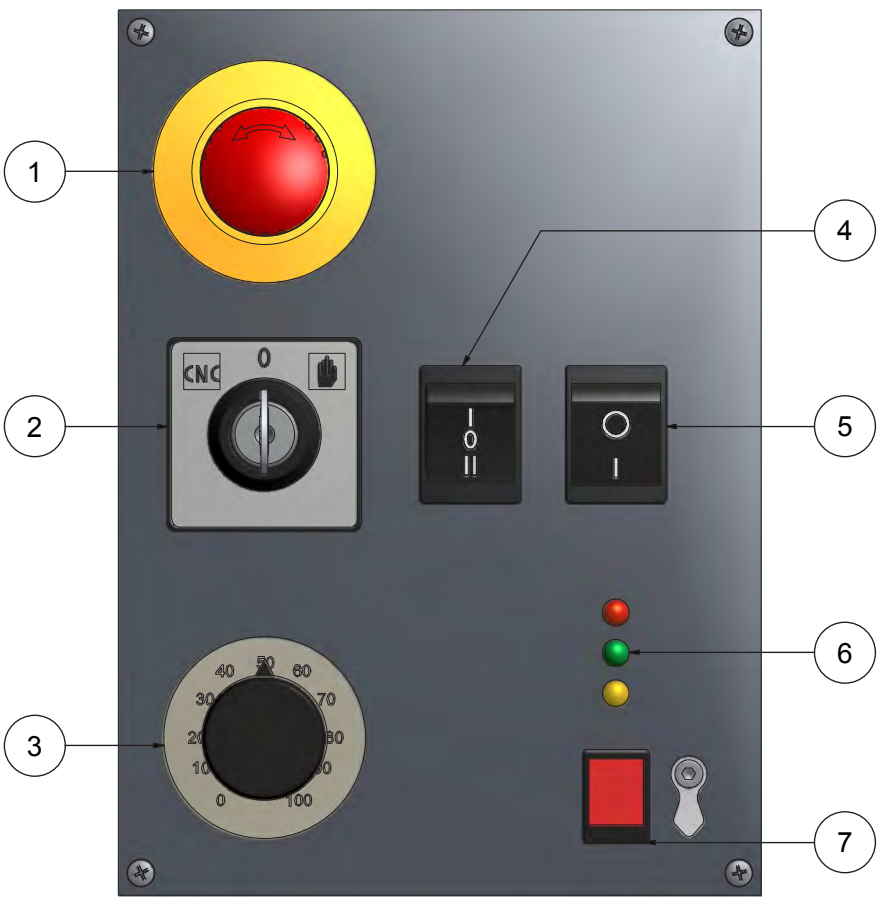
17.1 Threaded pin for securing the hand wheel in manual mode

18. Switch lever for switching the automatic feed on and off
19. Safety screw for the drive protection hood
20. Chuck protection hood

17. Control elements

17.3 CC-D6000 - CC-D6000 hs

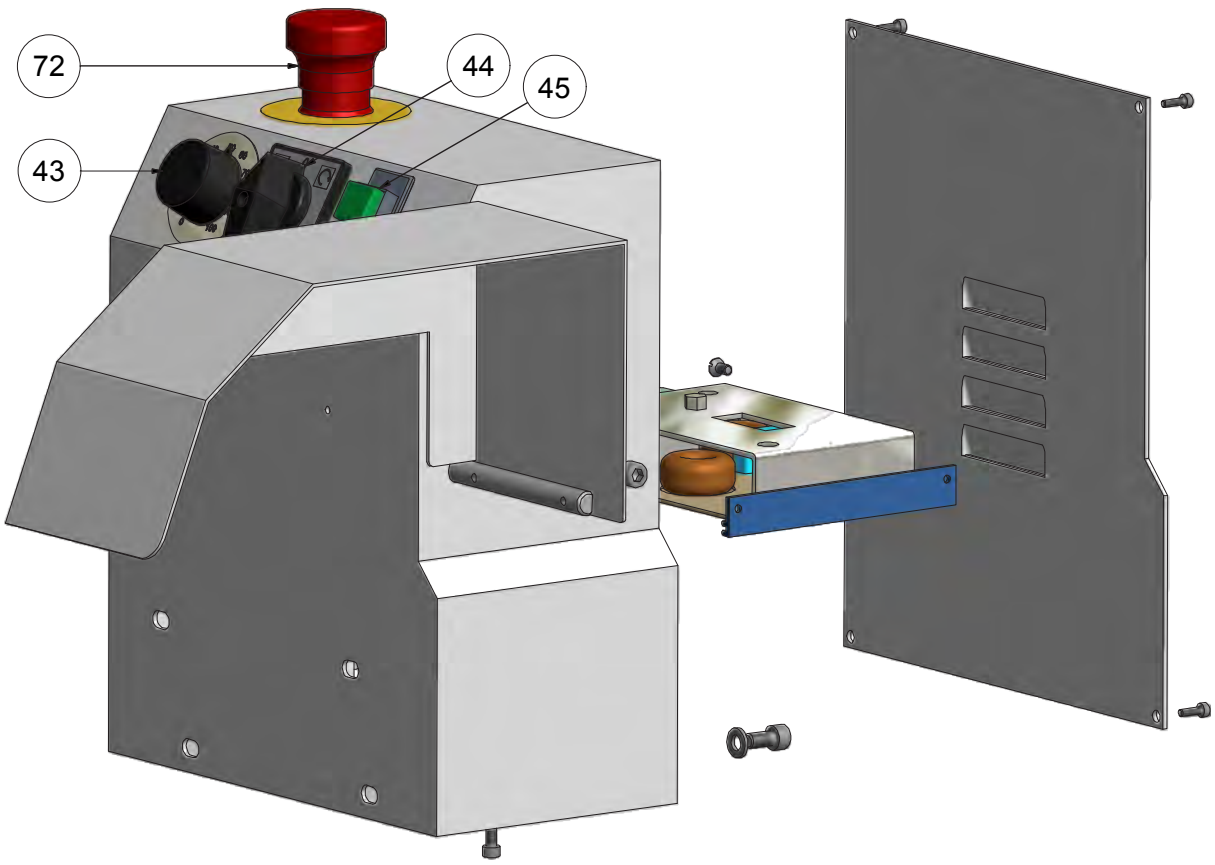
17.3.6 Switch cover on CNC control panel for lathes of type CC-D6000 with 2.5 kW motor



1. Emergency off switch
2. Mode selection switch (CNC operation) (Idle position) (Set-up mode)
3. Potentiometer rotating knob for speed selection of the electrical drive motor
4. 3-setting switch of the electrical drive motor (I=START RIGHT 0=STOP II=START LEFT)
5. Coolant ON/OFF (if coolant pump is connected)
6. Diodes to display the status of the controller
7. Reset switch for controller

18. Drawings and legends

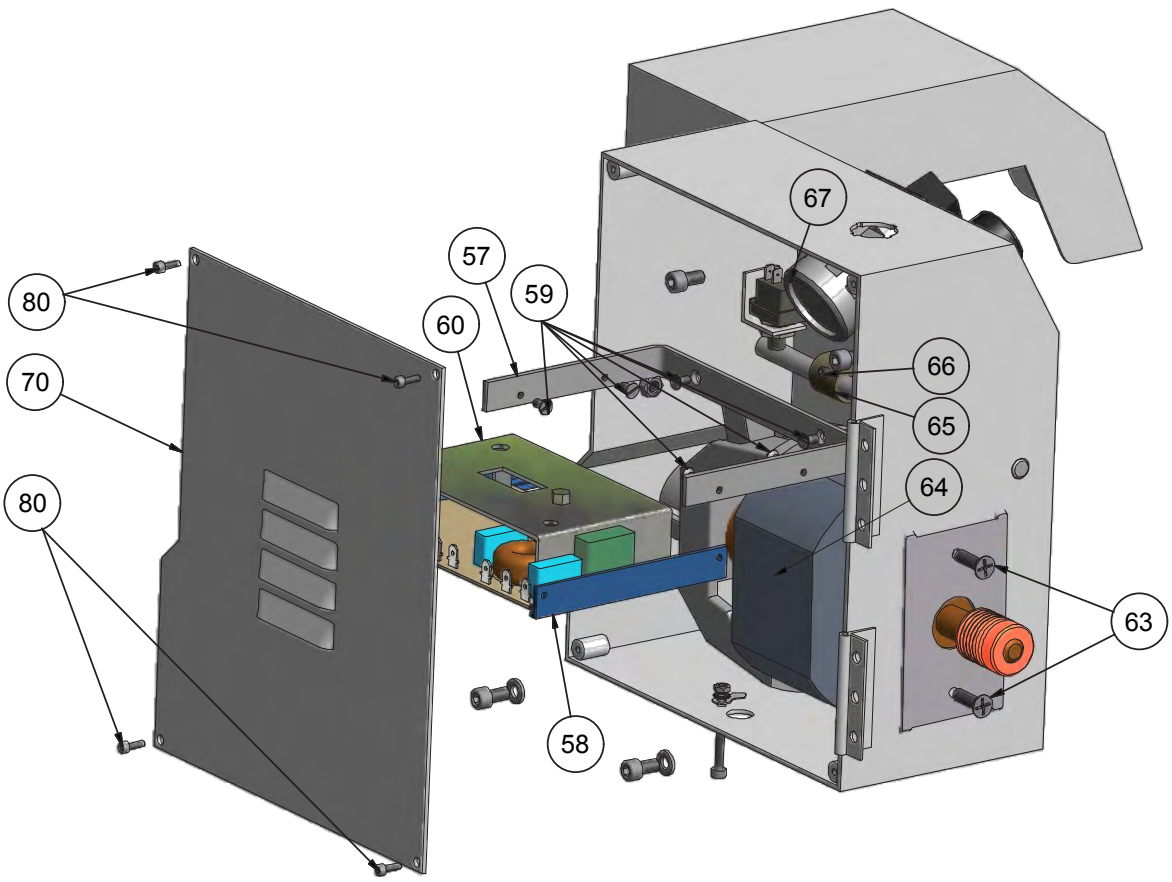
18.1 Electronic console, 1.4 kW motor



Part No.	Items	Order No.	Description
43	1	51500807-0001	Potentiometer with cable and connector
43.1	1	51500807-00011	Potentiometer, complete
44	1	51500608	Turn switch
45	1	51500606-0001	On-Off switch
72	1	51500624-0001	Emergency off button, complete

18. Drawings and legends

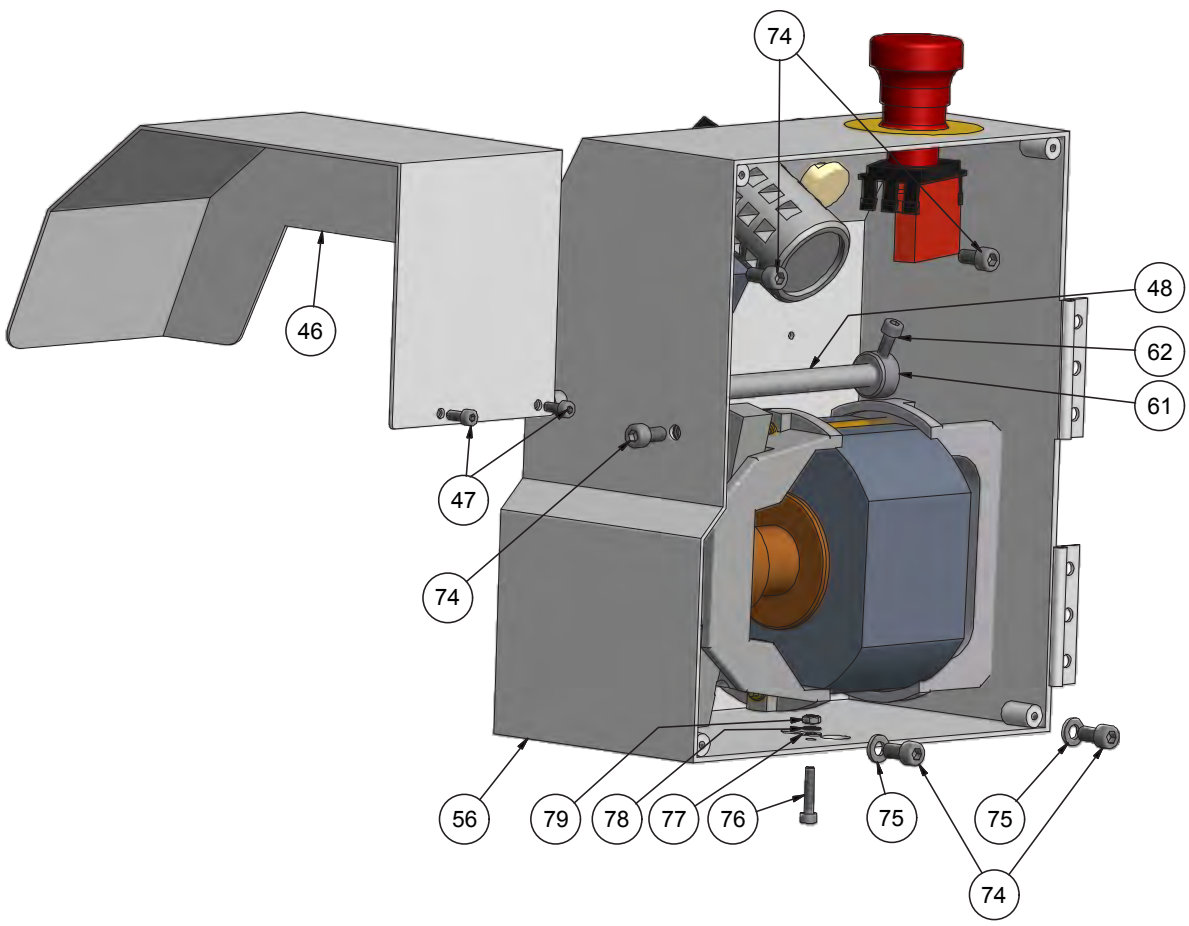
18.1 Electronic console, 1.4 kW motor



Part No	Items	Order No	Description
57	1	51001015-00021	Board holder with guide rails
59	6	16196500004008	Screw
60	1	51501402	Control board
63	2	16179910006020	Screw
64	1	51500102-0002	Motor
	1	51500108-0001	2 carbon brushes with brush holder
65	1	51004020-0003	Eccentric tappet
66	1	16191300005006	Threaded pin
67	1	51500619	Limit switch
70	1	51400405-0001	Cover plate
80	4	16191200004010	Screw

18. Drawings and legends

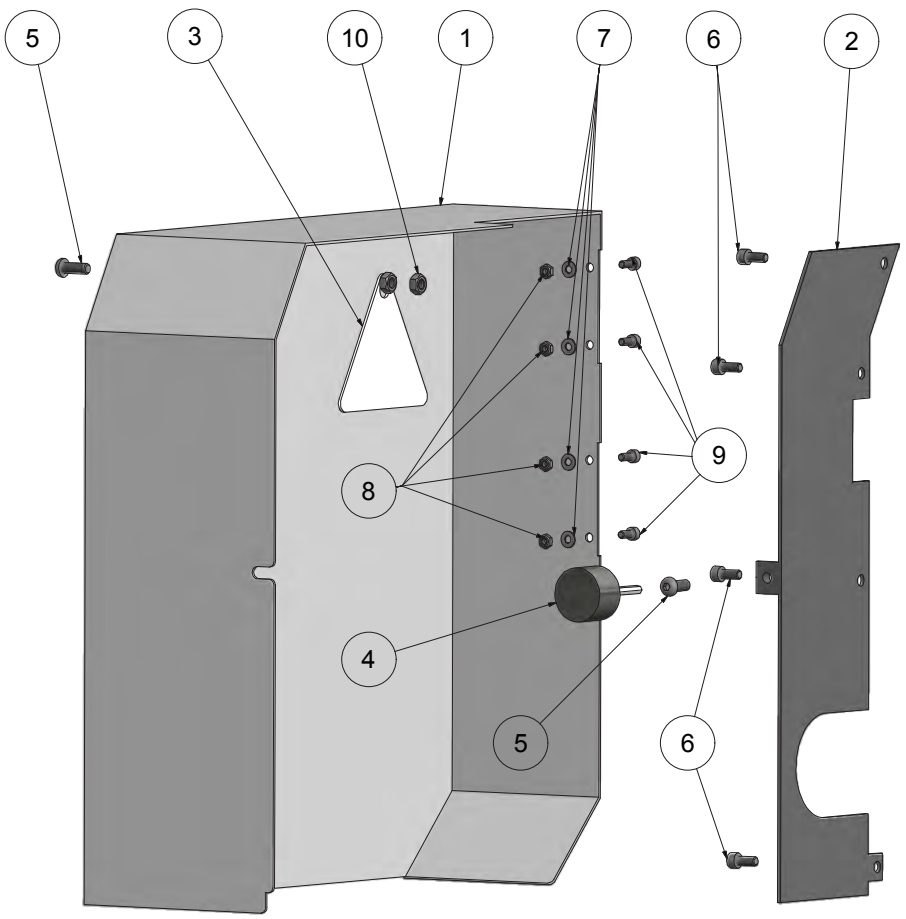
18.1 Electronic console, 1.4 kW motor



Part No.	Items	Order No.	Description
46	1	51400403-0001	Chuck protective hood
47	2	16191200004010	Screw
48	1	51004010-0010	Guide rod
56	1	51400406-0001	Electronic housing
61	1	160705A0010000	Adjusting ring
62	1	16191200005020	Screw
74	5	16191200006012	Screw
75	2	16112500006001	Washer
76	1	16191200004016	Screw
77	1	51501304	Symbol for earthed connection
78	2	16167980004000	Fanned washer
79	2	16193400004000	Nut

18. Drawings and legends

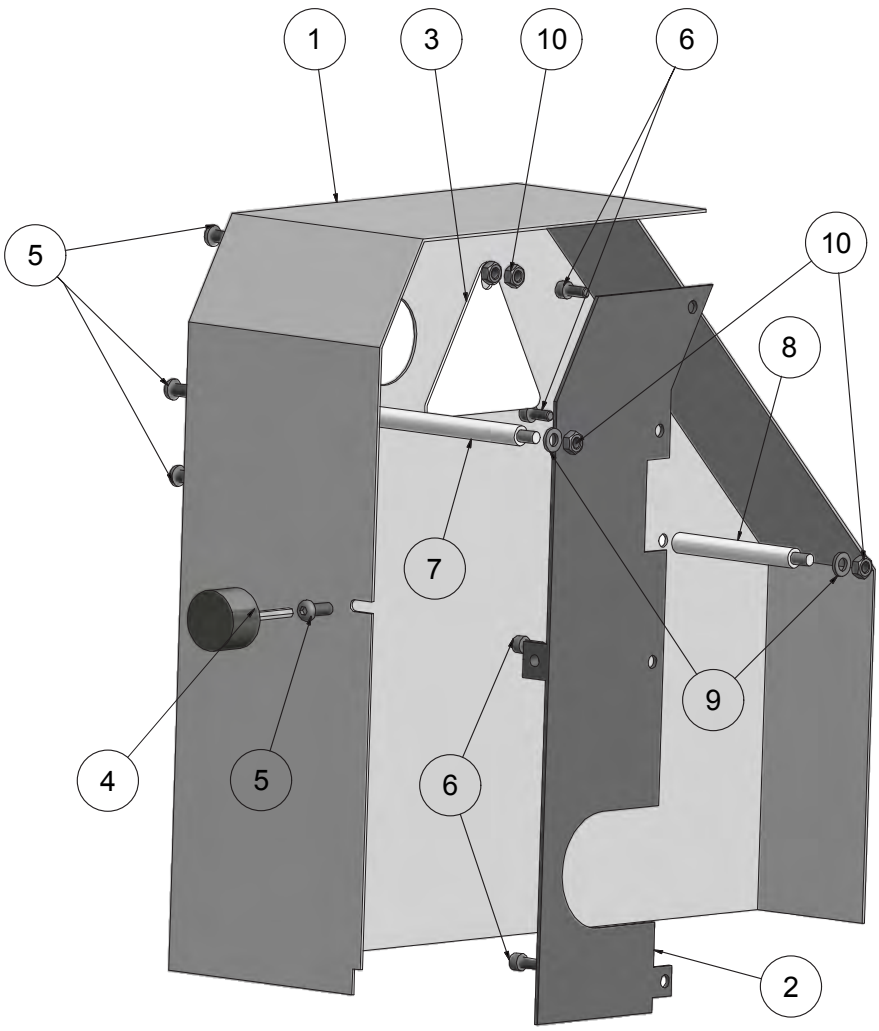
18.2 Protective hood, drive 1.4 kW motor



Part No.	Items	Order No.	Description
1	1	51400401-0001	Protective hood, drive
2	1	51400404-0001	Protective plate, lead screw drive
3	1	51400485-0001	Protective plate, spindle aperture
4	1	51508001	Key KW 4 for safety screw
5	2	16173800006012	Safety screw
6	4	16191200005012	Screw
7	4	16112500004000	Washer
8	4	16193400004000	Nut
9	4	16191200004010	Screw
10	1	16193400006000	Nut

18. Drawings and legends

18.3 Protective hood, drive 2.5 kW motor



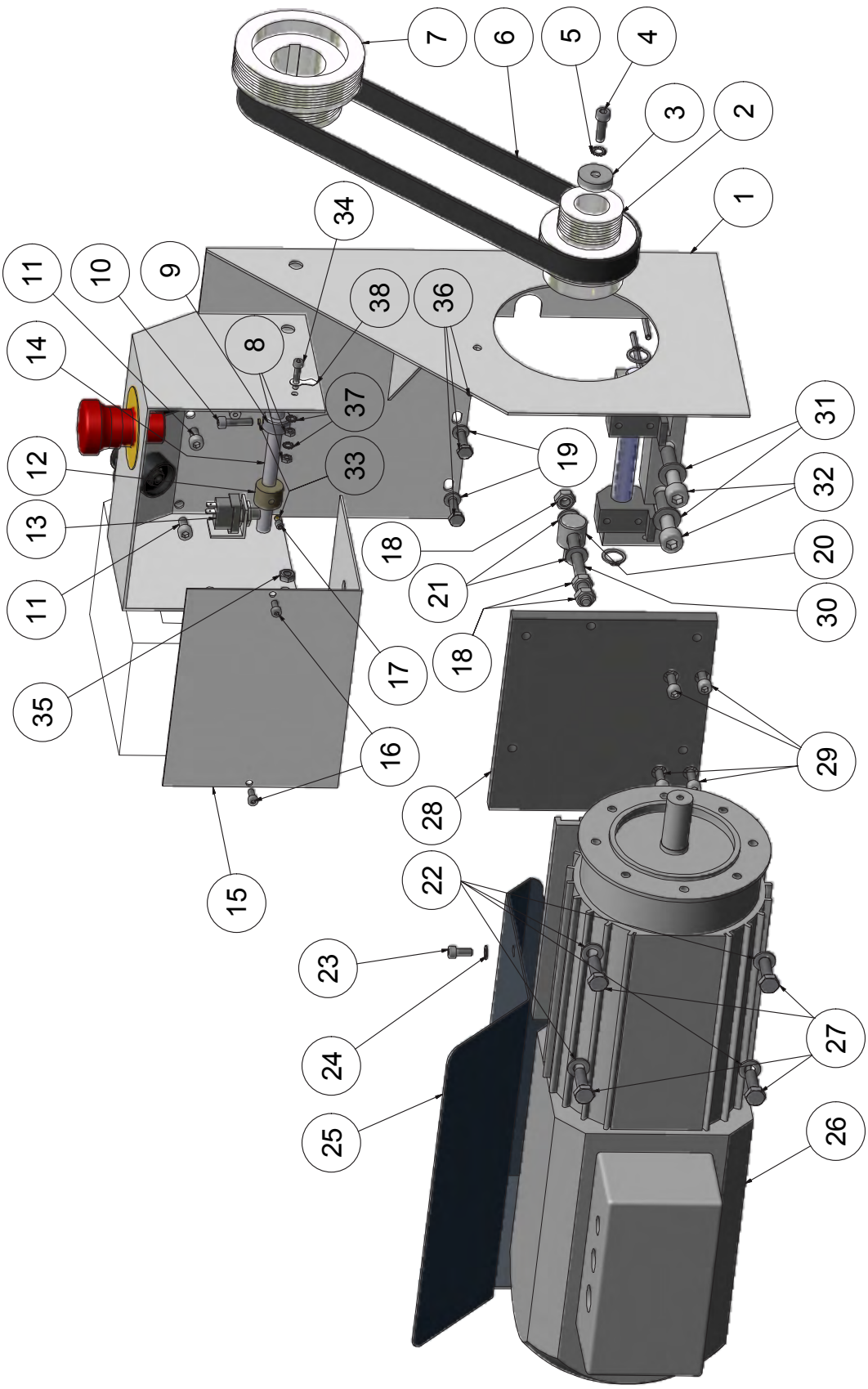
18. Drawings and legends

18.3 Protective hood, drive 2.5 kW motor

Part No	Items	Order No.	Description
1	1	51400421-0001	Protective hood, drive
2	1	51400404-0001	Protective plate, lead screw drive
3	1	51400485-0001	Protective plate, spindle aperture
4	1	51508001	Key KW 4 for safety screw
5	4	16173800006012	Safety screw
6	4	16191200005012	Screw
7	1	51004010-0006	Spacer bolt, long
8	1	51004010-0007	Spacer bolt, short
9	2	16112500006001	Washer
10	3	16193400006000	Nut

18. Drawings and legends

18.4 Electronic console, 2.5 kW motor



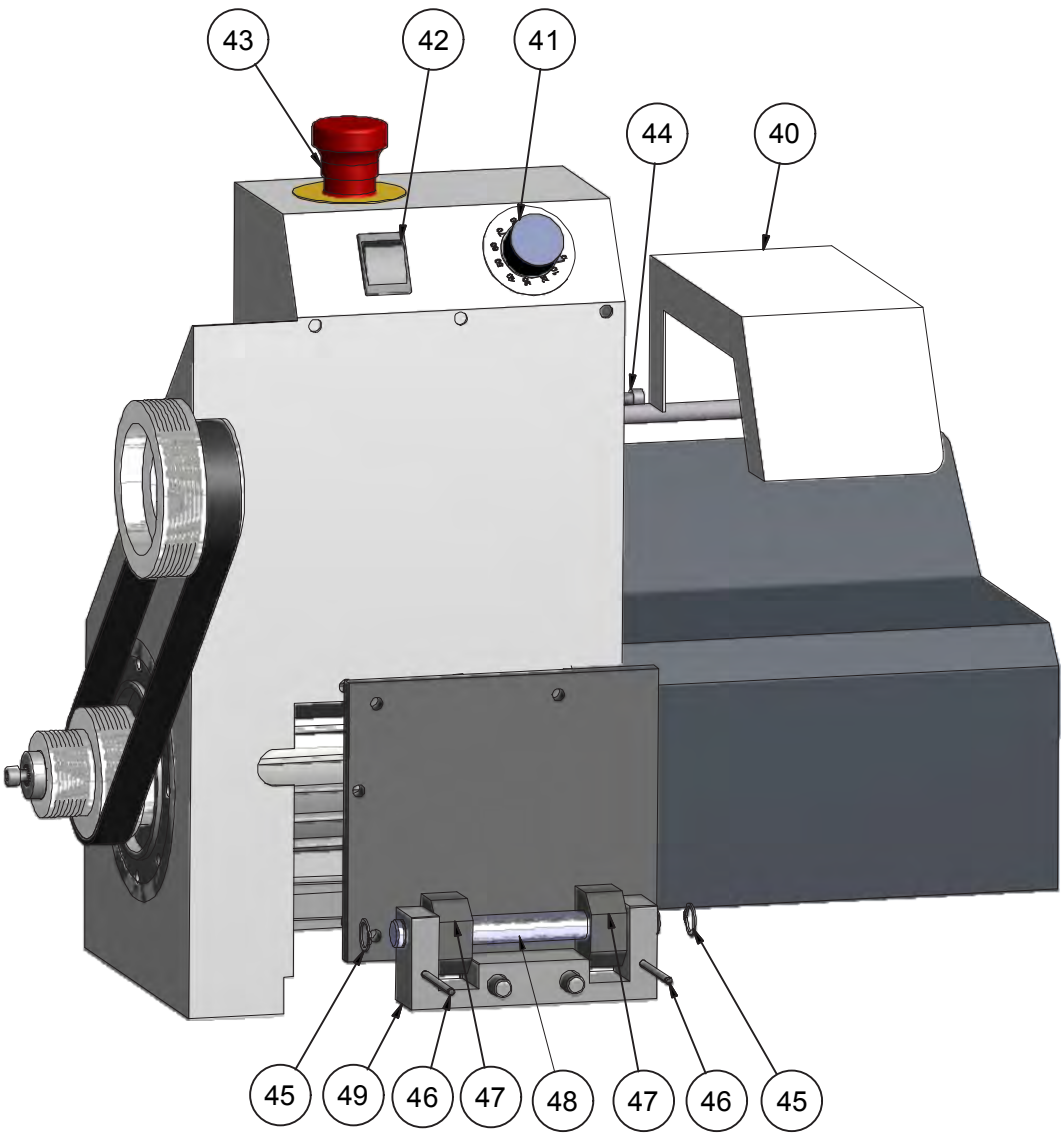
18. Drawings and legends

18.4 Electronic console, 2.5 kW motor

Part No.	Items	Order No.	Description
1	1	51400420-0001	Switching cabinet
2	1	51006575-0001	Gear wheel motor
3	1	51004025-0024	Pressure washer
4	1	16191200006020	Screw
5	1	16167980006000	Fanned washer
6	1	51502311	Drive belt 762
7	1	51006600-0001	Gear wheel main spindle
8	2	16193400004000	Nut
9	1	160705A0010000	Adjusting ring
10	1	16191200005020	Screw
11	3	16191200006012	Screw
12	1	51004020-0003	Eccentric tappet
13	1	51500619	Limit switch
14	1	51004010-0010	Guide rod
	2	16191200004010	Screw
15	1	51400422-0001	Electronic protection
16	2	16191200004010	Screw
17	1	16191300005006	Threaded pin
18	3	16193400008000	Nut
19	3	16112500006001	Washer
20	1	51004020-0017	Cotter pin
21	2	16112500008001	Washer
22	4	16112500008001	Washer
23	1	16191200005012	Screw
24	1	16112500005000	Washer
25	1	51401518-0001	Motor cover
26	1	51500128-0001	Motor 2.5 kW
27	4	16193300008020	Screw
28	1	51006290-0001	Holding plate
29	4	16191200006016	Screw
30	1	16197500008000-0001	Threaded rod
31	2	16112500010000	Washer
32	2	16191200010060	Screw
33	2	51007250-0001	Push piece
34	1	16191200004016	Screw
35	1	16193400006000	Nut
36	3	16193300006016	Screw
37	2	16167980004000	Fanned washer
38	1	51501304	Symbol for earthed connection

18. Drawings and legends

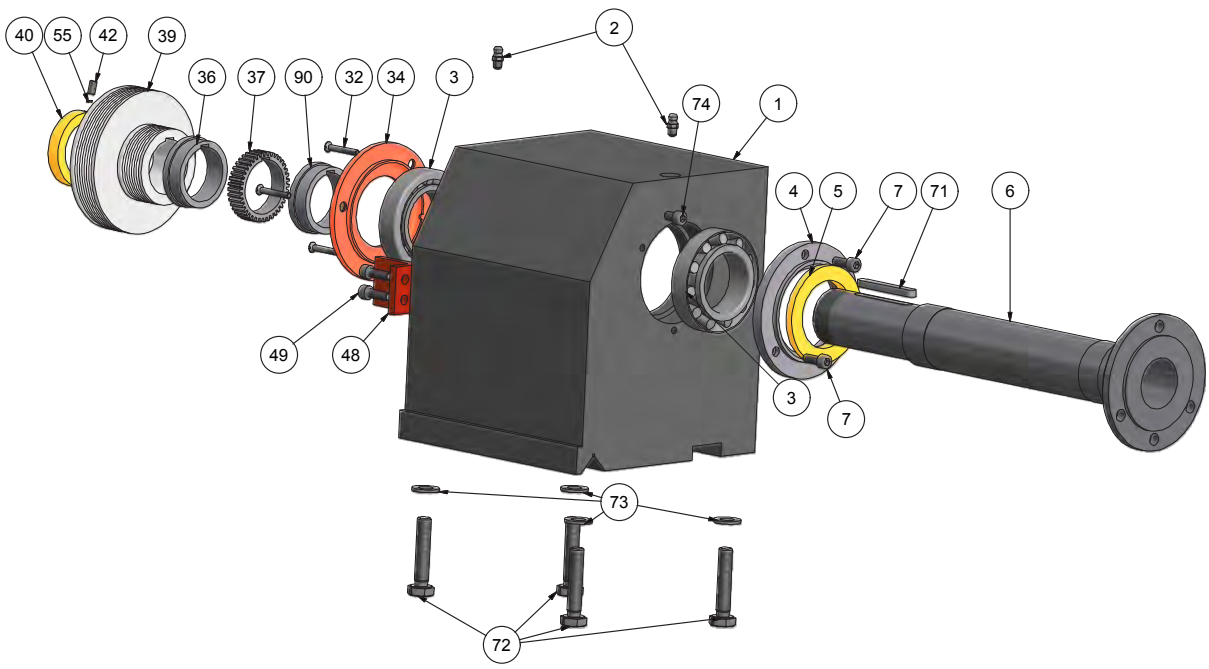
18.4 Electronic console, 2.5 kW motor



Part No.	Items	Order No.	Description
40	1	51400403-0001	Chuck protective hood
41	1	51500801-0001	Potentiometer
42	1	51500602	Switch
43	1	51500624-0001	Emergency off button, complete
44	1	16191200006012	Screw
45	2	16147100012003	Securing ring
46	2	16073430004050	Spiral tensioning pin
47	2	51006940-0002	Bearing element, plate
48	1	51004015-0005	Shaft
49	1	51006450-0001	Motor pinion

18. Drawings and legends

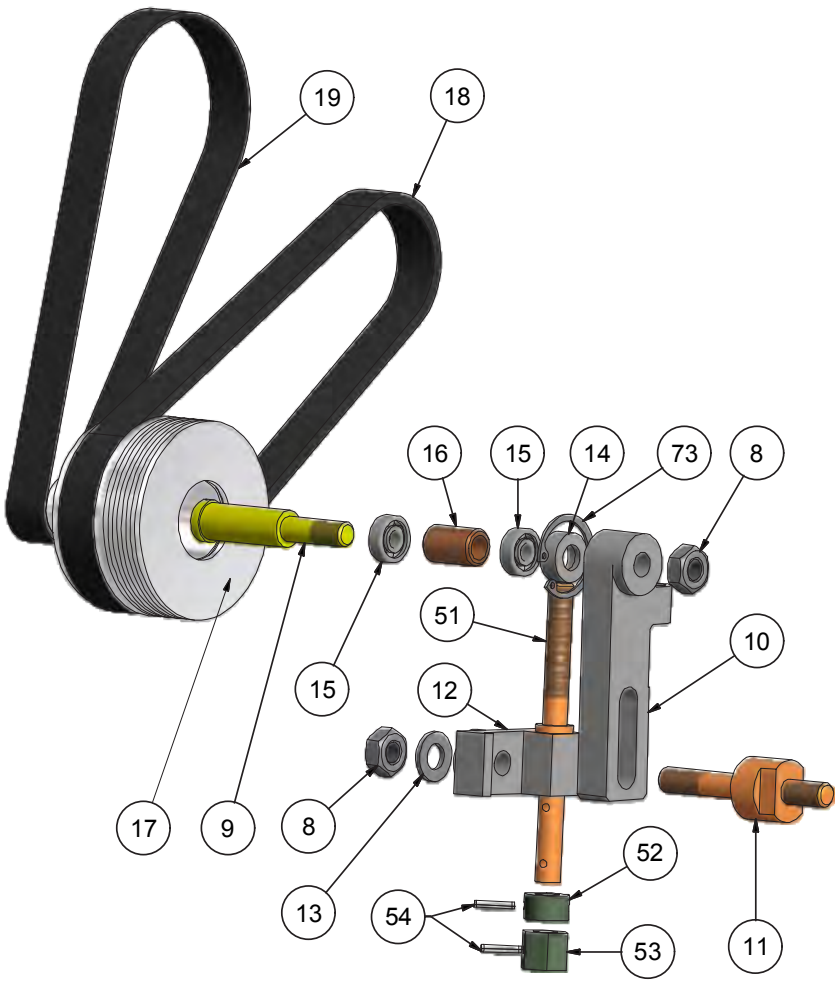
18.5 Headstock



Part No	Items	Order No.	Description
1	1	10600101	Headstock
2	2	51502517	Lubrication nipple
3	2	51502109	Tapered roller bearing
4	1	10600104	Flange
5	1	10600105	Oil scraper ring
6	1	10600106	Main spindle
7	3	16191200006012	Screw
32	3	16196500006014	Screw
34	1	10600134	Flange
36	1	10600136	Sleeve
37	1	10600137	Toothed wheel
39	1	10600139	Gear wheel with 1.4 kW motor
	1	51006600-0001	Gear wheel with 2.5 kW motor
40	1	51004055-0007	Nut
42	1	16091300006006	Threaded pin
48	1	10600148	Bracket
49	2	16191200006016	Screw
55	1	51007250-0001	Push piece
71	1	10600171	Parallel key
72	4	16193300010050	Screw
73	4	16112500010000	Washer
74	1	16191200005012	Screw
90	1	51004055-0003	Bush with collar

18. Drawings and legends

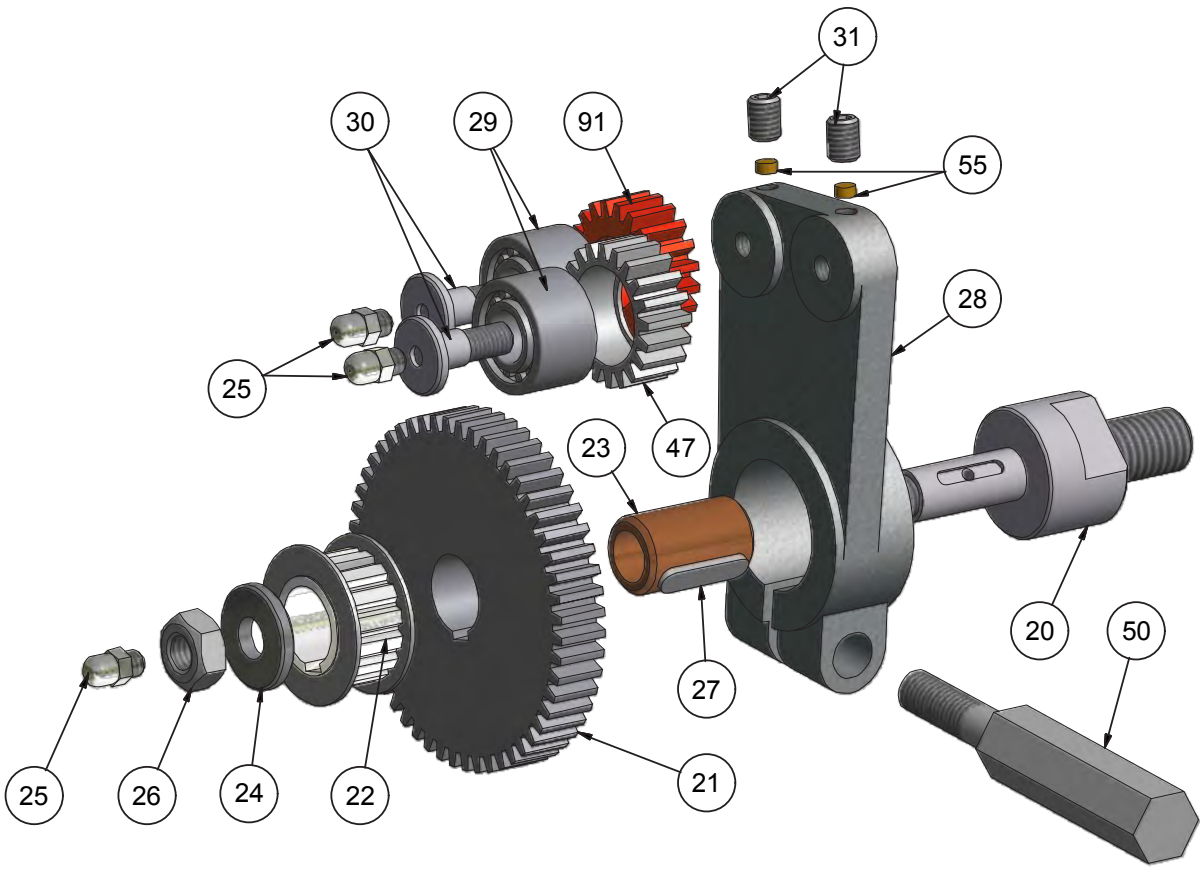
18.6 Headstock – Intermediate gear with trapezoidal thread spindle 1.4 kW motor



Part No.	Items	Order No.	Description
8	2	16193400010000	Nut
9	1	10600109	Axes
10	1	10600110	Intermediate gear lever
11	1	10600111	Intermediate gear bolt
12	1	10600112	Clamping piece
13	1	16112500010000	Washer
14	1	10600114	Sleeve
15	2	51502113	Ball bearing
16	1	10600116	Sleeve
17	1	10600117	Gear wheel
18	1	51502310	Belt 508
19	1	51502315	Belt 559
51	1	10600151	Clamping screw
52	1	10600152	Adjusting ring
53	1	10600153	Hexagonal element
54	2	16073430003014	Spiral tensioning pin
73	1	16047200032000	Securing ring

18. Drawings and legends

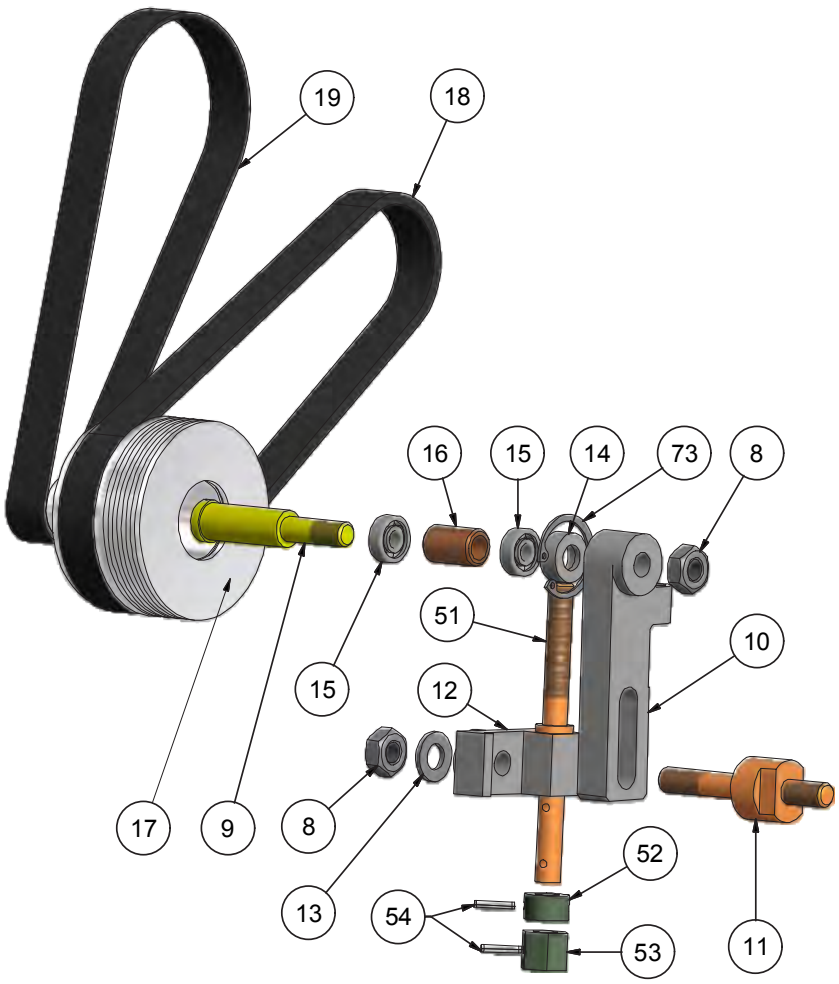
18.7 Headstock – Tumbler gear with trapezoidal thread spindle



Part No.	Items	Order No.	Description
20	1	51004025-0033	Bolt
21	1	10600121	Toothed wheel
22	1	51006530-00011	Toothed belt wheel Z16
23	1	51007016-0003	Sleeve
24	1	51004020-0010	Washer
25	3	51502518	Lubrication nipple
26	1	16193400008000	Nut
27	1	1606885A050320	Parallel key
28	1	10600128	Lever
29	2	51502124	Needle sleeve
30	2	51004020-0011	Bolt
31	2	16191300005006	Threaded pin
47	1	10600147	Toothed wheel
50	1	10600198	Clamping screw
55	2	51007250-0001	Push piece
91	1	51008530-0001	Toothed wheel, plastic

18. Drawings and legends

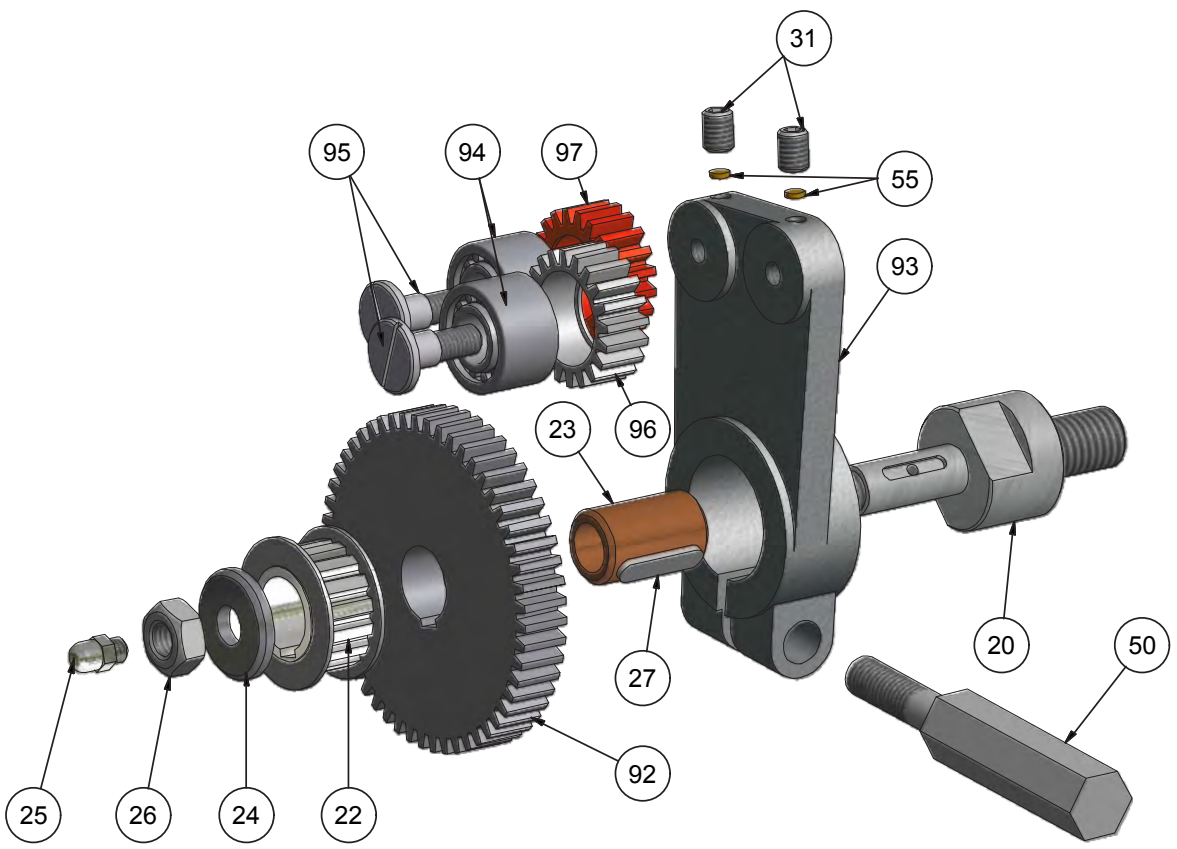
18.8 Headstock – Intermediate gear with ball screws 1.4 kW motor



Part No.	Items	Order No.	Description
8	2	16193400010000	Nut
9	1	10600109	Axes
10	1	10600110	Intermediate gear lever
11	1	10600111	Intermediate gear bolt
12	1	10600112	Clamping piece
13	1	16112500010000	Washer
14	1	10600114	Sleeve
15	2	51502113	Ball bearing
16	1	10600116	Sleeve
17	1	10600117-0001	Gear wheel
18	1	51502310	Belt 508
19	1	51502317	Belt 610
51	1	10600151	Clamping screw
52	1	10600152	Adjusting ring
53	1	10600153	Hexagonal element
54	2	16073430003014	Spiral tensioning pin
73	1	16047200032000	Securing ring

18. Drawings and legends

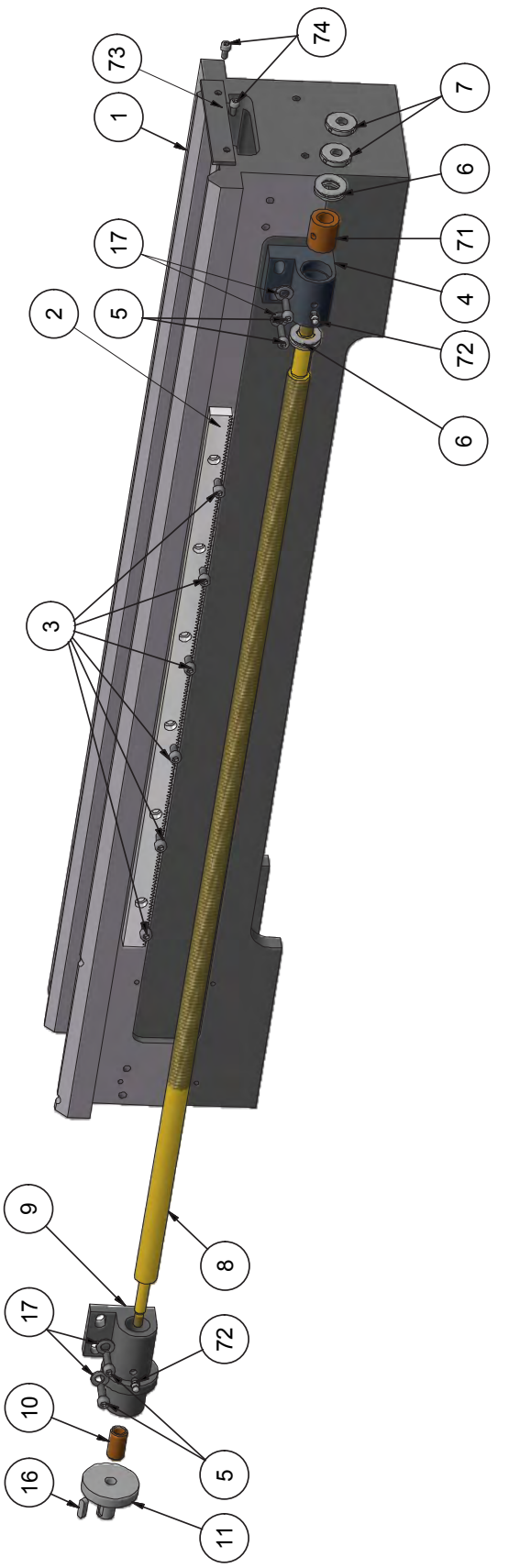
18.9 Headstock – Tumbler gear with ball screws



Part No.	Items	Order No.	Description
20	1	51004025-0033	Bolt
22	1	51006530-00011	Toothed belt wheel Z16
23	1	51007016-0003	Sleeve
24	1	51004020-0010	Washer
25	1	51502518	Lubrication nipple
26	1	16193400008000	Nut
27	1	1606885A050320	Parallel key
31	2	16191300005006	Threaded pin
50	1	10600198	Clamping screw
55	2	51007250-0001	Push piece
92	1	10600192	Toothed wheel
93	1	10600193	Lever
94	2	51502136	Ball bearing
95	2	51004015-0004	Bolt
96	1	10600196	Toothed wheel
97	1	51008530-0002	Toothed wheel, plastic

18. Drawings and legends

18.10 Bed with lead screw with trapezoidal thread spindle



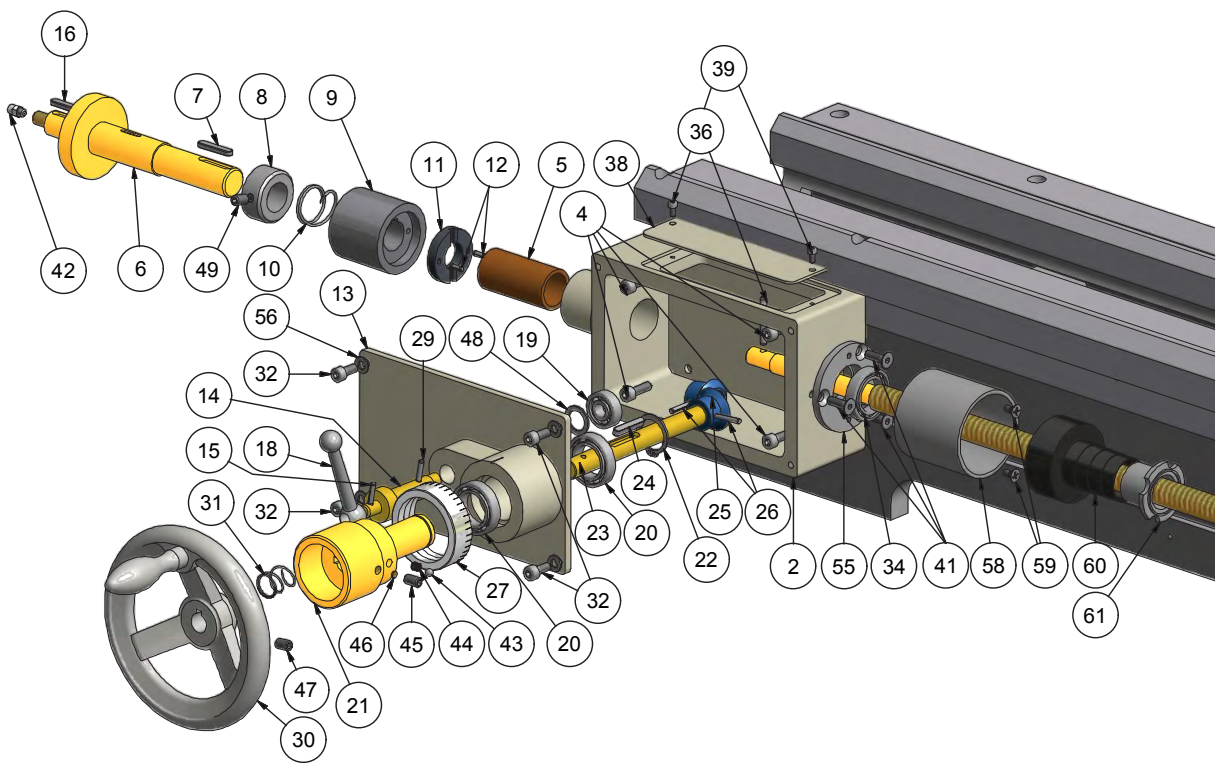
18. Drawings and legends

18.10 Bed with lead screw with trapezoidal thread spindle

Part No.	Items	Order No.	Description
1	1	10600201	Bed
2	1	10600202	Gear rod
3	6	16191200006016	Screw
4	1	10600204	Support bearing, right
5	4	16191200008025	Screw
6	2	51502122	Ball bearing
7	2	51004025-0020	Capstan nut
8	1	10600208	Lead screw
9	1	10600209	Support bearing, left
10	1	10600210	Sleeve
11	1	10600211	Safety clutch
16	1	1606885A050325	Parallel key
17	4	16112500008001	Washer
71	1	10600271	Sleeve
72	2	51502517	Lubrication nipple
73	1	51002020-0004	Tailstock stop
74	2	16191200005012	Screw

18. Drawings and legends

18.11 Bed with lead screw with ball screws



Part No.	Items	Order No.	Description
2	1	10600602	Support bearing, left
4	4	16191200005016	Screw
5	1	10600605	Sleeve
6	1	51004050-0011	Feed shaft
7	1	1606885A050325	Parallel key
8	1	51004035-0006	Adjusting ring
9	1	51004045-0006	Coupling element
10	1	51502021	Pressure spring
11	1	51003435-0001	Coupling disk
12	2	16073430003010	Spiral tensioning pin
13	1	10600613	Housing cover
14	1	51004020-0015	Eccentric shaft
15	1	16073430003014	Spiral tensioning pin
16	1	1606885A050325	Parallel key
18	1	51507018-0001	Lever

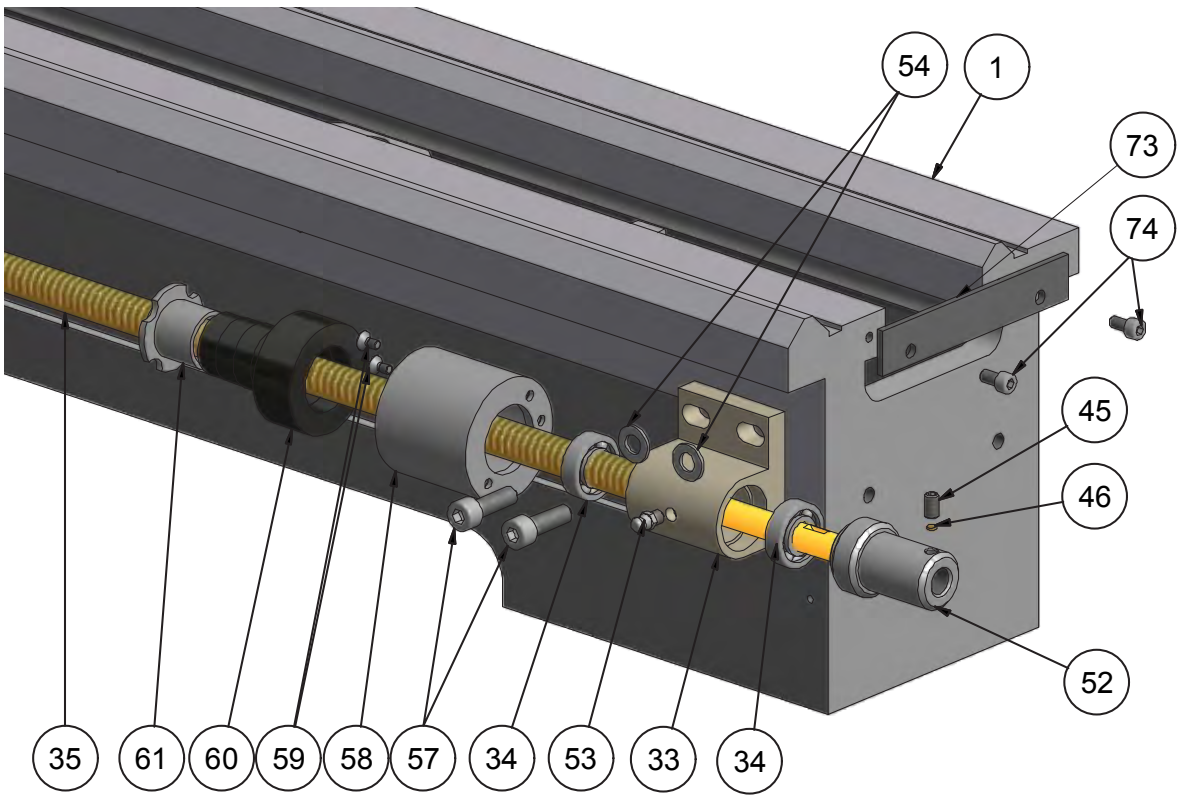
18. Drawings and legends

18.11 Bed with lead screw with ball screws

Part No.	Items	Order No.	Description
19	1	51502117	Ball bearing
20	2	51502127	Ball bearing
21	1	51004045-0008	Lead sleeve gear shaft
22	1	16047100020000	Securing ring
23	1	51004012-0006	Lead screw gear shaft
24	1	1606885A050325	Parallel key
25	2	51502401-0001	Bevel gear
26	2	16073430003018	Spiral tensioning pin
27	1	10600627	Scale ring
29	1	16073430003024	Spiral tensioning pin
30	1	51507011-0002	Hand wheel
31	1	51502001	Pressure spring
32	4	16191200005012	Screw
36	1	16073430004030	Spiral tensioning pin
38	1	10600638	Housing cover
39	2	16191200003010	Screw
41	3	16179910005016	Screw
42	1	51502518	Lubrication nipple
43	1	51502131	Steel ball
44	1	51502003	Pressure spring
47	1	16091400006006	Threaded pin
48	1	16000001812310	Washer
49	1	16091400006006	Threaded pin
55	1	51006555-0007	Bearing flange
56	4	16112500005000	Washer

18. Drawings and legends

18.11 Bed with lead screw with ball screws



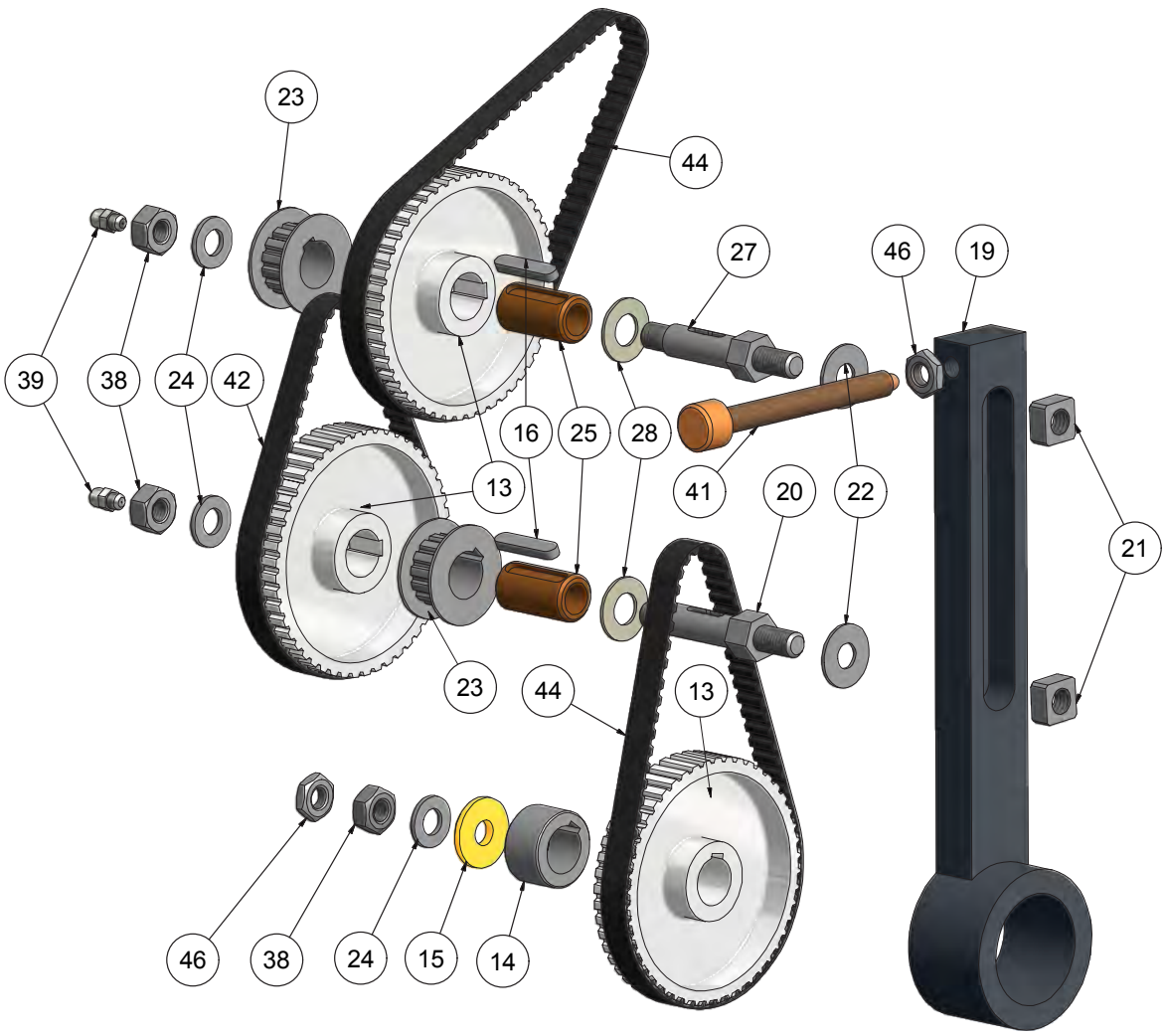
18. Drawings and legends

18.11 Bed with lead screw with ball screws

Part No.	Items	Order No.	Description
1	1	10600601	Bed
33	1	10600633	Support bearing, right
34	3	51502112	Ball bearing
35	1	51505226	Ball screws with ball screw nut
45	2	16091300006006	Threaded pin
46	2	51007250-0001	Push piece
73	1	51002020-0004	Tailstock stop
74	2	16191200005012	Screw
52	1	51004035-0007	Setting nut
53	1	51502517	Lubrication nipple
54	2	16112500008001	Washer
57	2	16191200008025	Screw
58	2	51006555-0020	Sleeve
59	4	16196500004008	Screw
60	2	51502513	Lead screw cover
61	2	51006540-0020	Sleeve

18. Drawings and legends

18.12 Change gear quadrant for trapezoidal thread spindle and ball screws



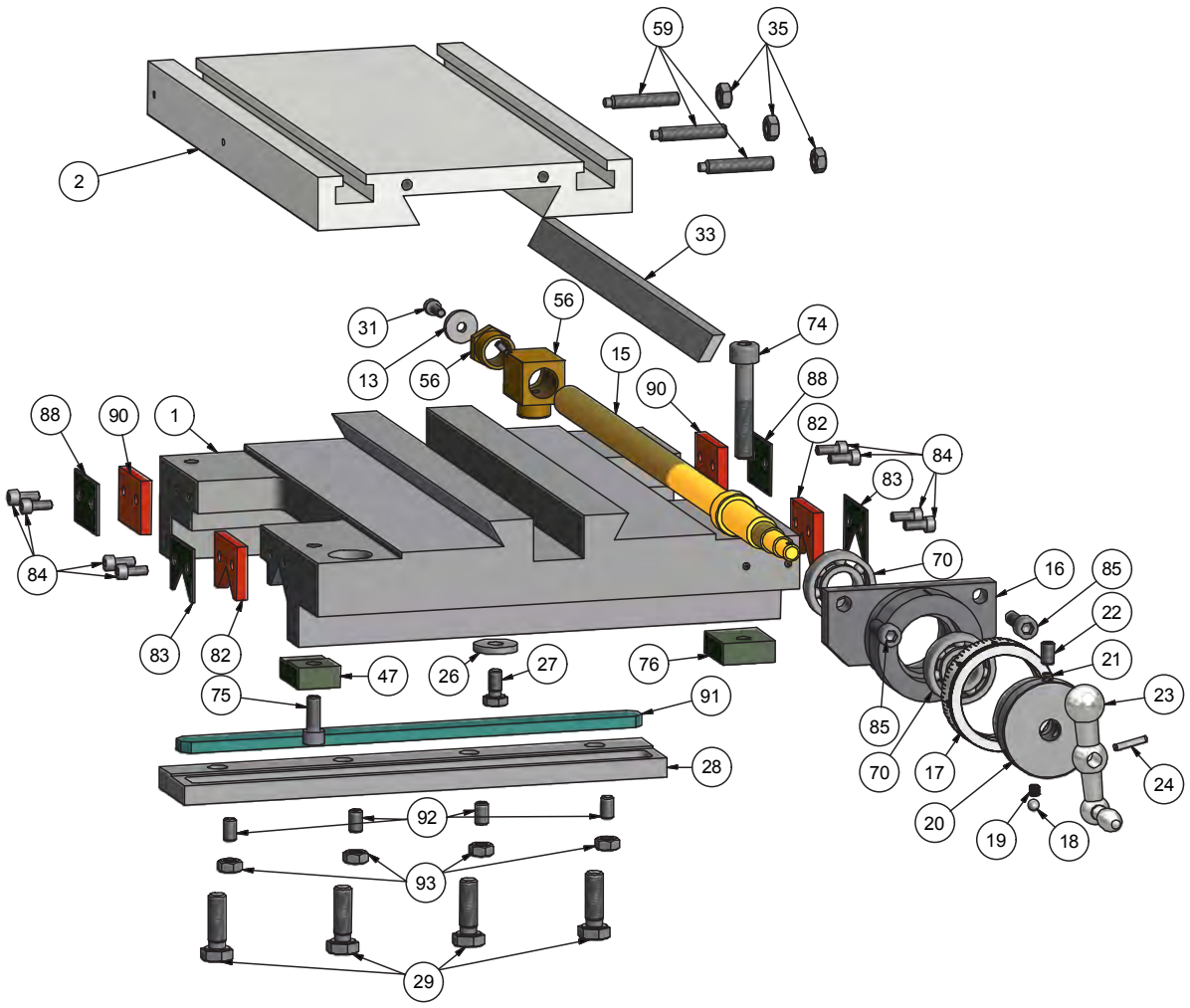
18. Drawings and legends

18.12 Change gear quadrant for trapezoidal thread spindle and ball screws

Part No.	Items	Order No.	Description
13	3	51006580-0004	Toothed belt wheel Z48
14	1	51004025-0008	Sleeve
16	2	1606885A050325	Parallel key
19	1	10600219	Change gear quadrant
20	1	51004633-0001	Change gear bolt, long
21	2	16155700008000	Nut
22	2	10600222	Washer
23	2	51006525-00011	Toothed belt wheel Z14
24	3	51004020-0010	Washer
25	2	51007016-0001	Change gear sleeve
27	1	51004633-0002	Change gear bolt, short
28	2	16000000010201	Washer
38	3	16193400008000	Nut
39	2	51502518	Lubrication nipple
41	1	10600241	Setting screw
42	1	51502320	Gear belt 120
44	2	51502323	Gear belt 140
	1	51006530-00011	Toothed belt wheel Z16
	1	51006530-00021	Toothed belt wheel Z18
	1	51006535-00011	Toothed belt wheel Z20
	1	51006540-0001	Toothed belt wheel Z22
	1	51006540-00021	Toothed belt wheel Z24
	1	51006545-0003	Toothed belt wheel Z26
	1	51006545-0001	Toothed belt wheel Z28
	1	51006555-0003	Toothed belt wheel Z32
	1	51006555-0004	Toothed belt wheel Z34
	1	51006560-00011	Toothed belt wheel Z36
	1	51006565-0001	Toothed belt wheel Z40
			for trapezoidal thread spindle
15	1	51007023-0002	Washer (gunmetal)
46	2	16143900008000	Nut
			for ball screws
46	1	16143900008000	Nut

18. Drawings and legends

18.13 Tool slide – cross slide with trapezoidal thread spindle



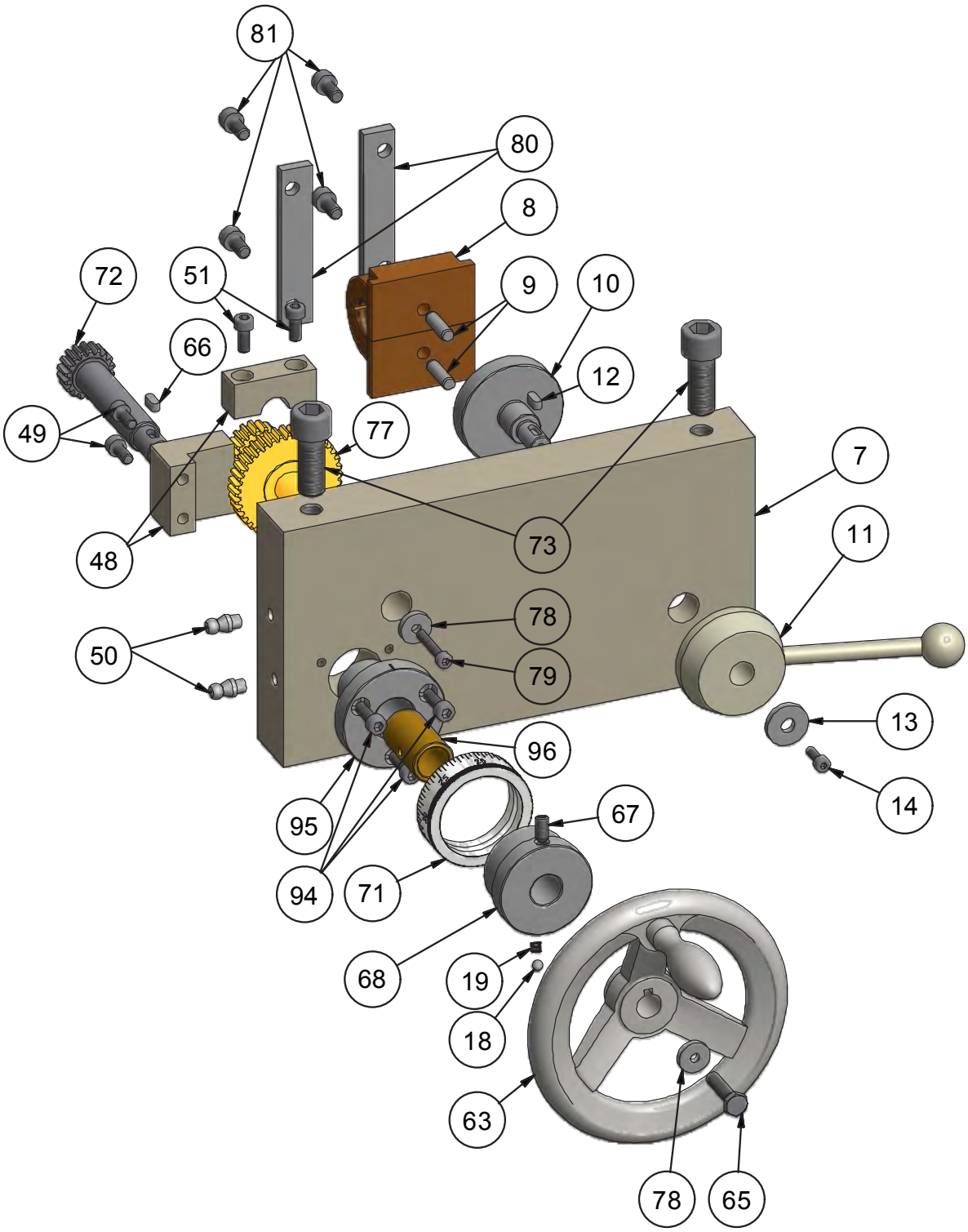
18. Drawings and legends

18.13 Tool slide – cross slide with trapezoidal thread spindle

Part No.	Items	Order No.	Description
1	1	10600301	Cross slide, lower section
2	1	10600302	Cross slide, upper section
13	1	51004015-0002	Washer
15	1	51004020-0012	Spindle
16	1	10600316	Spindle bearing
17	1	10600317	Scale ring
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
20	1	51004045-0011	Dial
21	3	51007250-0001	Push piece
22	3	16091300006012	Threaded pin
23	1	51507022-0001	Ball crank
24	1	16073430003018	Spiral tensioning pin
26	1	10600326	Washer
27	1	16193300006012	Screw
28	1	10600328	Guide bar
29	4	16193300008025	Screw
31	1	16191200004010	Screw
33	1	10600333	Adjustment bar
35	3	16193400006000	Nut
47	1	10600347	Guide element
56	1	10600356-0001	Spindle nut with adjusting nut
59	3	16091500006045	Threaded pin
70	2	51502113	Ball bearing
74	1	16191200008045	Screw
75	1	16191200006012	Screw
76	1	10600376	Clamping piece
82	2	10600382	Felt
83	2	10600383	Felt clamp
84	8	16191200004010	Screw
85	2	16191200006020	Screw
88	2	10600388	Felt clamp
90	2	10600390	Felt
91	1	10600391	Setting bar
92	4	16091300006012	Threaded pin
93	4	16193400006000	Nut

18. Drawings and legends

18.14 Tool slide – lock plate with trapezoidal thread spindle



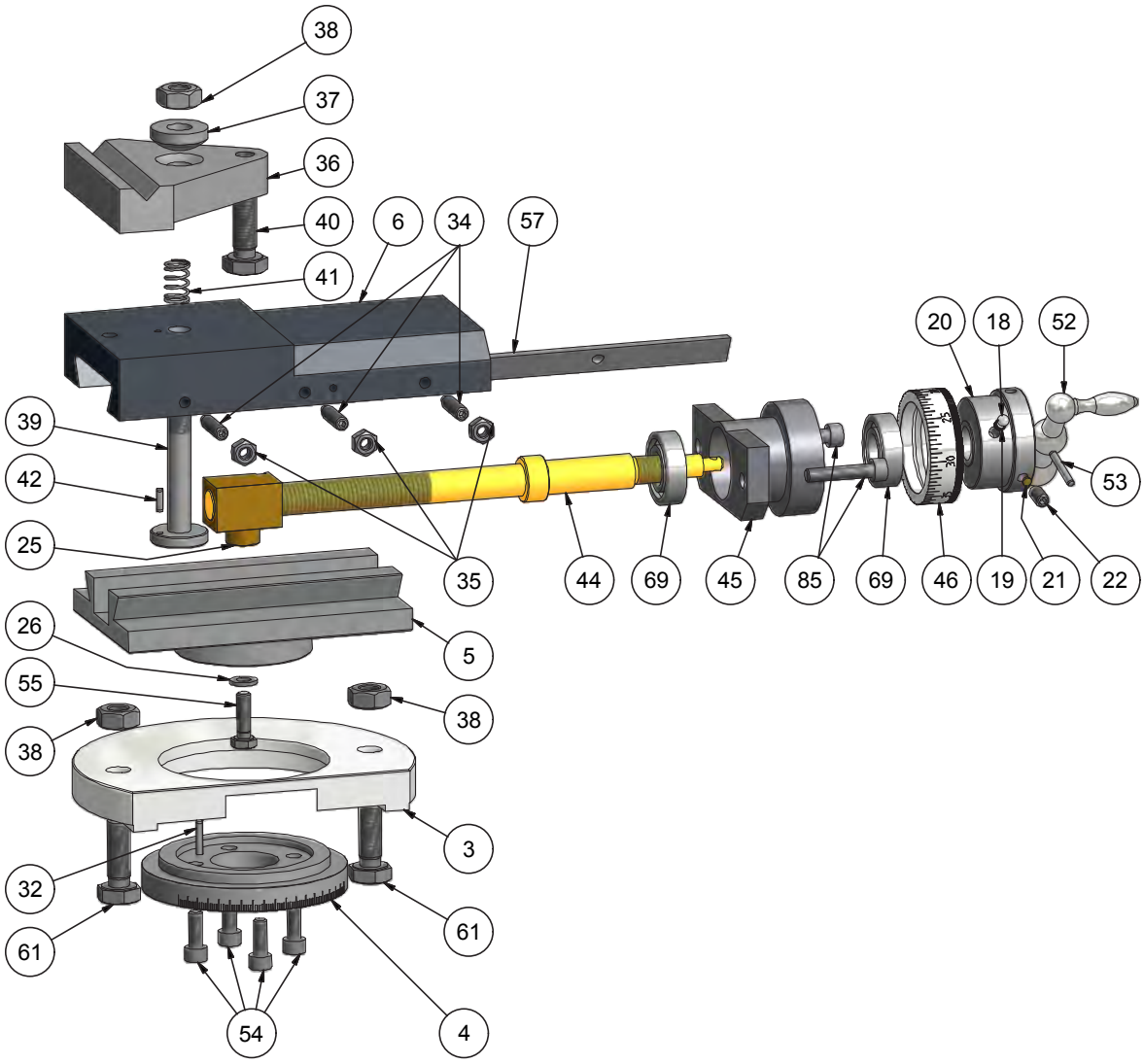
18. Drawings and legends

18.14 Tool slide – lock plate with trapezoidal thread spindle

Part No.	Items	Order No.	Description
7	1	10600307	Lock plate
8	1	10600308	Clasp nut, 2 pieces
9	2	16063250006020	Cylinder pin
10	1	10600310	Keylock switch
11	1	51507025-0001	Switch lever
	1	51507025-0002	Switch lever for CNC
12	1	1606885A040410	Parallel key
13	1	51004015-0002	Washer
14	1	16191200004010	Screw
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
48	1	10600348	Support bearing
49	2	16191200005030	Screw
50	2	51502517	Lubrication nipple
51	2	16191200005020	Screw
63	1	51507011-0001	Hand wheel
65	1	16191200004010	Screw
66	1	1606885A040408	Parallel key
67	1	16091400006012	Threaded pin
68	1	10600368	Dial
71	1	10600371	Scale ring
72	1	10600372	Pinion
73	2	16191212012035	Screw
77	1	10600377	Intermediate gear
78	2	51004020-0004	Washer
79	1	16191200004010	Screw
80	2	10600380	Guide bars
81	4	16191200006012	Screw
94	3	16191200005016	Screw
95	1	10600395	Flange
96	1	10600396	Sleeve

18. Drawings and legends

18.15 Tool slide – longitudinal slide for trapezoidal thread spindle and ball screws



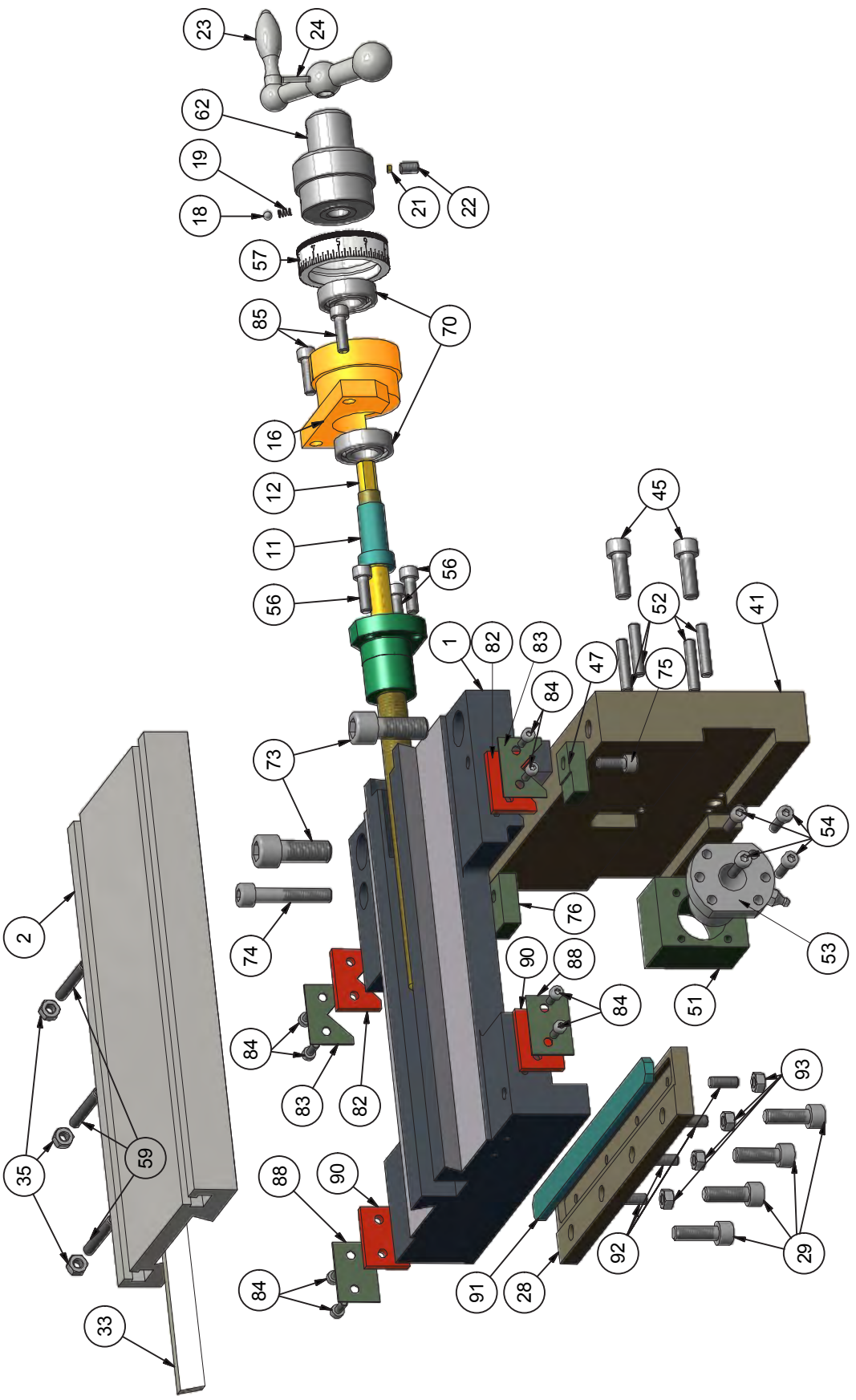
18. Drawings and legends

18.15 Tool slide – longitudinal slide for trapezoidal thread spindle and ball screws

Part No.	Items	Order No.	Description
3	1	10600303	Clamping ring
4	1	10600304	Guide ring
5	1	10600305	Longitudinal slide, lower section
6	1	10600306	Longitudinal slide, upper section
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
20	1	51004045-0011	Dial
21	3	51007250-0001	Push piece
22	3	16091300006010	Threaded pin
25	1	10600325	Spindle nut
26	1	10600326	Washer
32	1	16073430003018	Spiral tensioning pin
34	3	16091500006020	Threaded pin
35	3	16193400006000	Nut
36	1	10600336	Clamping jaw
37	1	10600337	Pressure washer
38	3	16193400010000	Hexagonal nut,
39	1	10600339	Threaded bolt
40	1	10600340	Hexagonal screw
41	1	10600341	Pressure spring
42	1	16073430003010	Spiral tensioning pin
44	1	51004020-0020	Spindle
45	1	10600345	Spindle bearing
46	1	10600346	Scale ring
52	1	51507023-0001	Ball crank
53	1	16073430003014	Spiral tensioning pin
54	4	16191200006012	Screw
55	1	16193300006025	Screw
57	1	10600357	Adjustment bar
61	2	10600361	T-groove screw
69	2	51502113	Ball bearing
85	2	16191200006020	Screw

18. Drawings and legends

18.16 Cross slide with lock plate with ball screws



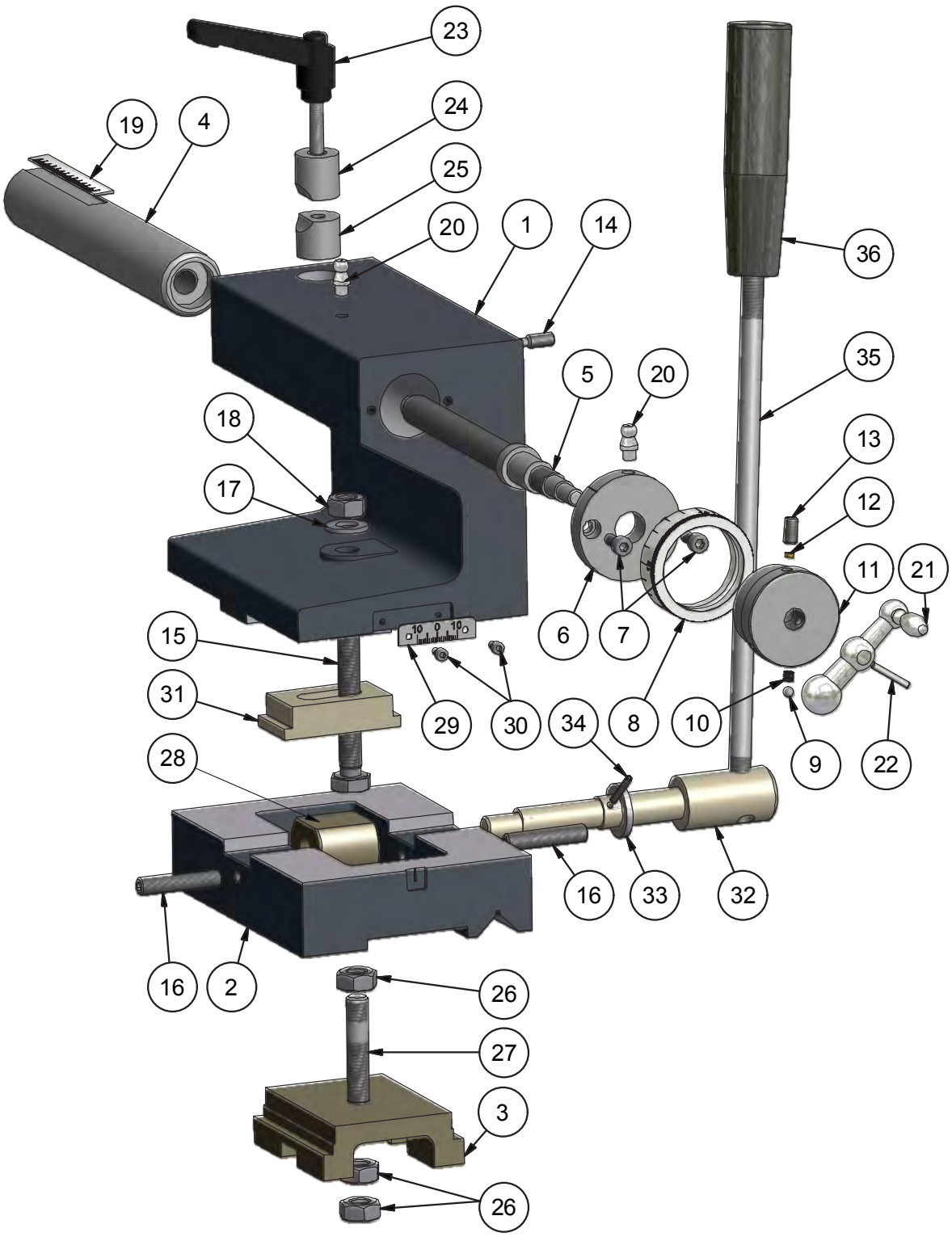
18. Drawings and legends

18.16 Cross slide with lock plate with ball screws

Part No.	Items	Order No.	Description
1	1	10600701	Cross slide, lower section
2	1	10600702	Cross slide, upper section
11	1	51004020-0014	Reducing bush
12	1	51505210-0006	Ball screws with ball screw nut
16	1	10600316	Spindle bearing, cross slide
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
21	1	51007250-0001	Push piece
22	1	16091300006012	Threaded pin
23	1	51507022-00011	Ball crank
24	1	16191300005006	Threaded pin
28	1	10600328	Guide bar
29	4	16193300008025	Screw
33	1	10600333	Adjustment bar
35	3	16193400006000	Nut
41	1	10600714	Lock plate
45	2	16191200008025	Screw
47	1	10600347	Guide element
51	1	10600719	Ball screw nut holder
52	4	16091300006025	Threaded pin
53	1	51505226	Ball screws with ball screw nut
54	4	16191200005020	Screw
56	3	16191200005016	Screw
57	1	51006750-0003	Scale ring
59	3	16091500006045	Threaded pin
62	1	51004045-0007	Setting nut
70	2	51502113	Ball bearing
73	2	16191212012035	Screw
74	1	16191200008045	Screw
75	1	16191200006012	Screw
76	1	10600376	Clamping piece
82	2	10600382	Felt
83	2	10600383	Felt clamp
84	8	16191200004010	Screw
85	2	16191200006020	Screw
88	2	10600388	Felt clamp
90	2	10600390	Felt
91	1	10600391	Setting bar
92	4	16091300006012	Threaded pin
93	4	16193400006000	Nut

18. Drawings and legends

18.17 Tailstock



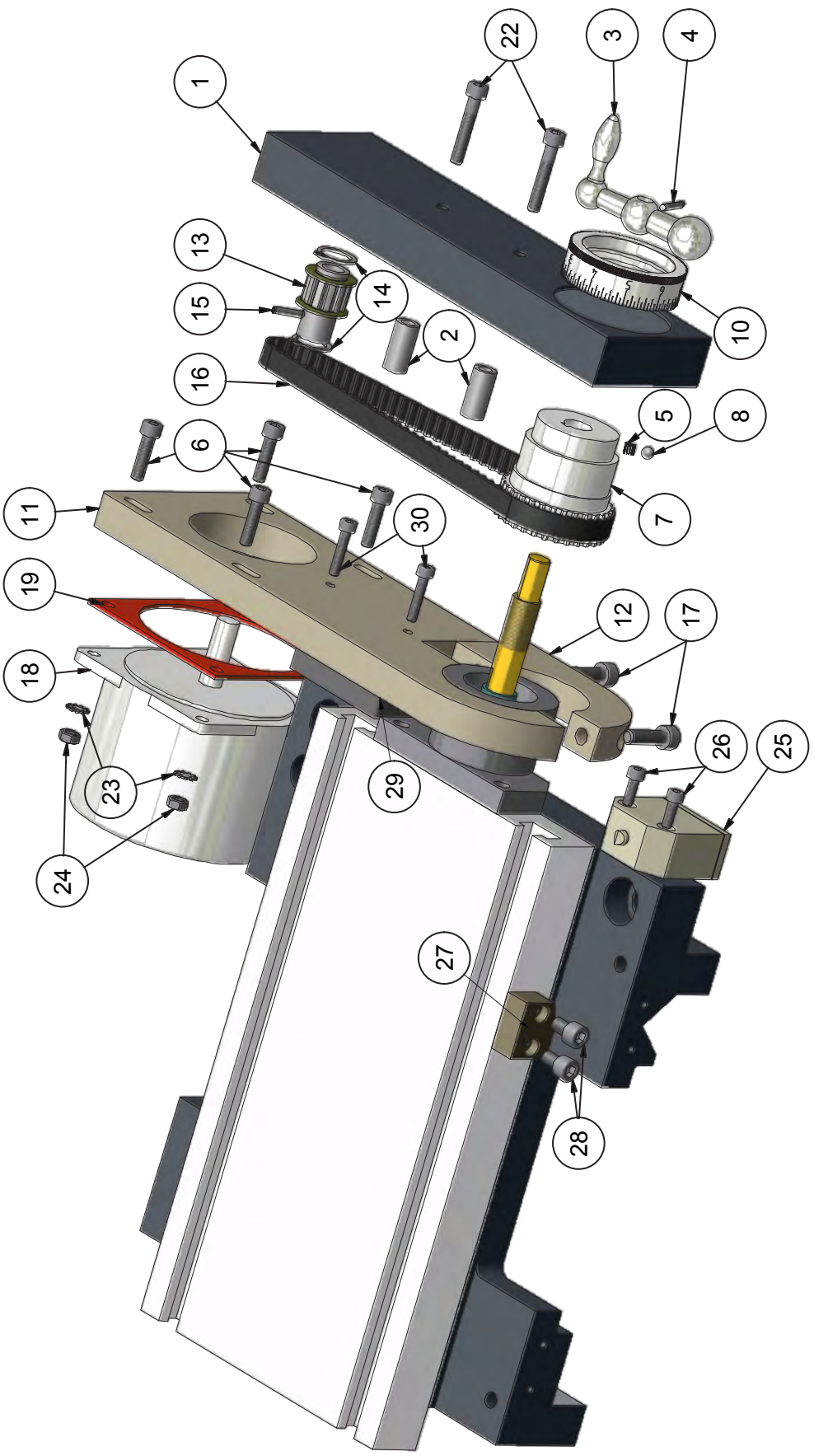
18. Drawings and legends

18.17 Tailstock

Part No.	Items	Order No.	Description
1	1	10600401	Tailstock upper section
2	1	10600402	Tailstock lower section
3	1	10600403	Clamping piece
4	1	10600404	Sleeve
5	1	51004020-0019	Spindle
6	1	51006550-0001	Flange
7	2	16191200005012	Screw
8	1	10600408	Scale ring
9	1	51502131	Steel ball
10	1	51502009	Pressure spring
11	1	51004045-0011	Dial
12	3	51007250-0001	Push piece
13	3	16091300006010	Threaded pin
14	1	16091500006016	Threaded pin
15	1	16193300010070	Screw
16	2	16191300008040	Threaded pin
17	1	16112500010000	Washer
18	1	16193400010000	Nut
19	1	10600419	Scale tape
20	2	51502517	Lubrication nipple
21	1	51507022-0001	Ball crank
22	1	16073430003018	Spiral tensioning pin
23	1	51507033	Tensioning lever
24	1	10600424	Sleeve clamping element, top
25	1	10600425	Sleeve clamping element, bottom
26	3	16193400010000	Nut
27	1	16091300010050	Stud bolt
28	1	10600428	Clamping bush
29	1	10600429	Scale
30	2	16191200003006	Screw
31	1	10600431	Clamping strap
32	1	10600432	Eccentric shaft
33	1	10600433	Washer
34	1	16073430003024	Spiral tensioning pin
35	1	10600435	Lever
36	1	10600436	Handle

18. Drawings and legends

18.18 Motor for control of the X-axis



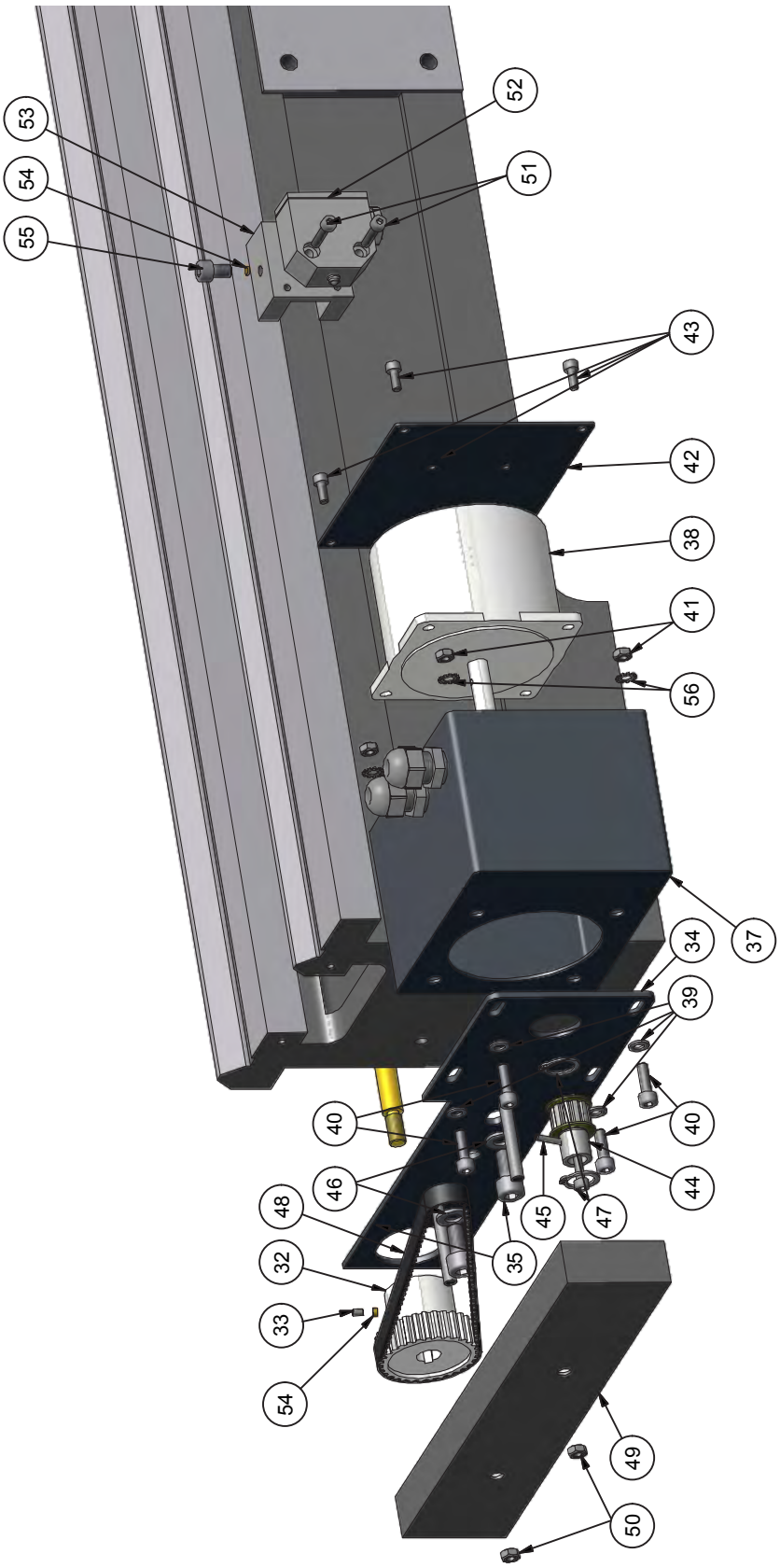
18. Drawings and legends

18.18 Motor for control of the X-axis

Part No.	Items	Order No.	Description
1	1	51401805-0001	Cover hood
2	2	51004010-0020	Spacer
5	1	51502003	Pressure spring
6	4	16191200005020	Screw
8	1	51502131	Steel ball
11	1	51401806-0001	Motor holding plate and clamping plate
14	2	16047100014000	Securing ring
15	1	16073430003014	Spiral tensioning pin
16	1	51502328	Gear belt
17	2	16191200006020	Screw
18	1	51500122	Stepper motor
19	1	51401703-0001	Motor intermediate plate
22	2	16191200005030	Screw
23	4	16167980005000	Fanned washer
24	4	16193400005000	Nut
25	1	51500633-0001	Limit switch with strain relief
26	2	16191200004020	Screw
27	1	51006425-0001	Actuating cams
28	2	16191200004012	Screw
29	1	51402115-0001	Terminal box of X-axis
30	2	16191200004020	Screw
			for trapezoidal thread spindle
3	1	51507022-0001	Ball crank
4	1	16073430003018	Spiral tensioning pin
7	1	51004801-0007	Toothed belt wheel Z22
10	1	10600317	Scale ring, divided into 40 sections
13	1	51004040-00022	Toothed belt wheel with flanged pulley Z22
			for ball screws
3	1	51507022-00011	Ball crank
4	1	16191300005006	Spiral tensioning pin
7.1	1	51004050-0001	Toothed belt wheel Z30
10	1	51006750-0003	Scale ring divided into 100 sections
13.1	1	51004020-00022	Toothed belt wheel Z12 with flanged pulley

18. Drawings and legends

18.19 Motor for control of the Z-axis



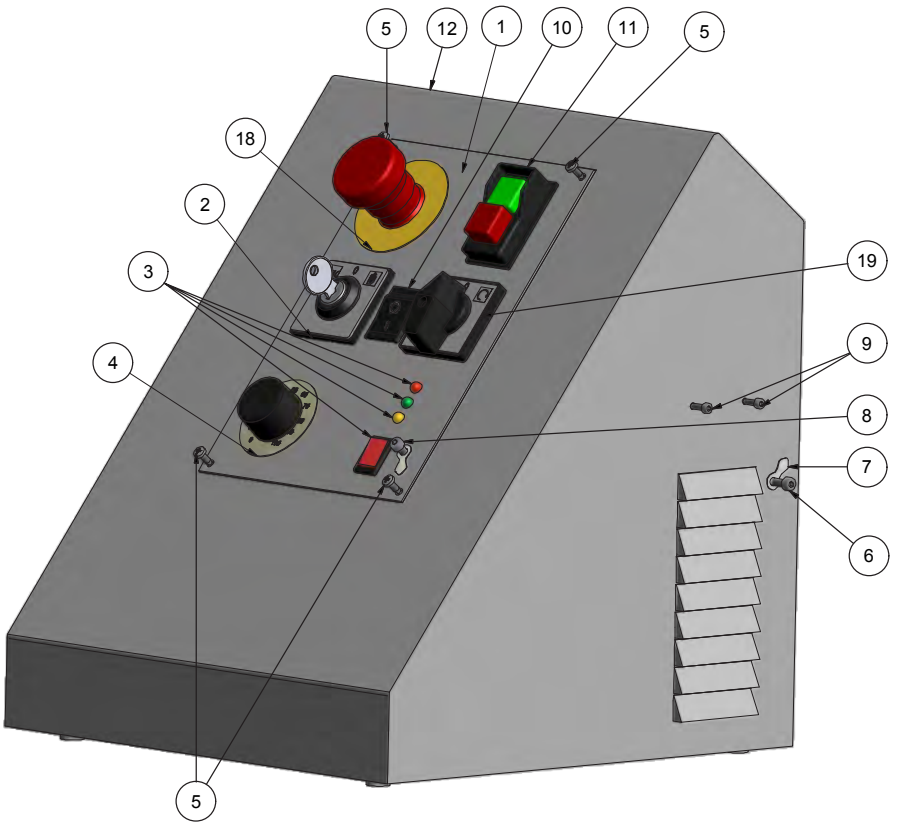
18. Drawings and legends

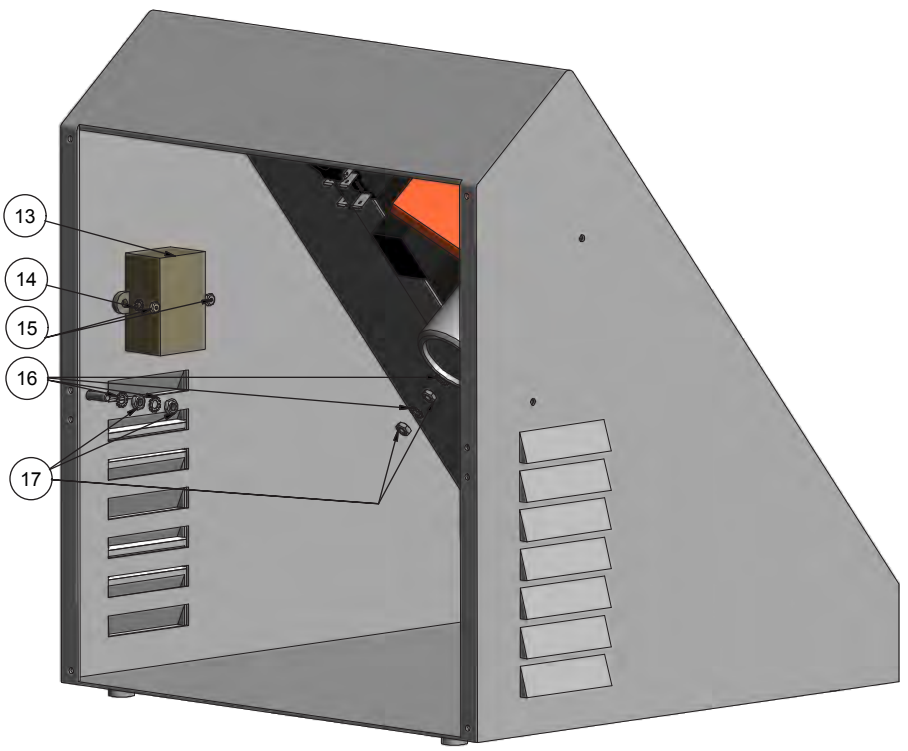
18.19 Motor for control of the Z-axis

Part No.	Items	Order No.	Description
33	1	16091300006006	Threaded pin
34	1	51401802-0001	Motor plate
35	2	16191200008016	Screw
37	1	51401804-0001	Motor housing with cover
38	1	51500122	Stepper motor
39	4	16112500005000	Washer
40	4	16191200005016	Screw
41	4	16193400005000	Nut
43	4	16191200004010	Screw
44	1	51004020-00022	Belt pulley Z12 with flanged pulley
45	1	16073430003014	Spiral tensioning pin
46	2	16112500008001	Washer
47	2	16047100014000	Securing ring
48	1	51502330	Gear belt
49	1	51401801-0001	Cover hood
50	2	16193400006000	Nut
51	2	16191200004020	Screw
52	1	51500633-0002	Limit switch, Z-axis
53	1	51006940-0001	Limit switch holder
54	2	51007250-0001	Push piece
55	1	16191200006010	Screw
56	4	16167980005000	Fanned washer
			for trapezoidal thread spindle
32.1	1	51004040-0007	Toothed belt wheel Z24
			for ball screws
32	1	51004050-0002	Toothed belt wheel Z30

18. Drawings and legends

18.20 Control panel for 1.4 kW motor





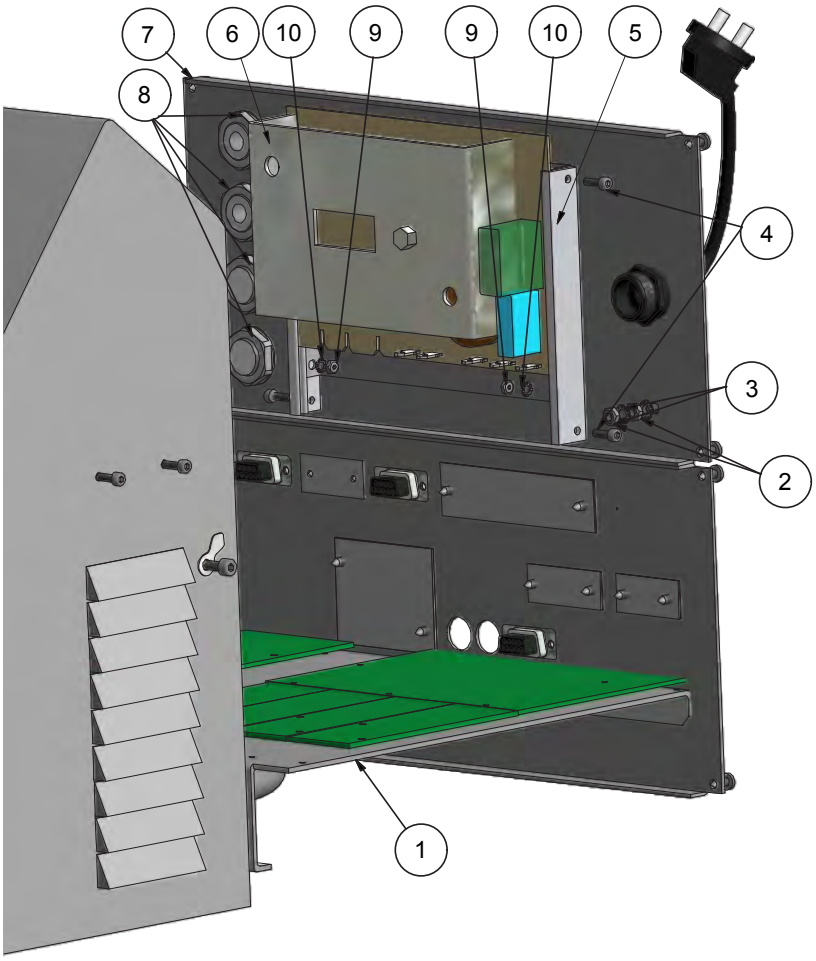
18. Drawings and legends

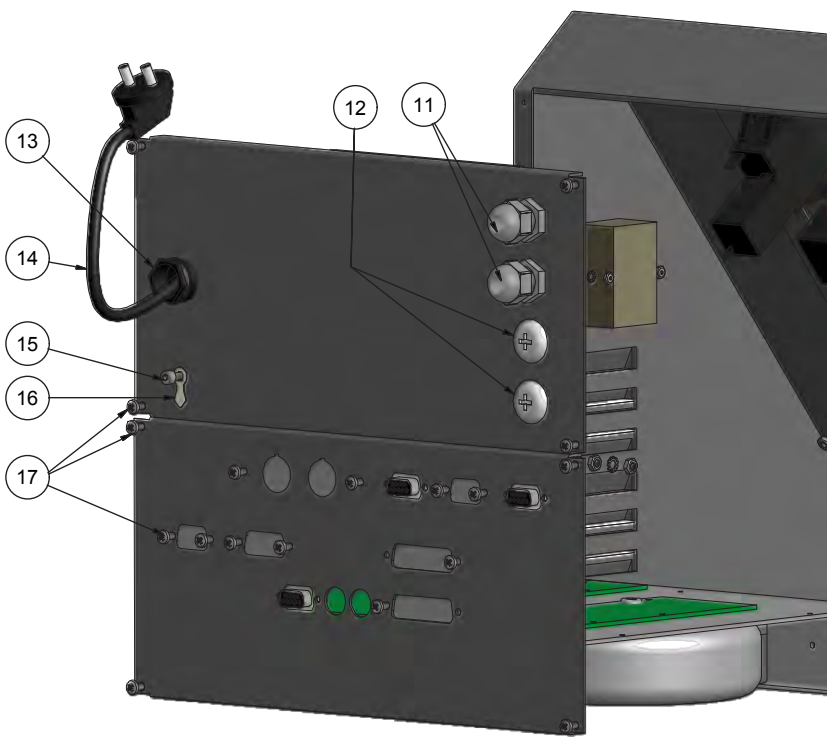
18.20 Control panel for 1.4 kW motor

Part No.	Items	Order No.	Description
1	1	51401535-0001	Switch cover
2	1	51500600	Switch for operating modes
3			LEDs with switch (contained in controller package)
4	1	51500807-0001	Potentiometer with cable and connector
4.1	1	51500807-00011	Potentiometer, complete
5	4	16179810003095	Screw
6	1	16191200004025	Screw
7	2	51501304	Symbol for earthed connection
8	1	16191200004012	Screw
9	2	16191200003010	Screw
10	1	51500601	Switch
11	1	51500606-0001	On-Off switch
12	1	51401509-0001	Control panel
13	1	51500800-0001	Noise filter
14	2	16167980003000	Fanned washer
15	2	16193400003000	Nut
16	4	16167980004000	Fanned washer
17	4	16193400004000	Nut
18	1	51500624-0001	Emergency off switch, complete
19	1	51500608	Switch

18. Drawings and legends

18.20 Control panel for 1.4 kW motor





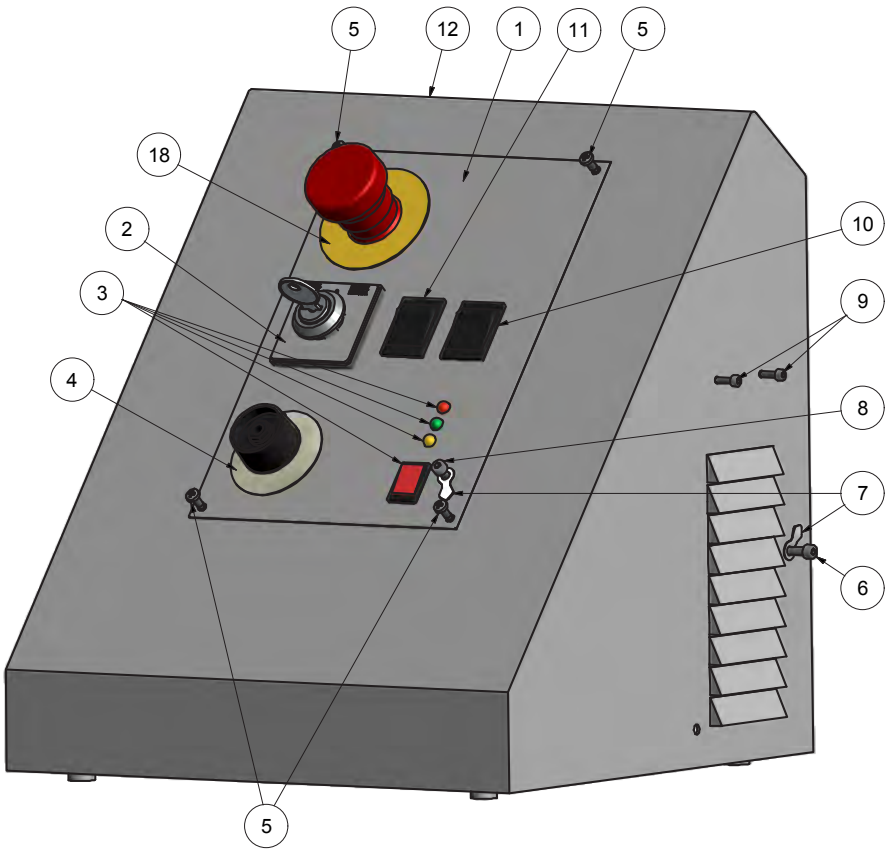
18. Drawings and legends

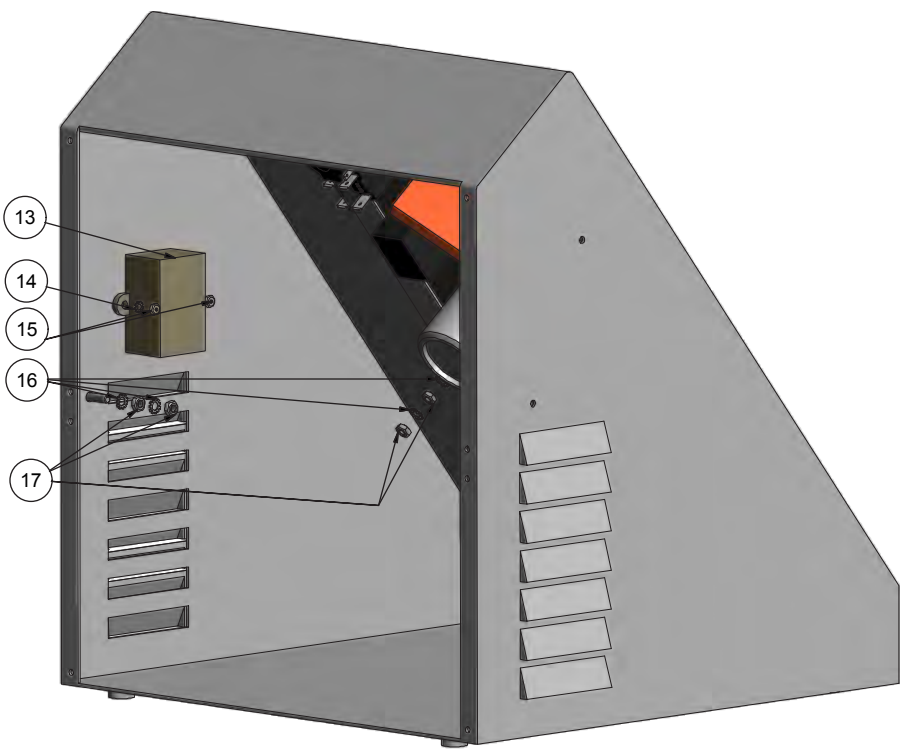
18.20 Control panel for 1.4 kW motor

Part No.	Items	Order No.	Description
1	1	1062105	Controller board for turning, basic
	1	1062110	Controller board for turning, professional
2	2	16193400003000	Nut
3	2	16167980003000	Fanned washer
4	4	16191200003010	Screw
5	2	51500401-0001	Guide rails
6	1	51501402	Control board
7	1	51401528-0001	Cover
8	4	51501505	Counter nut
9	4	16193400003000	Nut
10	4	16167980003000	Fanned washer
11	2	51501533	Cable screw
12	2	51501523	Closure screw
13	1	51501531	Strain relief
14	1	51500920-0003	Mains cable
15	1	16191200004012	Screw
16	1	51501304	Symbol for earthed connection
17	20	16179810003095	Screw

18. Drawings and legends

18.21 Control panel for 2.5 kW motor





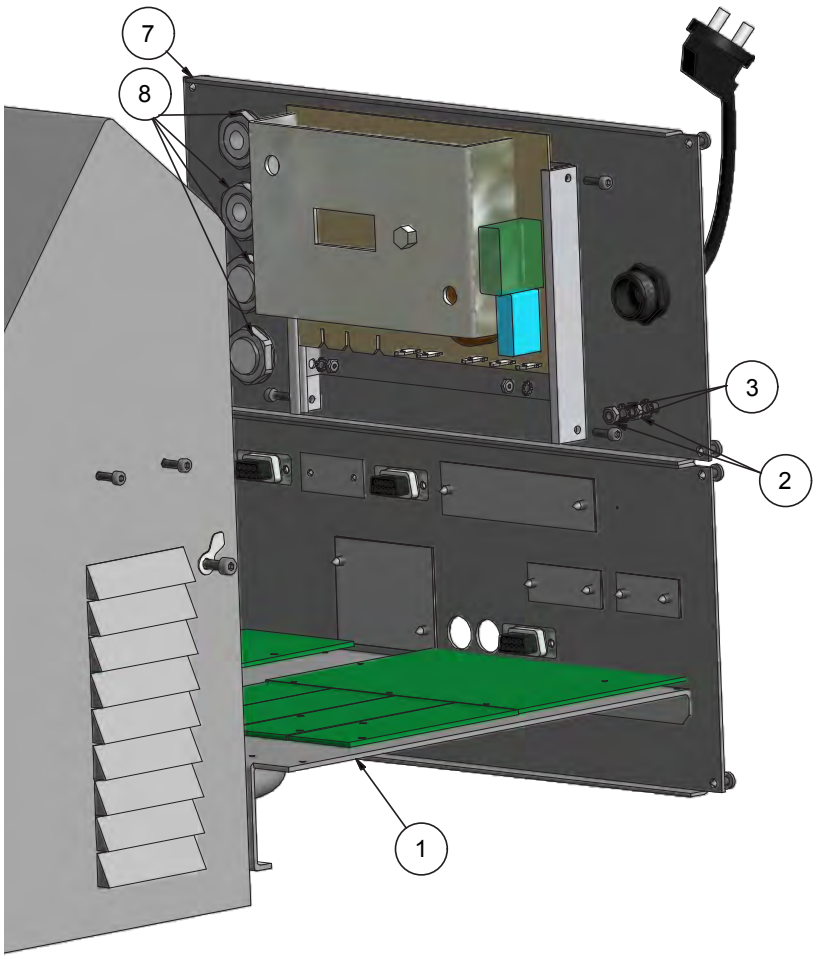
18. Drawings and legends

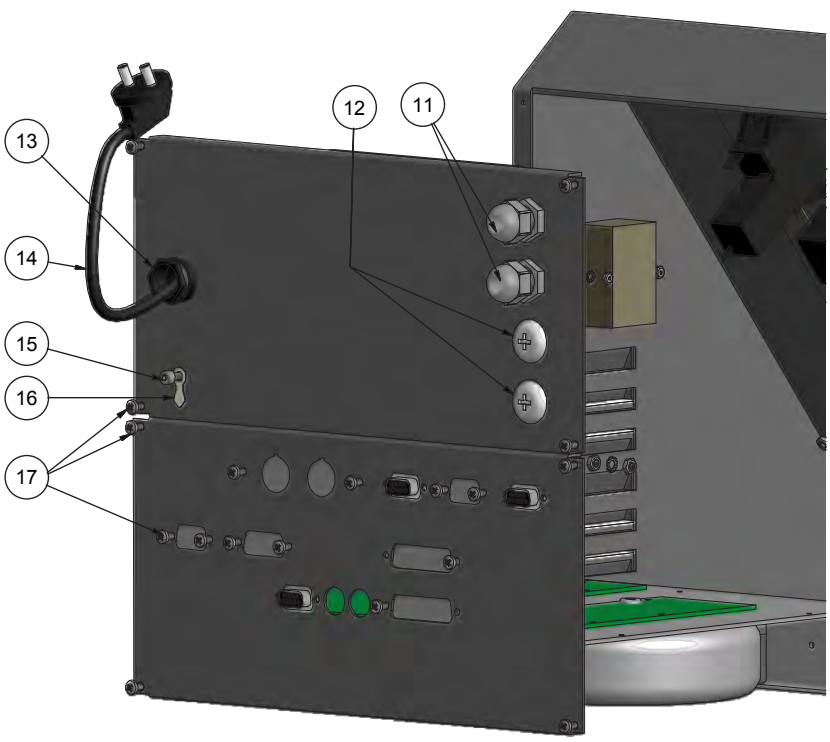
18.21 Control panel for 2.5 kW motor

Part No.	Items	Order No.	Description
1	1	51401539-0001	Switch cover
2	1	51500600	Switch for operating modes
3			LEDs with switch (contained in controller package)
4	1	51500801-0001	Potentiometer
5	4	16179810003095	Screw
6	1	16191200004025	Screw
7	2	51501304	Symbol for earthed connection
8	1	16191200004012	Screw
9	2	16191200003010	Screw
10	1	51500601	Switch
11	1	51500602	Switch
12	1	51401509-0001	Control panel
13	1	51500800-0001	Noise filter
14	2	16167980003000	Fanned washer
15	2	16193400003000	Nut
16	4	16167980004000	Fanned washer
17	4	16193400004000	Nut
18	1	51500624-0001	Emergency off switch, complete

18. Drawings and legends

18.21 Control panel for 2.5 kW motor





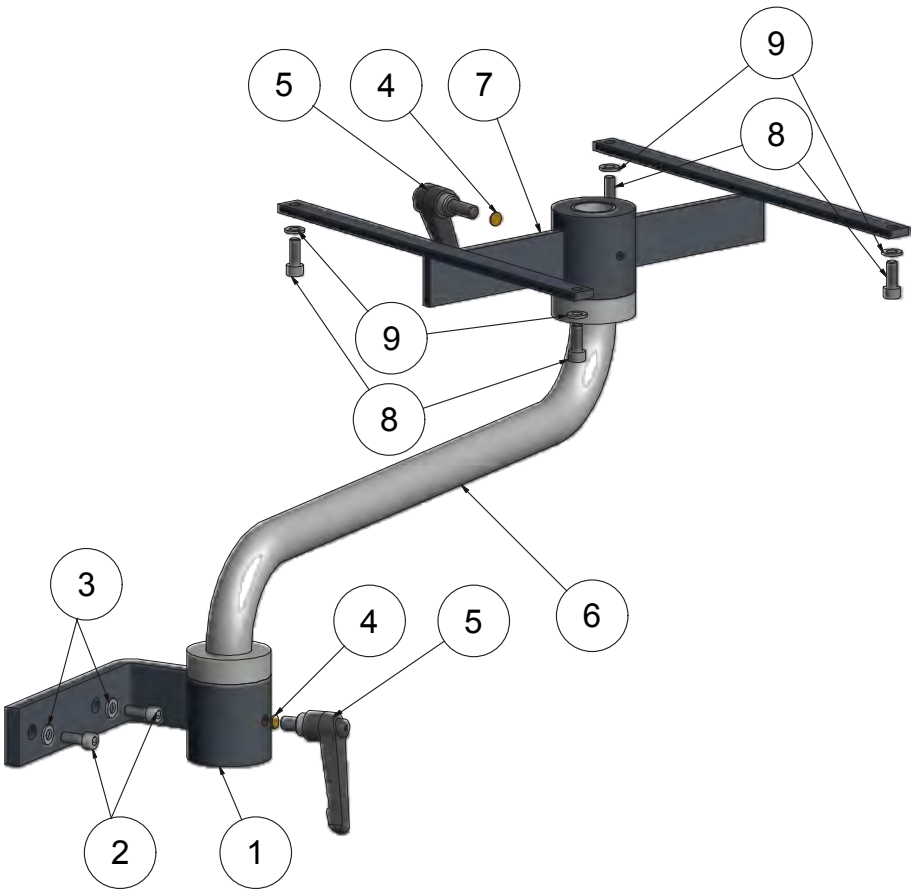
18. Drawings and legends

18.21 Control panel for 2.5 kW motor

Part No.	Items	Order No.	Description
1	1	1062105	Controller board for turning, basic
	1	1062110	Controller board for turning, professional
2	2	16193400004000	Nut
3	2	16167980004000	Fanned washer
7	1	51401528-0001	Cover
8	4	51501505	Counter nut
11	2	51501533	Cable screw
12	2	51501523	Closure screw
13	1	51501531	Strain relief
14	1	51500920-0003	Mains cable
15	1	16191200004012	Screw
16	1	51501304	Symbol for earthed connection
17	20	16179810003095	Screw

18. Drawings and legends

18.22 Support arm for control panel



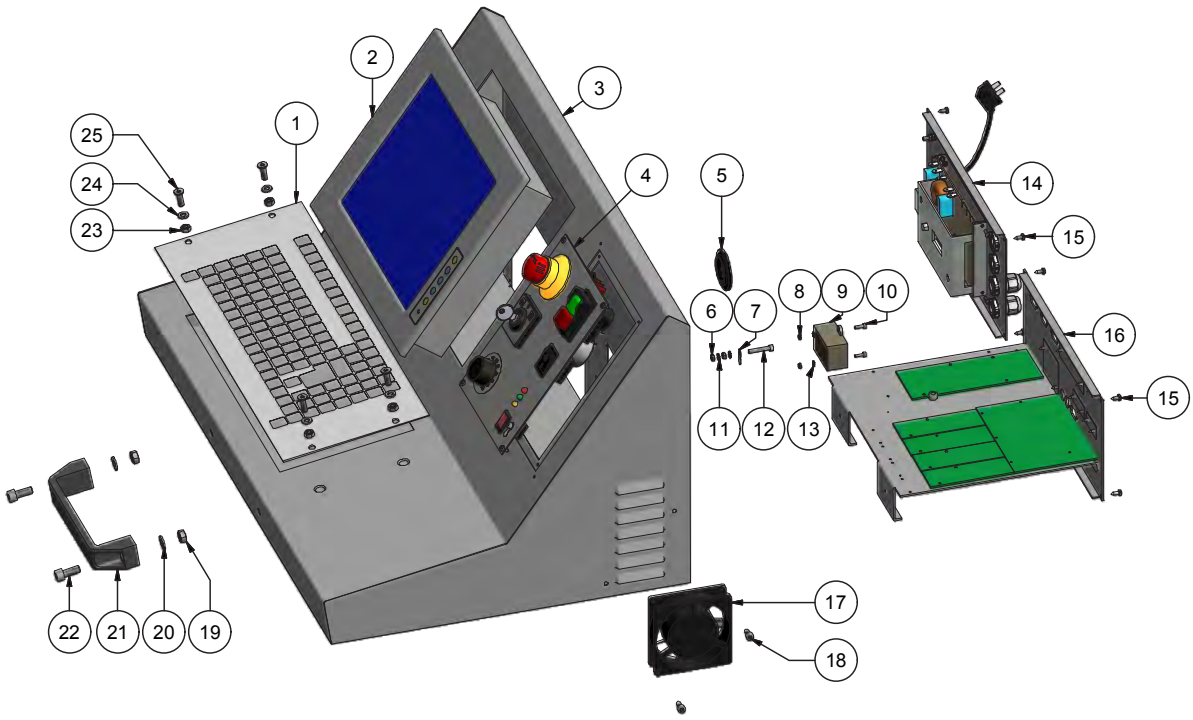
18. Drawings and legends

18.22 Support arm for control panel

Part No.	Items	Order No.	Description
4	2	51007250-0001	Push piece
5	2	51507029	Clamping lever
6	1	51401316-0001	Console arm
7	1	51001016-00031	Holder for controller housing
8	4	16191200006016	Screw
9	4	16112500006001	Washer
			Without machine safety cabin
1	1	51002035-00011	Holder for arm
2	2	16191200008020	Screw
3	2	16112500008001	Washer
			in conjunction with machine safety cabin
1	1	51002130-00031	Holder for arm
2	2	16191200010030	Screw
3	2	16112500010000	Washer

18. Drawings and legends

18.23 Industrial monitor and membrane keyboard



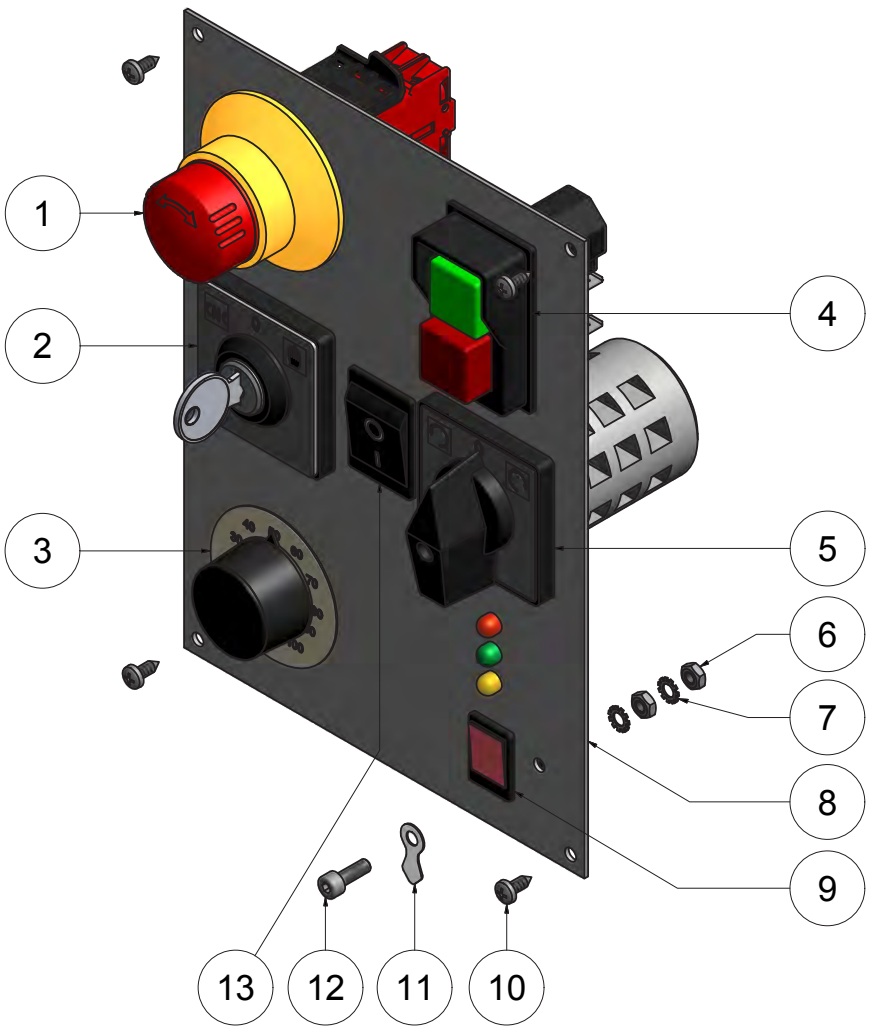
18. Drawings and legends

18.23 Industrial monitor and membrane keyboard

Part No.	Items	Order No.	Description
1	1	51505031	19“ built-in membrane keyboard
2	1	51505030	TFT flat screen monitor
	1	51505043	Installation kit for TFT flat screen monitor
3	1	51401537-0001	Controller housing for industrial monitor
4	1		Switch cover
5	1	51508322-0001	Cable duct
6	2	16193400004000	Nut
7	1	51501304	Symbol for earthed connection
8	2	16193400003000	Nut
9	1	51500800	Noise filter
10	2	16191200003010	Screw
11	2	16167980004000	Fanned washer
12	1	16191200004025	Screw
13	2	16167980003000	Fanned washer
14	1	-	Cover
15	8	16179810003095	Screw
16	1	1062105	Control board nccad basic
		1062110	Control board nccad professional
17	1	51500121	Fan
18	2	16191200005010	Screw
19	2	16193400008000	Nut
20	2	16112500008001	Washer
21	1	51507006	Bar handle
22	2	16191200008020	Screw
23	4	16193400006000	Nut
24	4	16112500006001	Washer
25	4	16179910006020	Screw

18. Drawings and legends

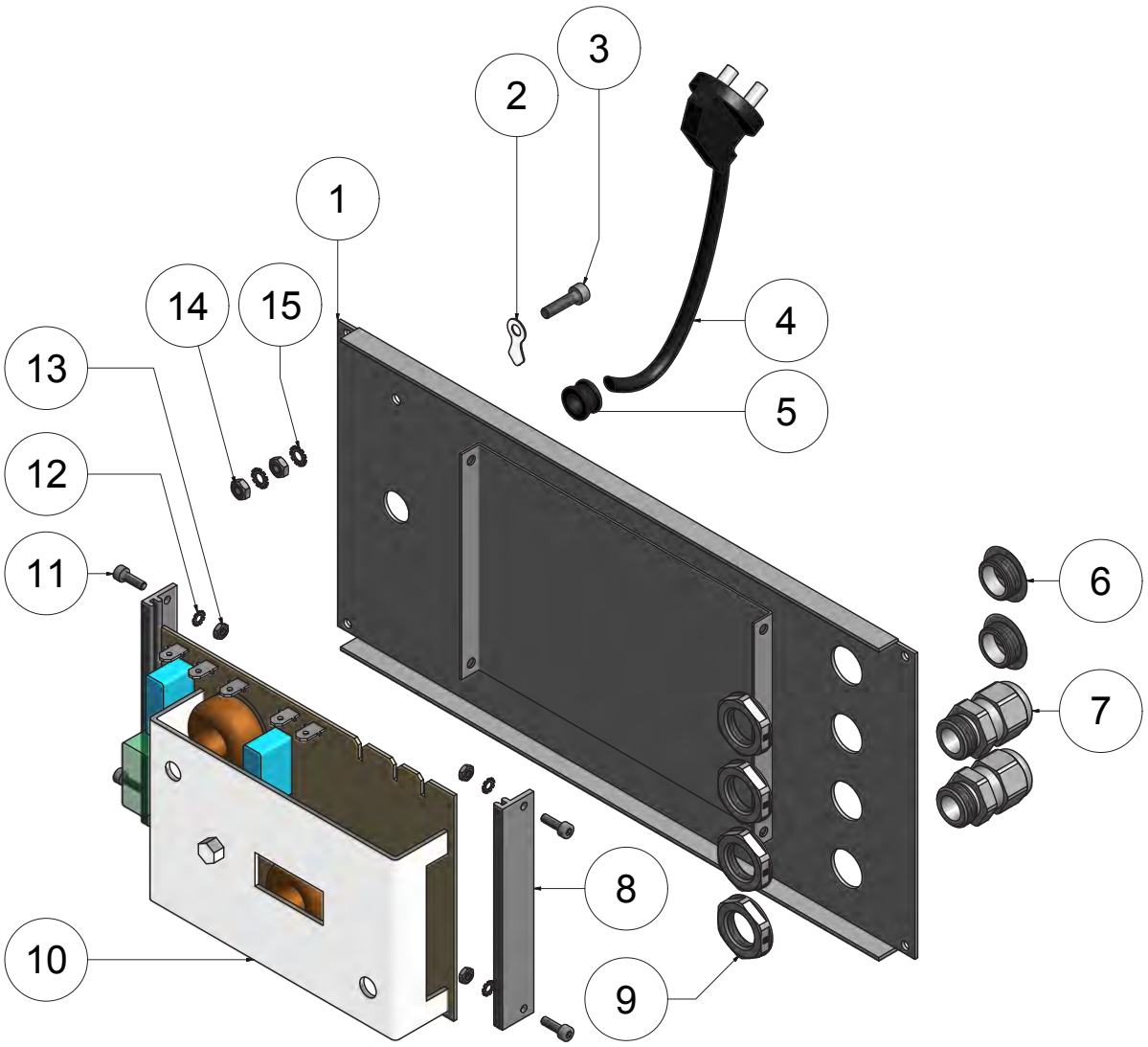
18.24 Industrial monitor and membrane keyboard especially for 1.4 kW motor



Part No.	Items	Order No.	Description
1	1	51500624-0001	Emergency off switch, complete
2	1	51500600	Switch for operating modes
3	1	51500807-0001	Potentiometer with cable and connector
3.1	1	51500807-00011	Potentiometer, complete
4	1	51500606-0001	On-Off switch
5	1	51500608	Switch
6	2	16193400004000	Nut
7	2	16167980004000	Fanned washer
8	1	51401535-0001	Switch cover
9			LEDs with switch (contained in controller package)
10	4	16179810003095	Screw
11	1	51501304	Symbol for earthed connection
12	1	16191200004012	Screw
13	1	51500601	Switch

18. Drawings and legends

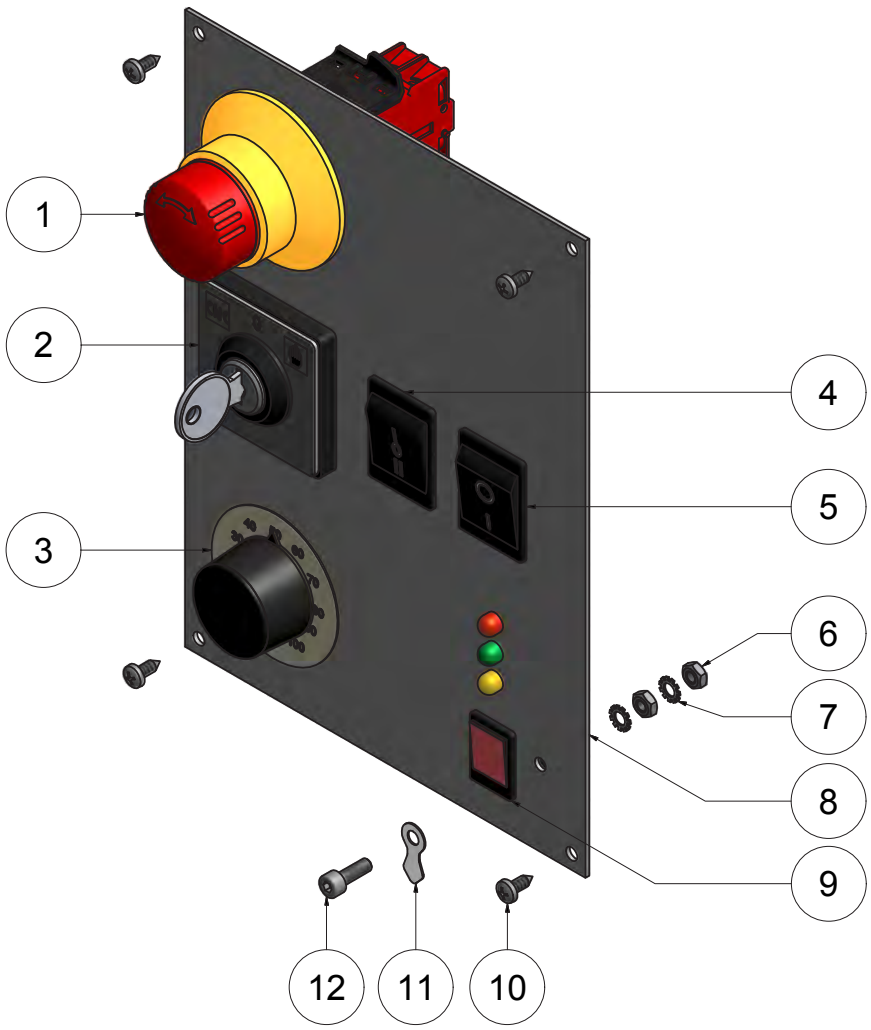
18.24 Industrial monitor and membrane keyboard especially for 1.4 kW motor



Part No.	Items	Order No.	Description
1	1	51401528-0001	Cover
2	1	51501304	Symbol for earthed connection
3	1	16191200004012	Screw
4	1	51500920-0003	Mains cable
5	1	51501531	Strain relief
6	2	51501523	Closure screw
7	2	51501533	Cable screw
8	2	51500401-0001	Guide rails
9	4	51501505	Counter nut
10	1	51501402	Control board
11	4	16191200003010	Screw
12	4	16167980003000	Fanned washer
13	4	16193400003000	Nut
14	2	16193400004000	Nut
15	2	16167980004000	Fanned washer

18. Drawings and legends

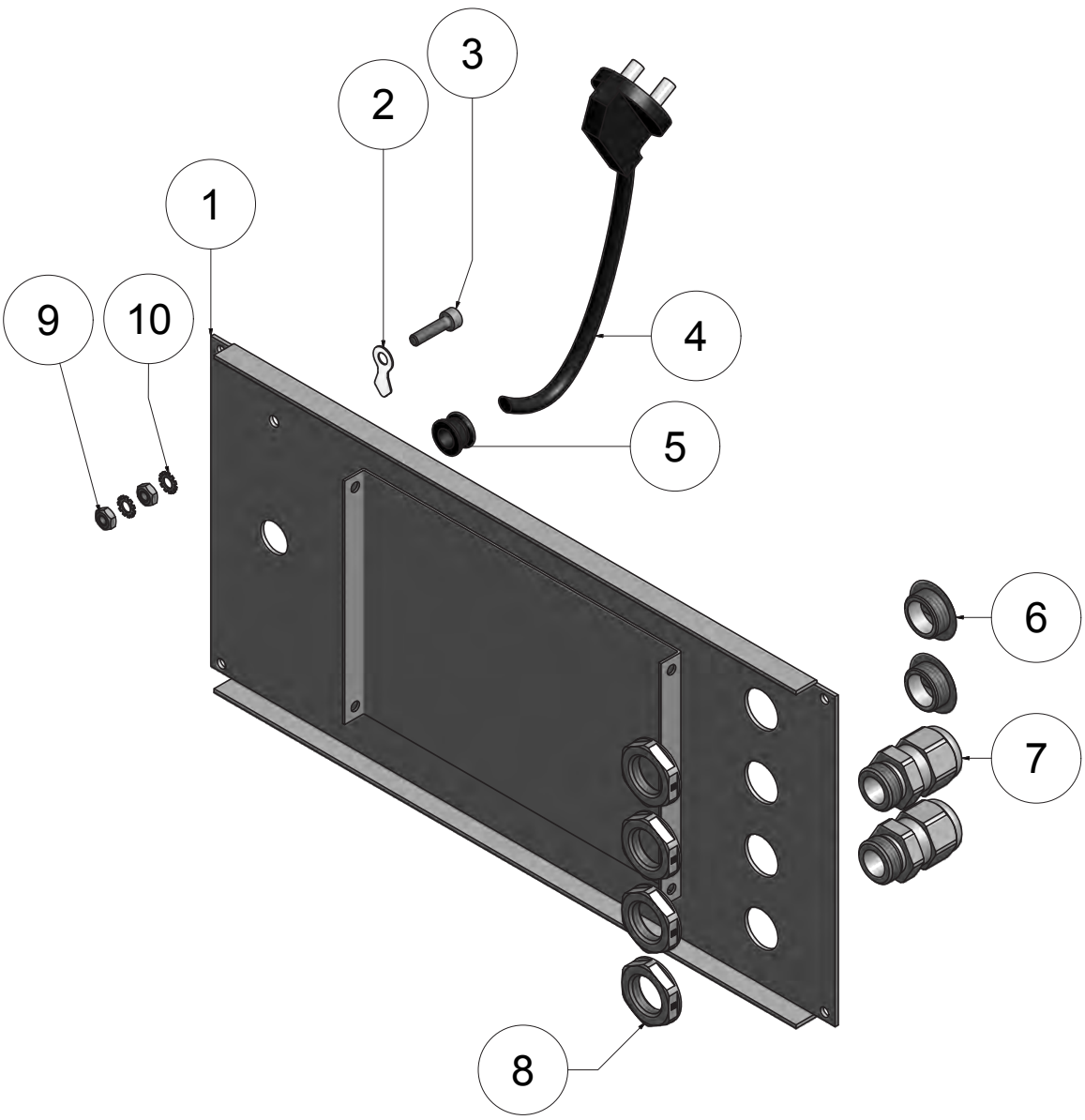
18.25 Industrial monitor and membrane keyboard especially for 2.5 kW motor



Part No.	Items	Order No.	Description
1	1	51500624-0001	Emergency off switch, complete
2	1	51500600	Switch for operating modes
3	1	51500801-0001	Potentiometer
4	1	51500602	Switch
5	1	51500601	Switch
6	2	16193400004000	Nut
7	2	16167980004000	Fanned washer
8	1	51401539-0001	Switch cover
9			LEDs with switch (contained in controller package)
10	4	16179810003095	Screw
11	1	51501304	Symbol for earthed connection
12	1	16191200004012	Screw

18. Drawings and legends

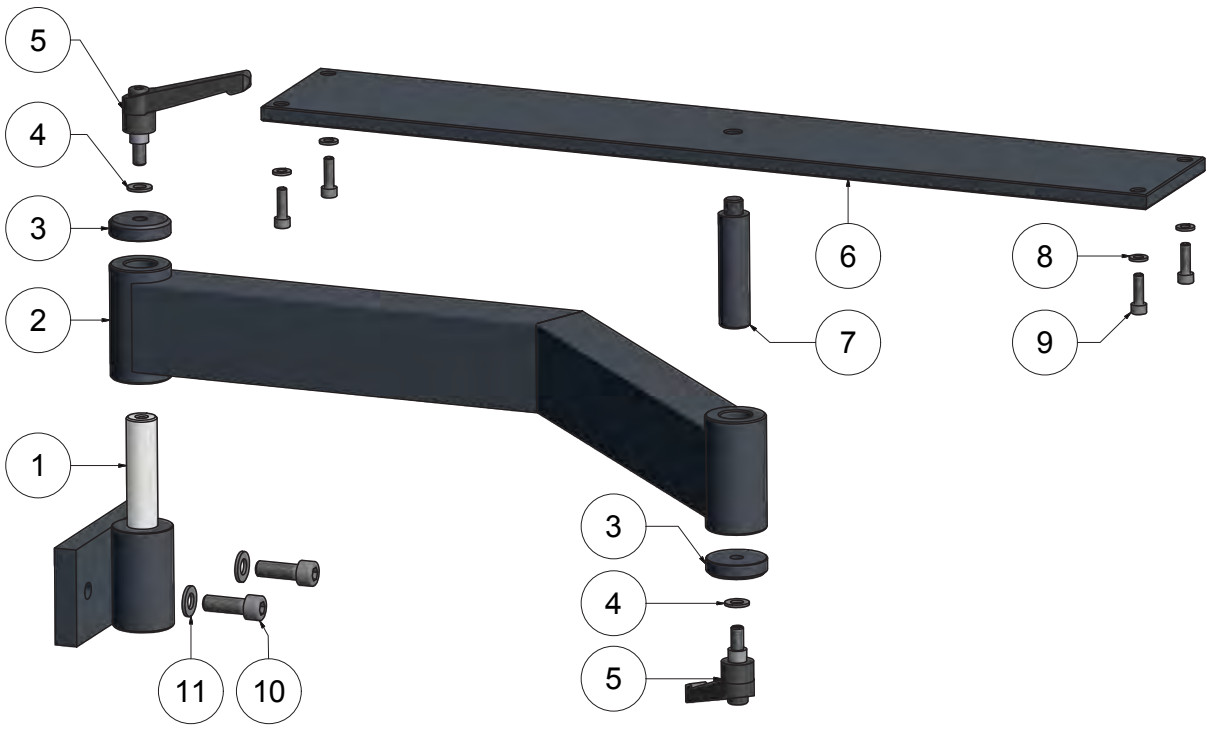
18.25 Industrial monitor and membrane keyboard especially for 2.5 kW motor



Part No.	Items	Order No.	Description
1	1	51401528-0001	Cover
2	1	51501304	Symbol for earthed connection
3	1	16191200004012	Screw
4	1	51500920-0003	Mains cable
5	1	51501531	Strain relief
6	2	51501523	Closure screw
7	2	51501533	Cable screw
8	4	51501505	Counter nut
9	2	16193400004000	Nut
10	2	16167980004000	Fanned washer

18. Drawings and legends

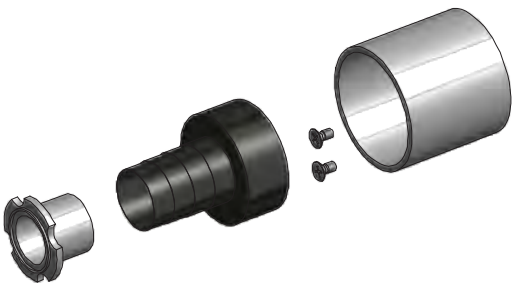
18.26 Support arm for industrial monitor and membrane keyboard

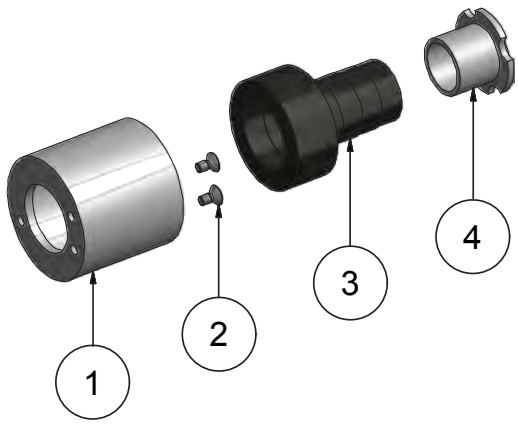


Part No.	Items	Order No.	Description
1	1	51002130-00032	Holder for arm
2	1	51002416-00011	Console arm
3	2	51004040-0006	Washer
4	2	16112500008001	Washer
5	2	51507031-0003	Clamping lever
6	1	51002100-0001	Holding plate for industrial monitor
7	1	51004020-0013	Bolt
8	4	16112500006001	Washer
9	4	16191200006020	Screw
10	2	16191200010030	Screw
11	2	16112500010000	Washer

18. Drawings and legends

18.27 Lead screw cover (optional)



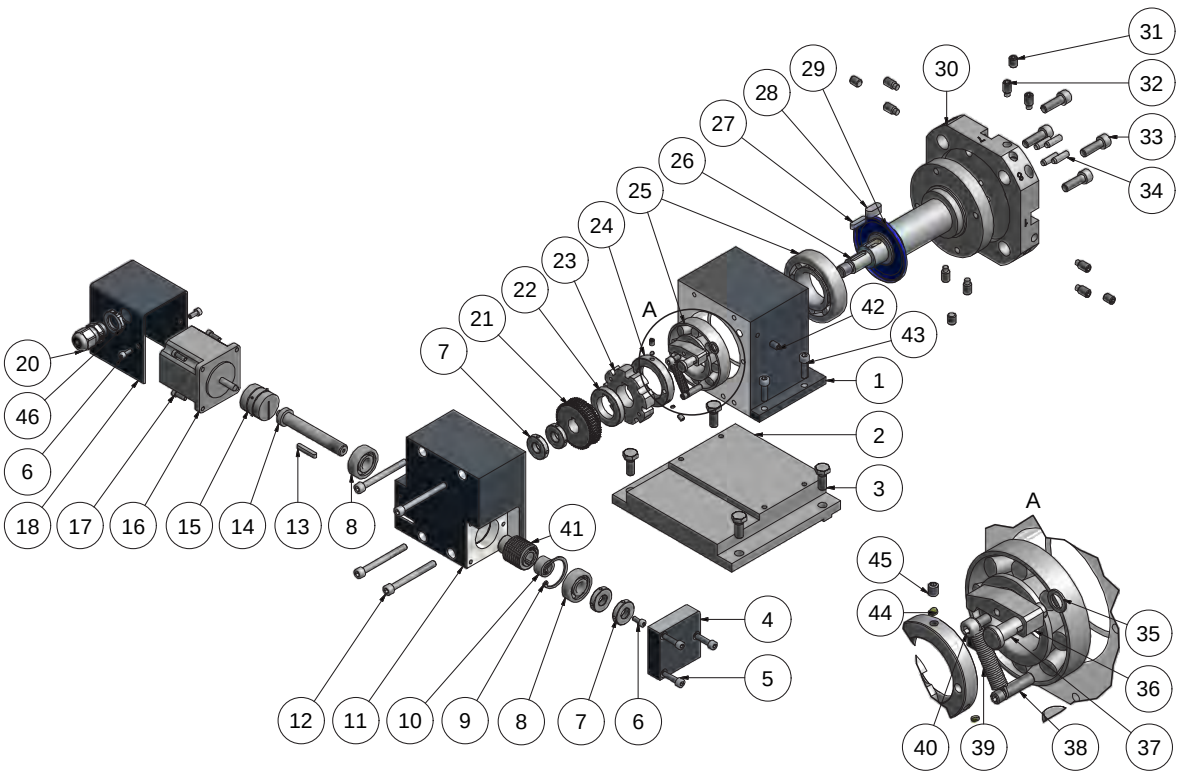


Part No.	Items	Order No.	Description
1	2	51006555-0020	Sleeve
2	4	16196500004008	Screw
3	2	51502513	Lead screw cover
4	2	51006540-0020	Sleeve

18. Drawings and legends

18.28 Automatic tool turret with 8 tool positions (optional)

In order to control the automatic tool turret with 8 tool positions with the control software, this must be parameterised and activated in nccad professional in accordance with the enclosed parameter sheet.



Part No.	Items	Order No.	Description
1	1	51508480-00011	Basic body
2	1		Base plate (contained in tool turret)
3	4	16193300008020	Screw
4	1	51508480-00031	Bearing cover
5	3	16191200005020	Screw
6	3	16191200004010	Screw
7	4	51004025-0021	Capstan nut
8	2	51502118	Ball bearing
9	1	16047200032000	Securing ring
10	1	51004018-0003	Spacer ring
11	1	51508480-00021	Cover
12	4	16191200006060	Screw
13	1	1606885A040425	Parallel key
14	1		Worm gear (contained in tool turret)

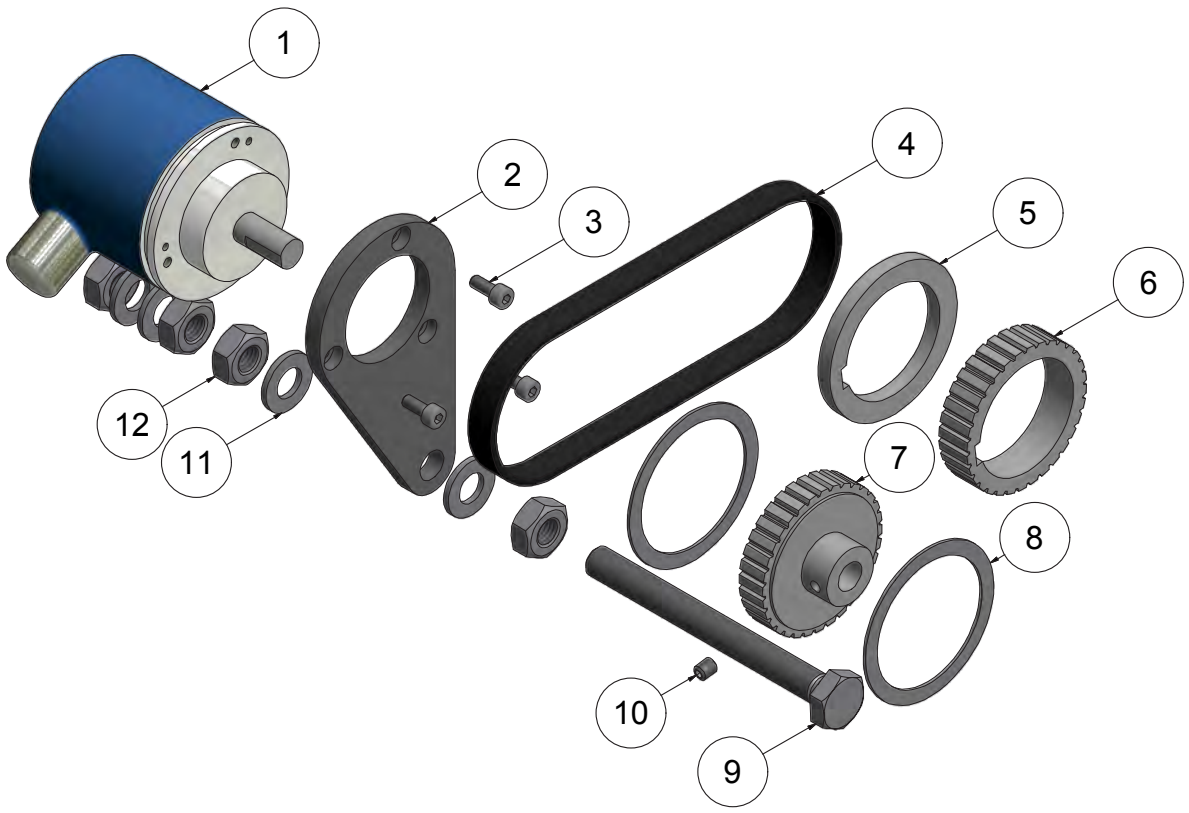
18. Drawings and legends

18.28 Automatic tool turret with 8 tool positions (optional)

Part No.	Items	Order No.	Description
15	1	51502600-0001	Coupling
16	1	51500113	Motor
17	4	16191200004012	Screw
18	1	51401812-0001	Cover hood
19	1	51501505	Counter nut
20	1	51501533	Cable screw
21	1	51502601	Worm gear
22	1	51508480-00051	Spacer
23	1	51508480-00041	Ratchet wheel
24	1	51004055-0001	Capstan nut
25	2	51502108	Tapered roller bearing
26	1		Main spindle (contained in tool turret)
27	1	1606885A005020	Parallel key
28	1	6885A080818-01	Parallel key
29	1	51502199	Nilos ring
30	1	51508481	Tool carrier disk
31	4	16091300008010	Threaded pin
32	8	16091500008016	Threaded pin
33	4	16191200008025	Screw
34	4	16063250006020	Cylinder pin
35	1		Spacer disk (contained in tool turret)
36	1		Ratchet (contained in tool turret)
37	1		Bolt (contained in tool turret)
38	1		Bolt (contained in tool turret)
39	1	51502036	Tension spring
40	1	16191200005010	Screw
41	1	51502602	Worm
42	1	16091300006010	Threaded pin
43	4	16191200006020	Srew
44	3	51007250-0001	Push piece
45	3	16091300005006	Threaded pin

18. Drawings and legends

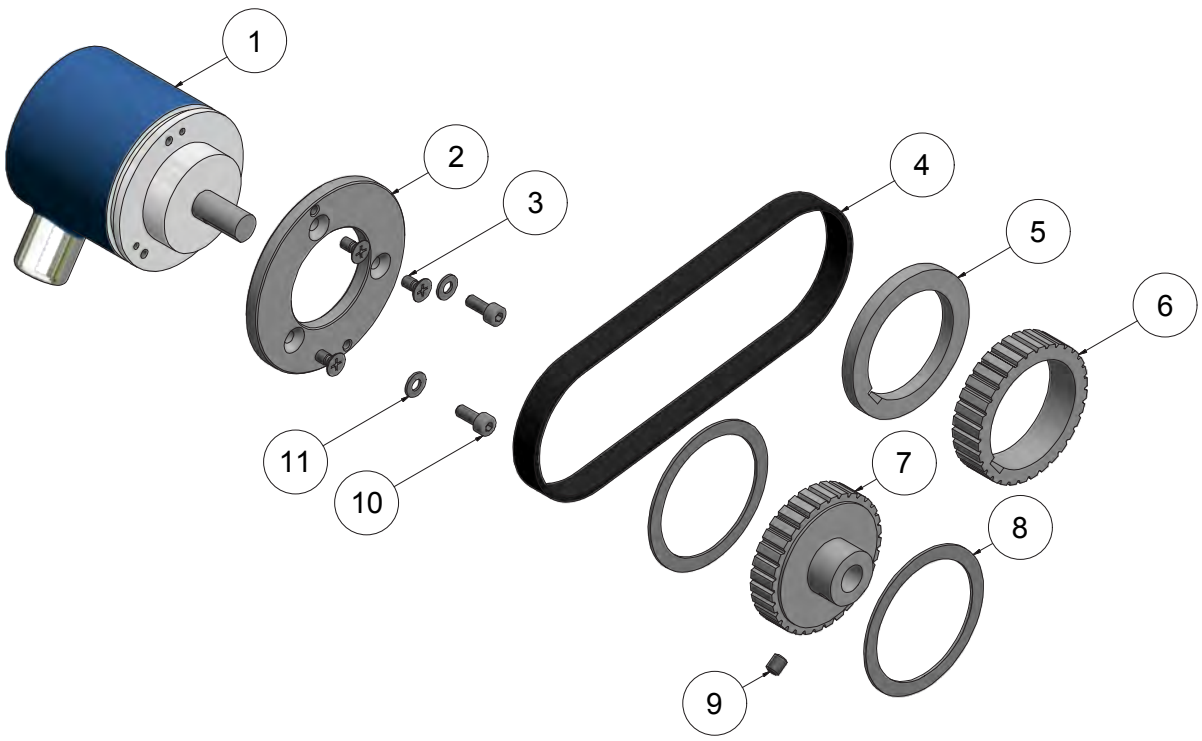
18.29 Speed sensor (optional)
for 2.5 kW motor with machine safety cabin
for 1.4 kW motor with and without machine safety cabin



Part No.	Items	Order No.	Description
1	1	51500101-0001	Speed sensor
2	1	51400223-0001	Speed sensor holder
3	3	16191200004010	Screw
4	1	51502323	Gear belt
5	1	51004055-0004	Sleeve
6	1	51006555-0002	Toothed belt wheel Z32
7	1	51006555-0001	Toothed belt wheel Z32
8	2	16000002214020	Adjusting washer
9	1	16193300010100	Screw
10	1	16191300005006	Threaded pin
11	4	16112500010000	Washer
12	4	16193400010000	Nut

18. Drawings and legends

18.30 Speed sensor (optional) for 2.5 kW motor without machine safety cabin

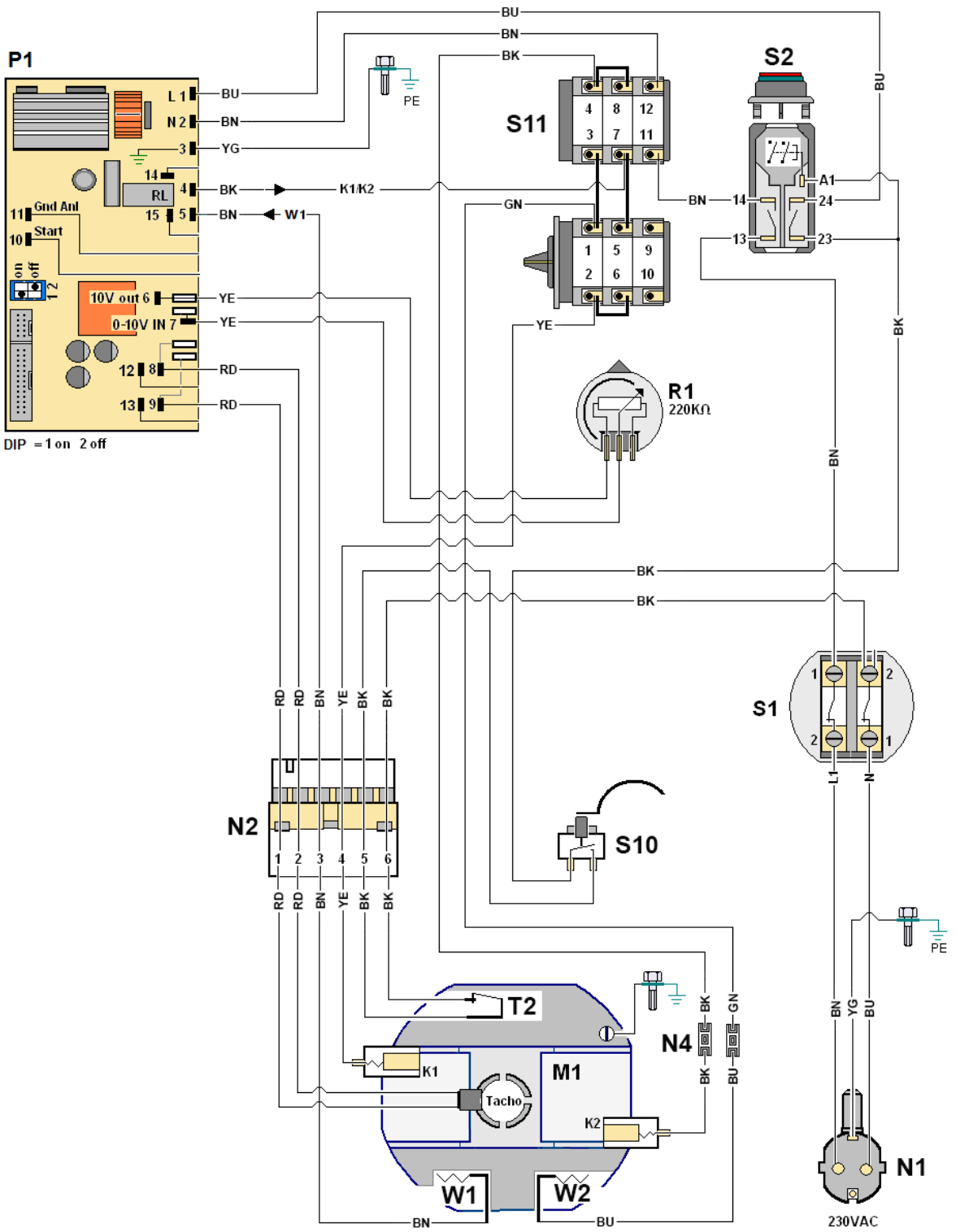


Part No.	Items	Order No.	Description
1	1	51500101-0001	Speed sensor
2	1	51006575-0003	Holding flange
3	3	16196500004008	Screw
4	1	51502323	Gear belt
5	1	51004055-0004	Sleeve
6	1	51006555-0002	Toothed belt wheel Z32
7	1	51006555-0001	Toothed belt wheel Z32
8	2	16000002214020	Adjusting washer
9	1	16191300005006	Threaded pin
10	2	16191200004010	Screw
11	2	16112500004000	Washer

19. Circuit diagram

19.1 For 1.4 kW motor

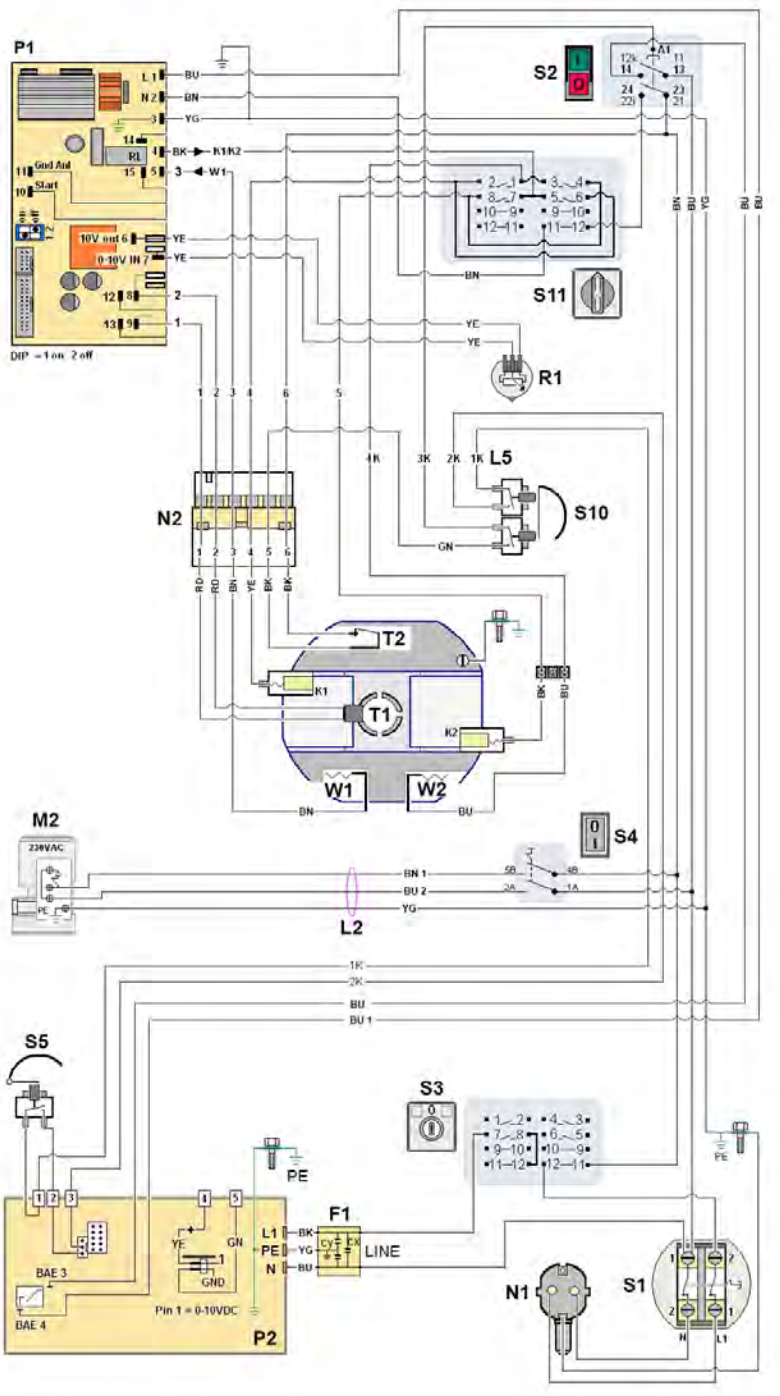
This document shows all the equipment for the electrical set-up
including connection to the power supply network



19. Circuit diagram

19.2 For 1.4 kW motor and machine safety cabin with nccad basic

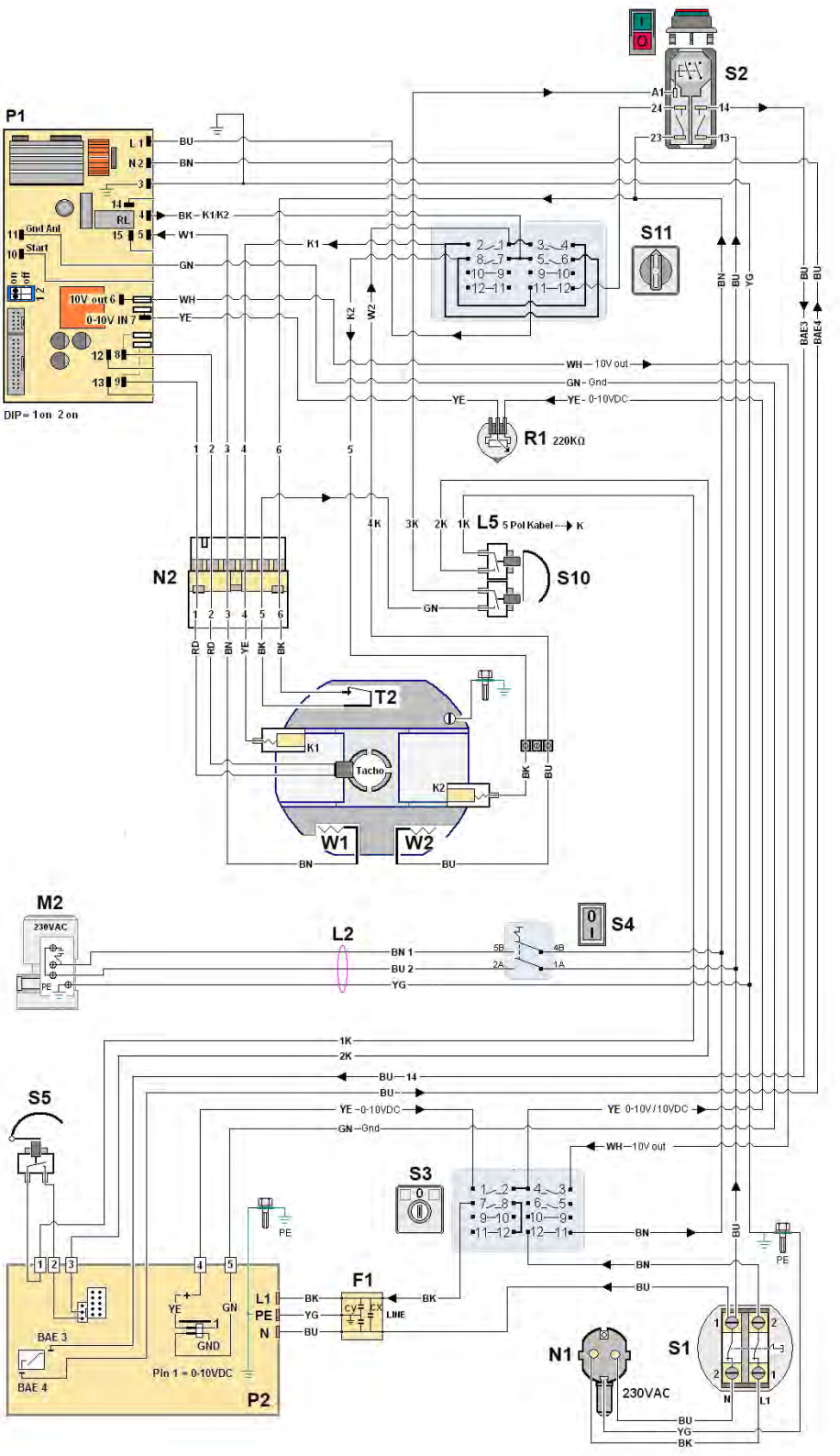
This document shows all the equipment for the electrical set-up
including connection to the power supply network



19. Circuit diagram

19.3 For 1.4 kW motor and machine safety cabin with nccad professional

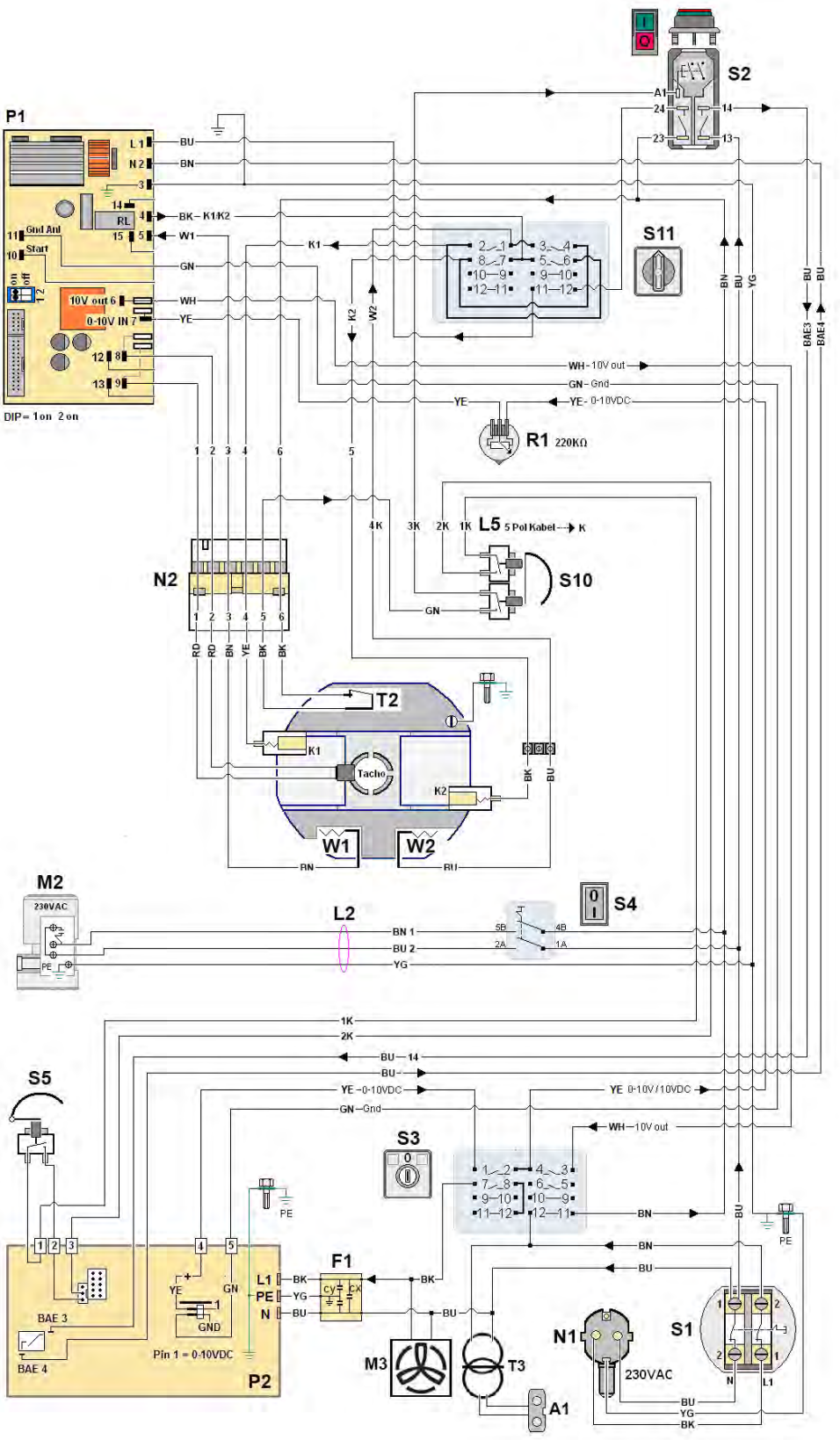
This document shows all the equipment for the electrical set-up including connection to the power supply network.



19. Circuit diagram

19.4 Industrial monitor and membrane keyboard especially for 1.4 kW motor

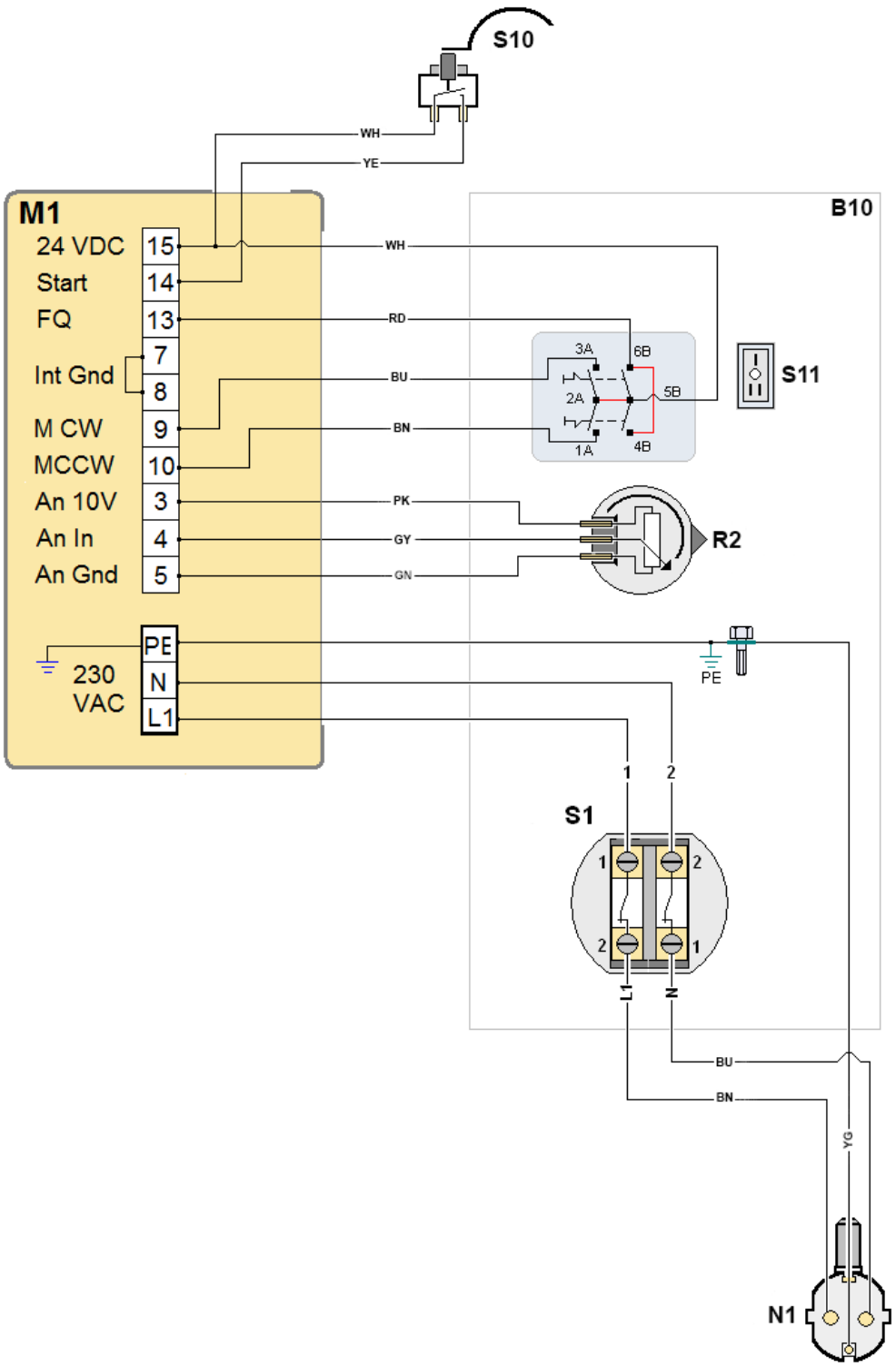
This document shows all the equipment for the electrical set-up
including connection to the power supply network.



19. Circuit diagram

19.5 For 2.5 kW motor

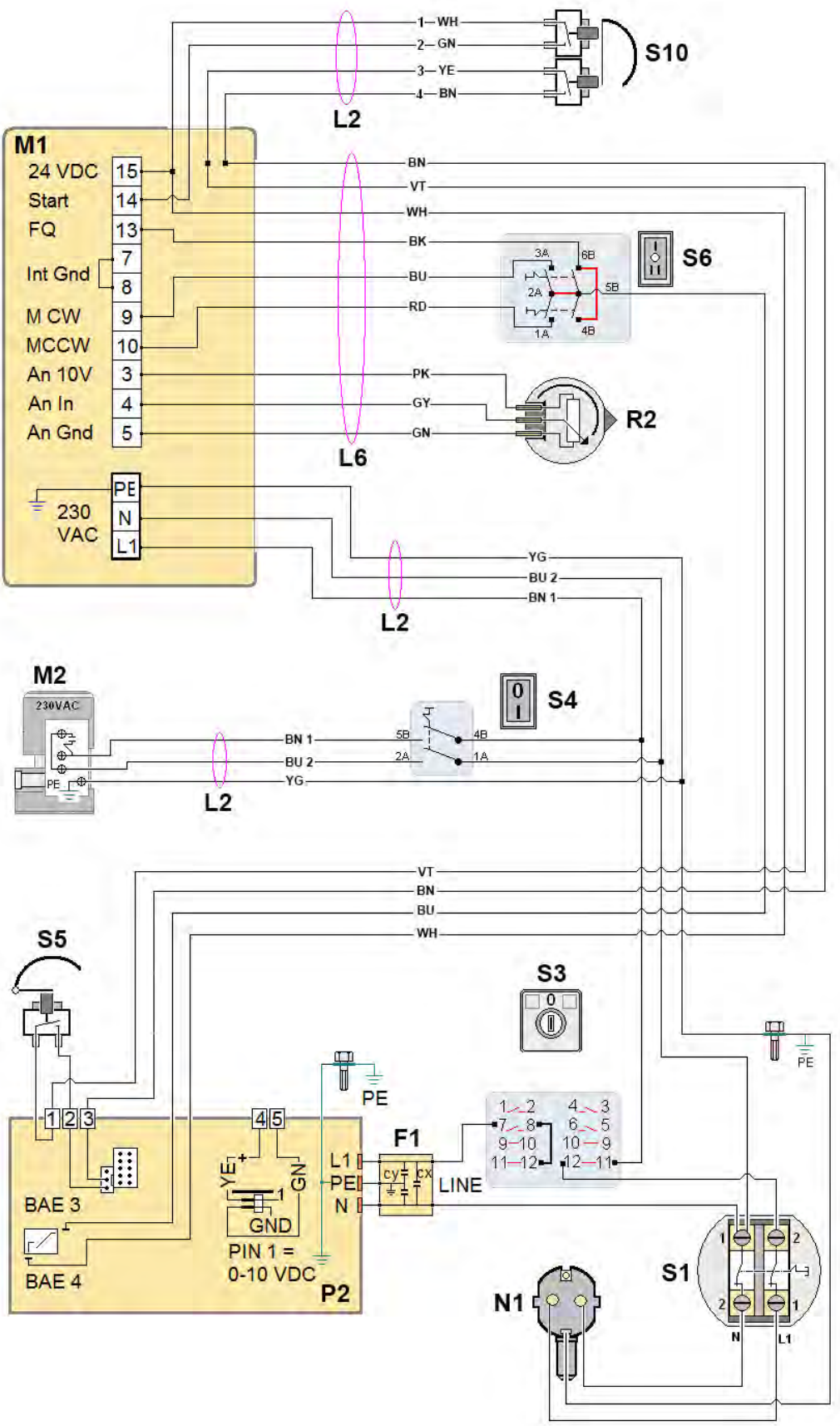
This document shows all the equipment for the electrical set-up including connection to the power supply network.



19. Circuit diagram

19.6 For 2.5 kW motor and machine safety cabin with nccad basic

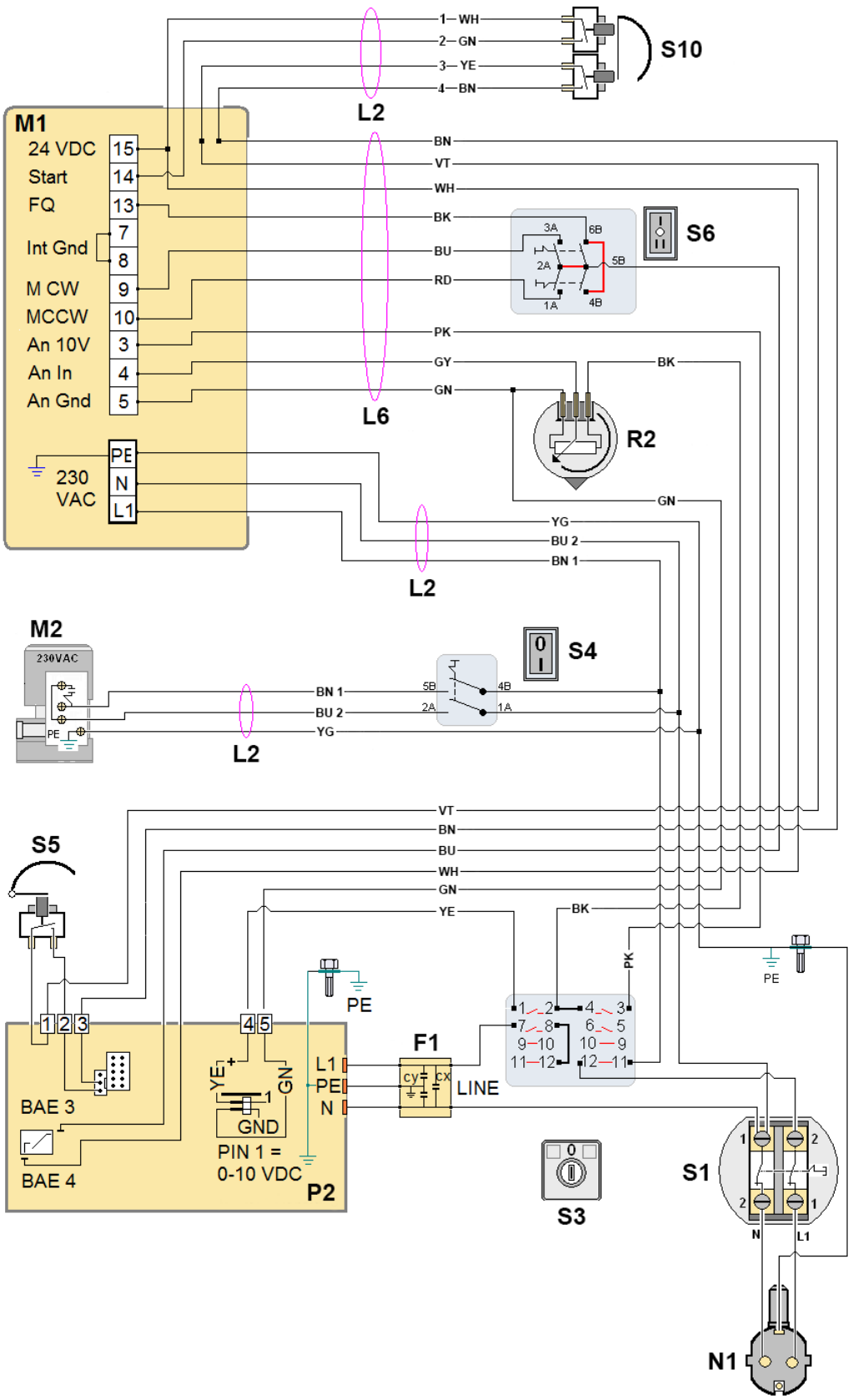
This document shows all the equipment for the electrical set-up including connection to the power supply network.



19. Circuit diagram

19.7 For 2.5 kW motor and machine safety cabin with nccad professional

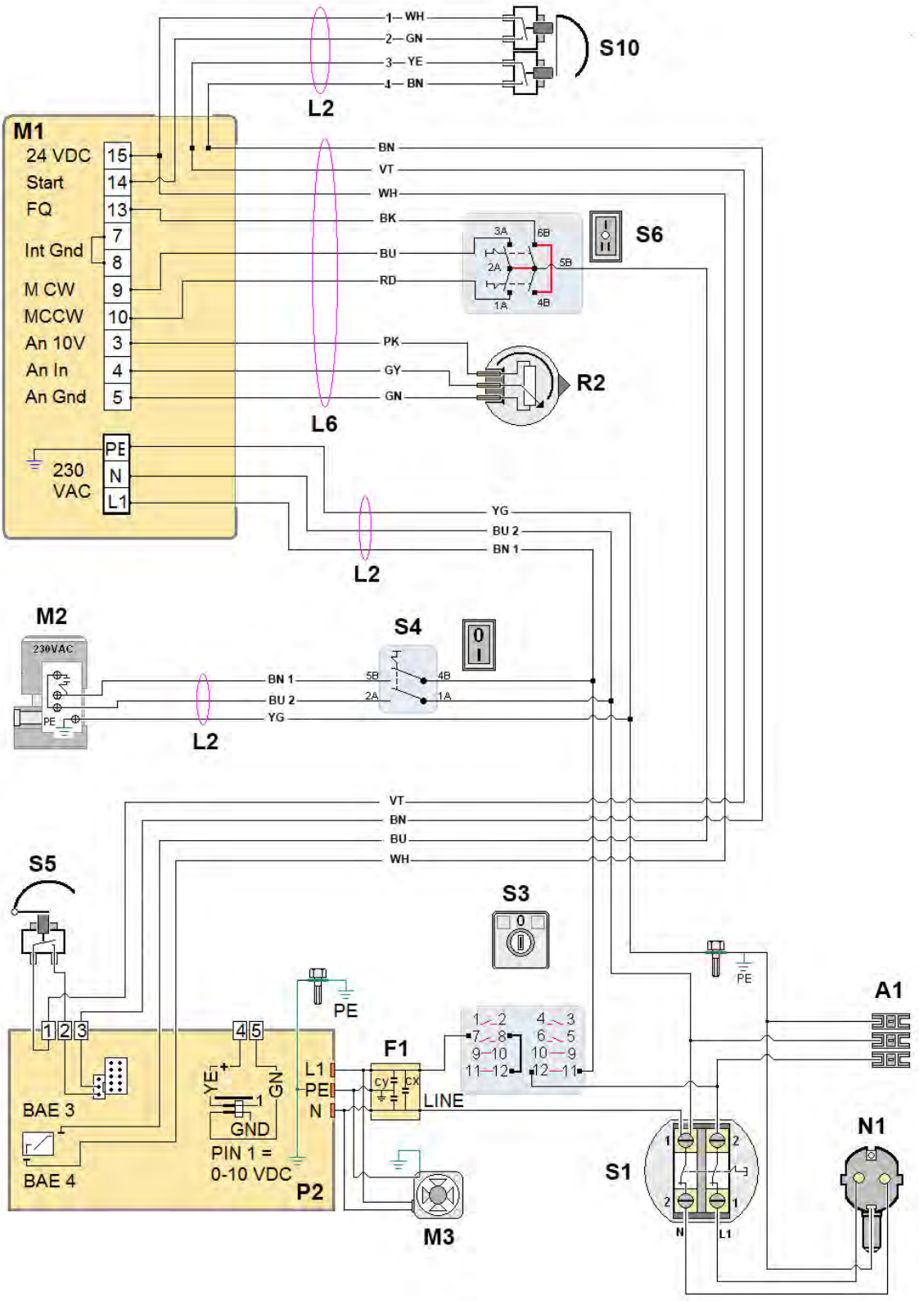
This document shows all the equipment for the electrical set-up
including connection to the power supply network.



19. Circuit diagram

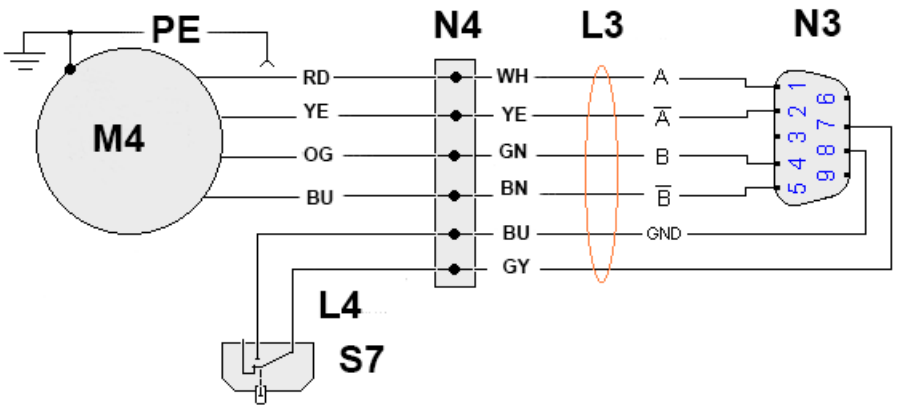
19.8 Industrial monitor and membrane keyboard especially for 2.5 kW motor

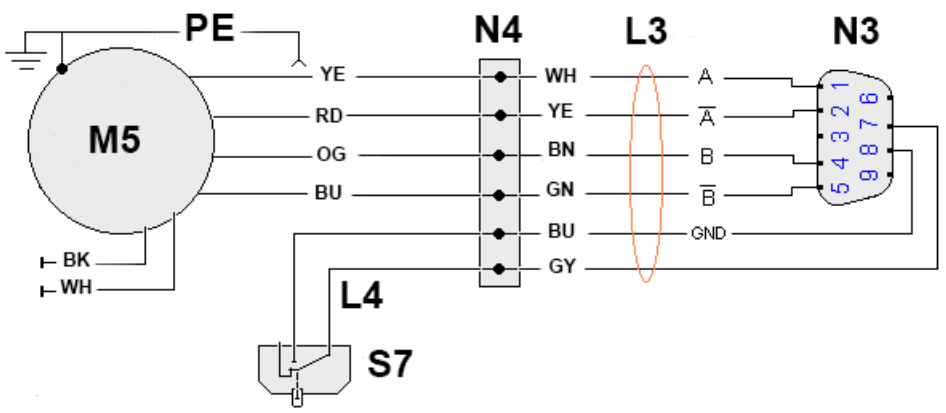
This document shows all the equipment for the electrical set-up
including connection to the power supply network.

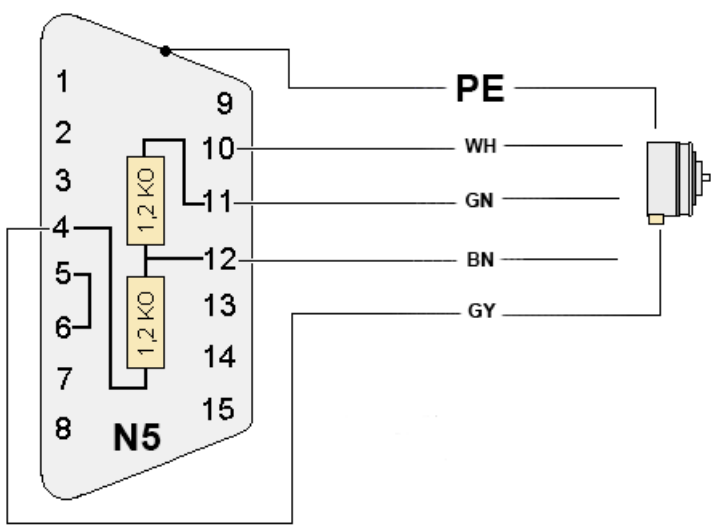


19. Circuit diagram

19.9 Stepper motor with limit switch







Exchange direction of rotation green with brown

See legend for circuit diagrams 19.10

19. Circuit diagram

19.10 Key for circuit diagram

Color-code by IEC 60757

BK	Black	PK	Pink
BN	Brown	RD	Red
BU	Blue	VT	Violet
GN	Green	WH	White
GY	Gray	YE	Yellow
OG	Orange	YG	Yellow/Green

A1	Ports for industrial monitor
B10	Control panel case
F1	Noise filter
K1	Carbon brush
K2	Carbon brush
L2	3 - pole cable without shielding 1mm²
L3	6 - pole cable with shielding
L4	2 - pole cable with shielding
L5	5 - pole cable without shielding
L6	10- pole cable with shielding 0.34 mm2
M1	Main spindle motor
M2	Coolant pump
M3	Fan for industrial monitor
M4	Axis motor 3H8221 - 624/6A
M5	Axis motor T-axis 103H7123-0740 3 ADC
M6	Feed motor

19. Circuit diagram

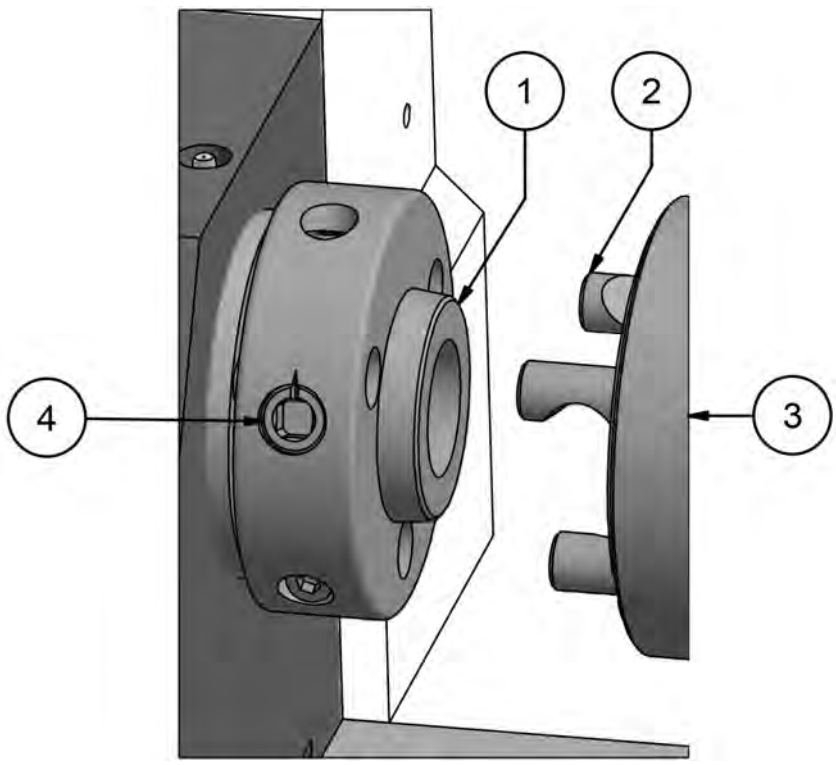
19.10 Key for circuit diagram

N1	Power plug
N2	Motor plug
N3	9- pin plug
N4	Clamping bar
N5	15- pin plug
P1	Motor control board
P2	CNC control board
P3	Optical coupler board
P4	Feed board
PE	Protection against electrical shock
R1	220 kΩ (ohm) potentiometers spindle speed
R2	10 kΩ (ohm) potentiometers spindle speed
S1	Emergency switch-off
S2	Main switch
S3	Selection switch
S4	Switch coolant
S5	Limit switch machine safety cabin
S6	Turn switch spindle R/L
S7	Limit switch /optional
S10	Limit switch chuck -cover
S11	Turn switch spindle right/left
S12	Feed direction
T1	Speedometer
T2	Thermistor
T3	Transformer
W1	Coil 1
W2	Coil 2

20. Camlock main spindle (optional)

20.1 Undoing a chuck or holding flange from the camlock main spindle nose

- Open the three clamping tappets (4) located around the circumference of the camlock main spindle (1) using an Allen key in size 10 mm (not part of the delivery).
- After opening, the markings of the clamping tappets (4) must, as shown, point to the markings on the camlock main spindle (1).
- The moving of the camlock bolt (2) and thus the removal of the chuck or holding flange (3) is only possible if both markings point to one another.
- Remove the chuck or the holding flange (3).

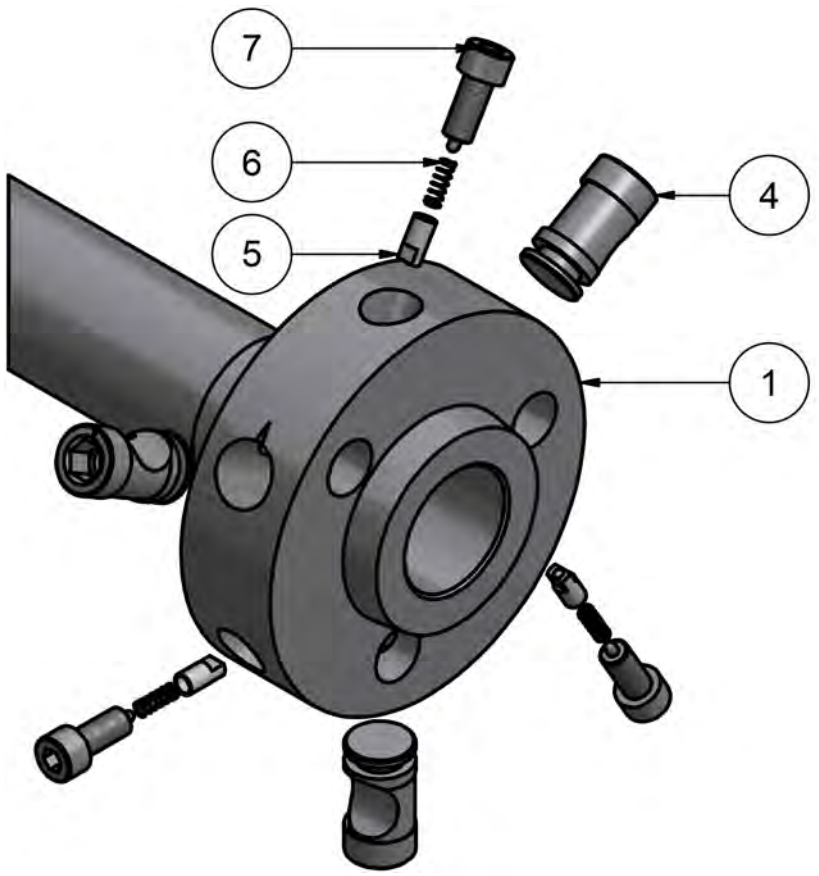


20.2 Blocking a chuck or holding flange on the camlock main spindle nose

- Ensure that the markings on the clamping tappets (4) point to those markings on the camlock main spindle (1).
- Place the chuck or holding flange (3) on the camlock main spindle (1), in doing so, insert the camlock bolt (2) into the holes drilled in the camlock main spindle.
- Tighten the three clamping tappets (4) located around the circumference of the camlock main spindle (1) using an Allen key in size 10 mm (not included in the scope of delivery), so that the chuck or holding flange (3) pulls towards the camlock main spindle.

20. Camlock main spindle (optional)

20.3 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51003520-0001	Camlock main spindle
4	3	51508096	Clamping tappet
5	3	51004008-0012	Fastening pin
6	3	51502027	Pressure spring
7	3	16191200008020	Screw

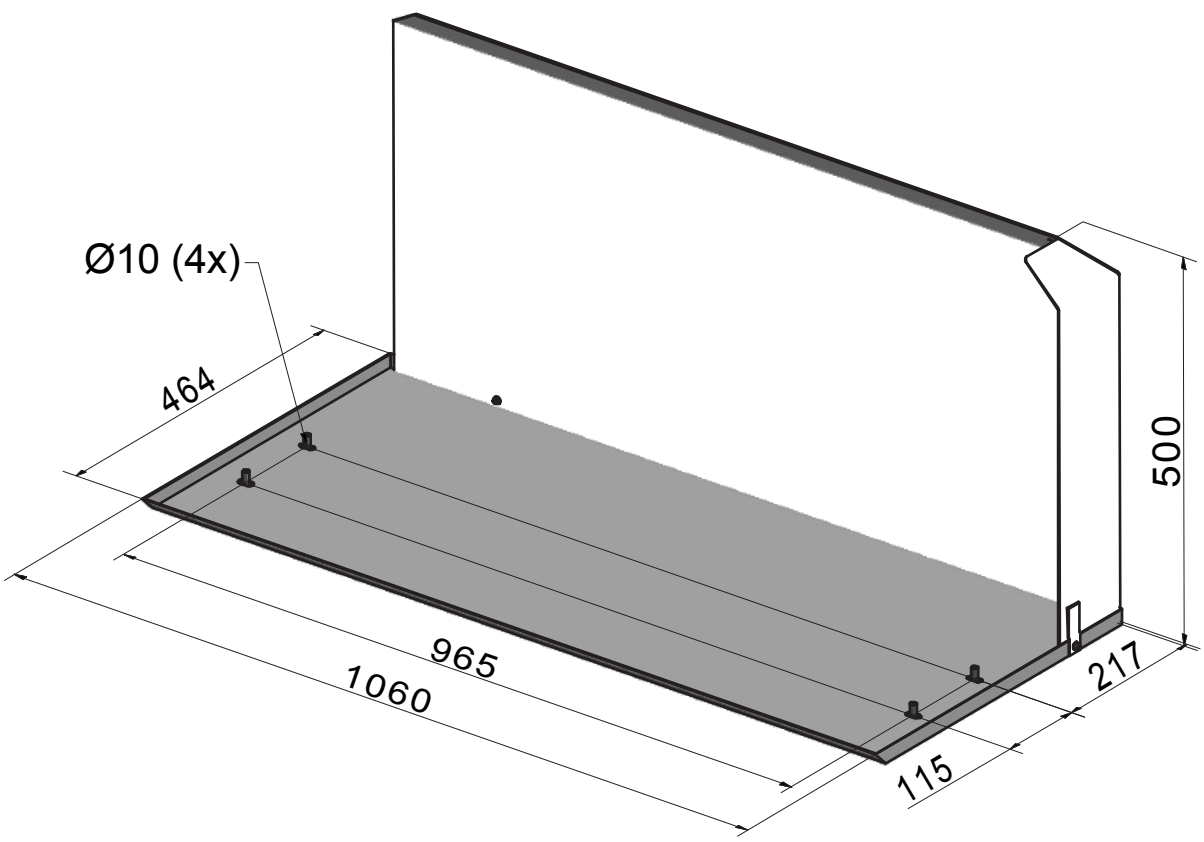
21. Chip- and coolant tray with splash guard (optional)

21.1 Setting up the chip- and coolant tray with splash guard

When mounting the chip- and coolant tray with splash guard to a WABECO machine base cabinet, the appropriate bores are already present. The machine base cabinet ensures a safe base for the lathe or chip- and coolant tray with splash guard.

If the chip- and coolant tray with splash guard is secured to another suitable surface, the four through holes must be bored into the surface by the client. For the positions of the four drilled holes for the lathe or chip- and coolant tray with splash guard, see the diagram. The diameter of the through holes in the surface must be at least 9 mm.

The supplied fixture screws are designed for the installation on a WABECO machine base cabinet. If the chip- and coolant tray with splash guard is attached to another, suitable surface, screws suitable for the thickness of the surface must be used.



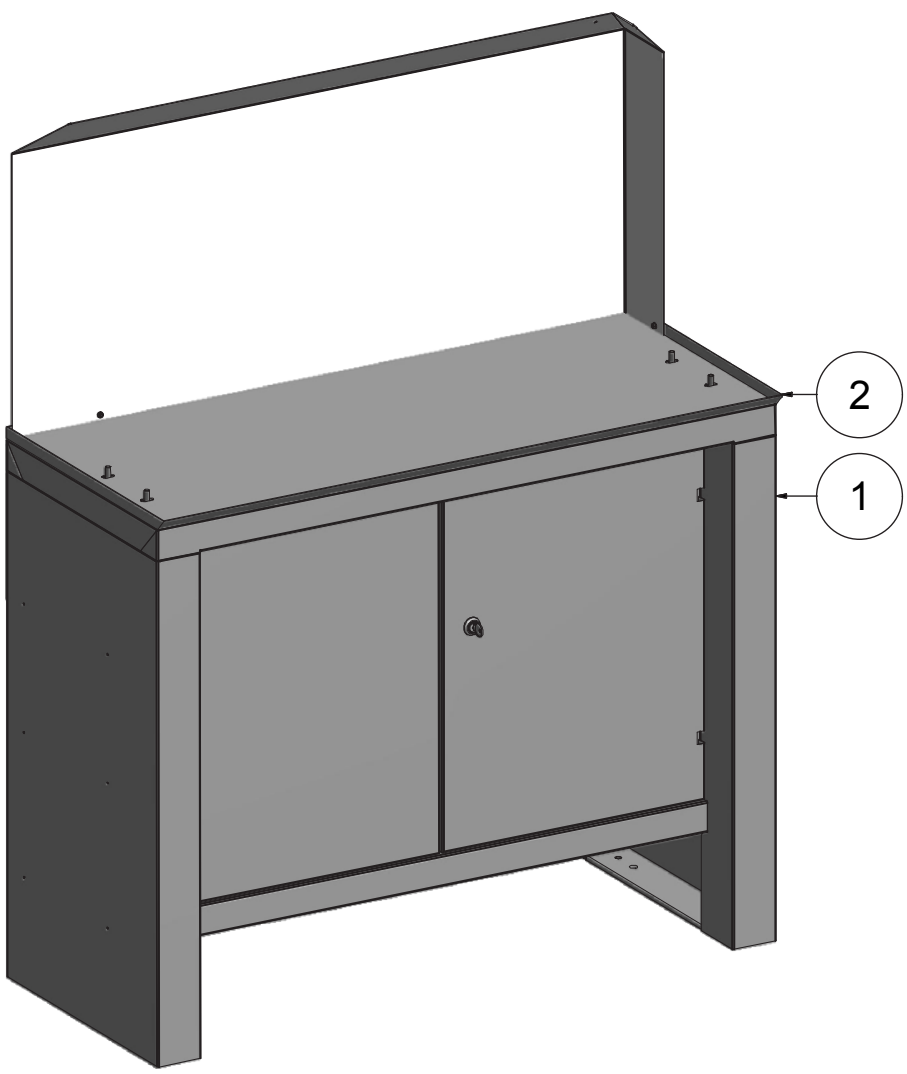
21. Chip- and coolant tray with splash guard (optional)

21.2 Mounting the chip- and coolant tray with splash guard on the machine base cabinet (optional)

- The chip- and coolant tray with splash guard (2) is positioned, as shown, on the machine base cabinet (1).
- The screws and washers required for assembly are included in the scope of delivery.

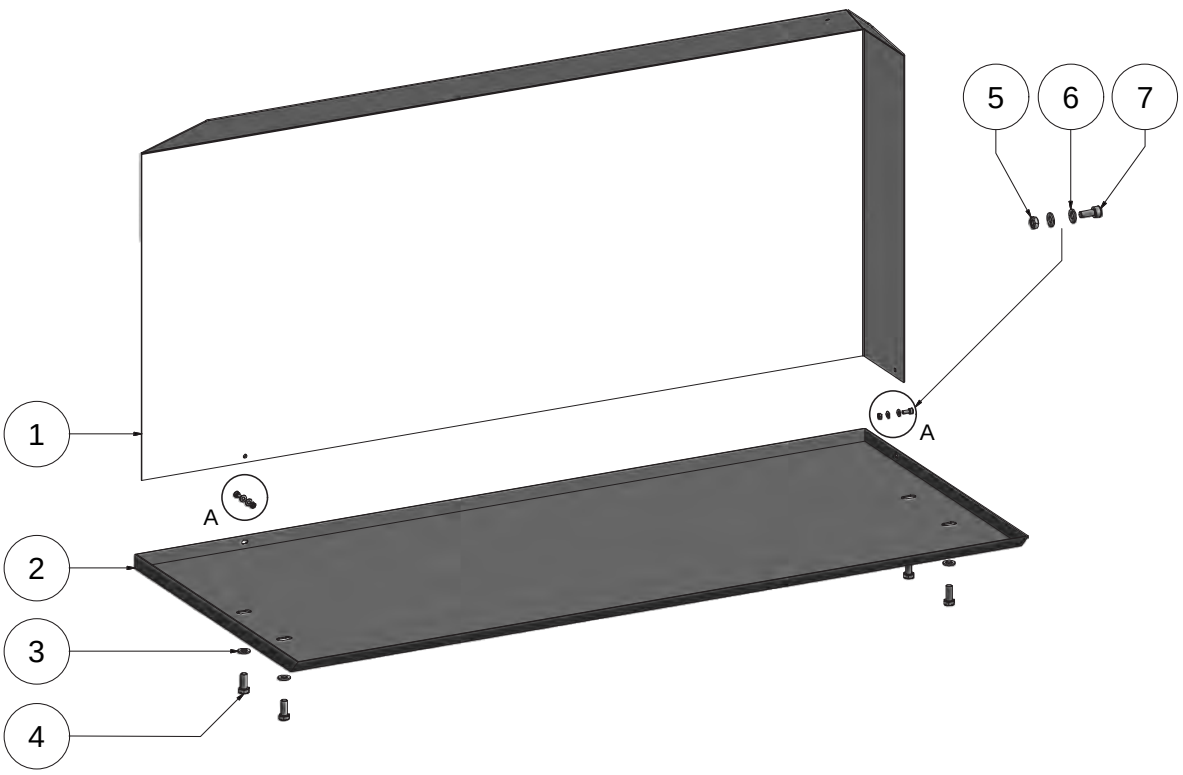
To screw the chip- and coolant tray with splash guard to the machine base cabinet proceed as follows:

1. Place the lathe carefully onto the chip- and coolant tray with splash guard and align the fixing holes.
2. Combine each screw with a washer.
3. Open the doors of the machine base cabinet.
4. Push the screws from below, through the fixing holes in the machine base cabinet, into the chip- and coolant tray with splash guard and into the fixture thread on the bed of the lathe and tighten using a size 13 combination wrench.



21. Chip- and coolant tray with splash guard (optional)

21.3 Drawing and legend



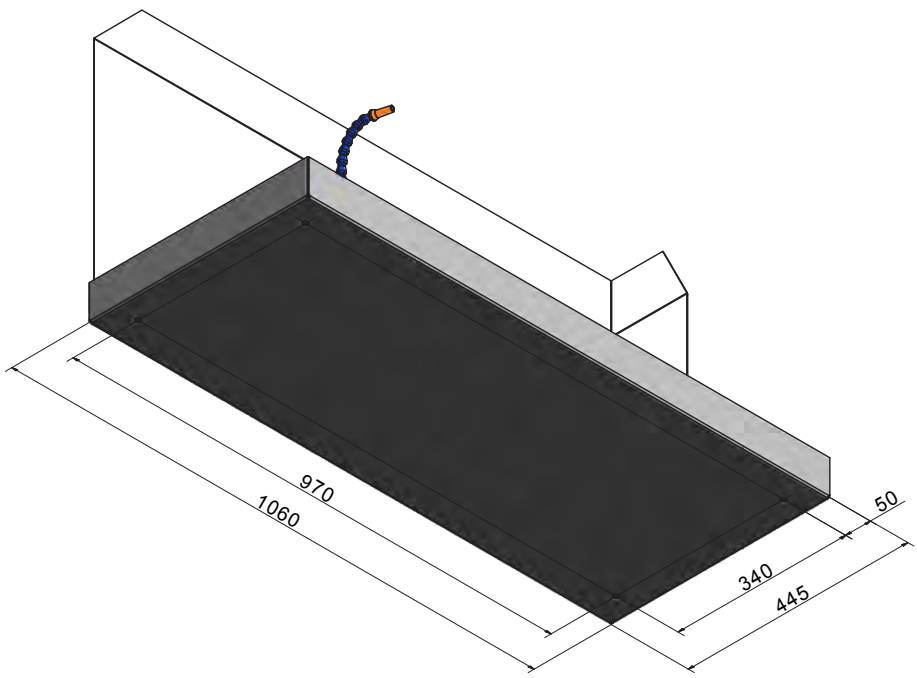
Part No.	Items	Order No.	Description
1	1	51400235-0001	Splash guard
2	1	51400484-0001	Chip- and coolant tray
3	4	16112500008001	Washer
4	4	16193300008020	Screw
5	2	16193400004000	Nut
6	4	16112500004000	Washer
7	2	16191200004010	Screw

22. Coolant unit (optional)

22.1 Setting up the coolant unit

When mounting the coolant unit to a WABECO machine base cabinet, the appropriate bores are already present. The machine base cabinet ensures a safe base for the lathe or coolant unit.

If the coolant unit is secured to another suitable surface, the four through holes must be bored into the surface by the client. For the positions of the four fixtures threaded sockets (thread M8) of the coolant unit, see diagram. The diameter of the through holes in the surface must be at least 9 mm.



22.2 Mounting of the coolant unit to the machine base cabinet (optional)

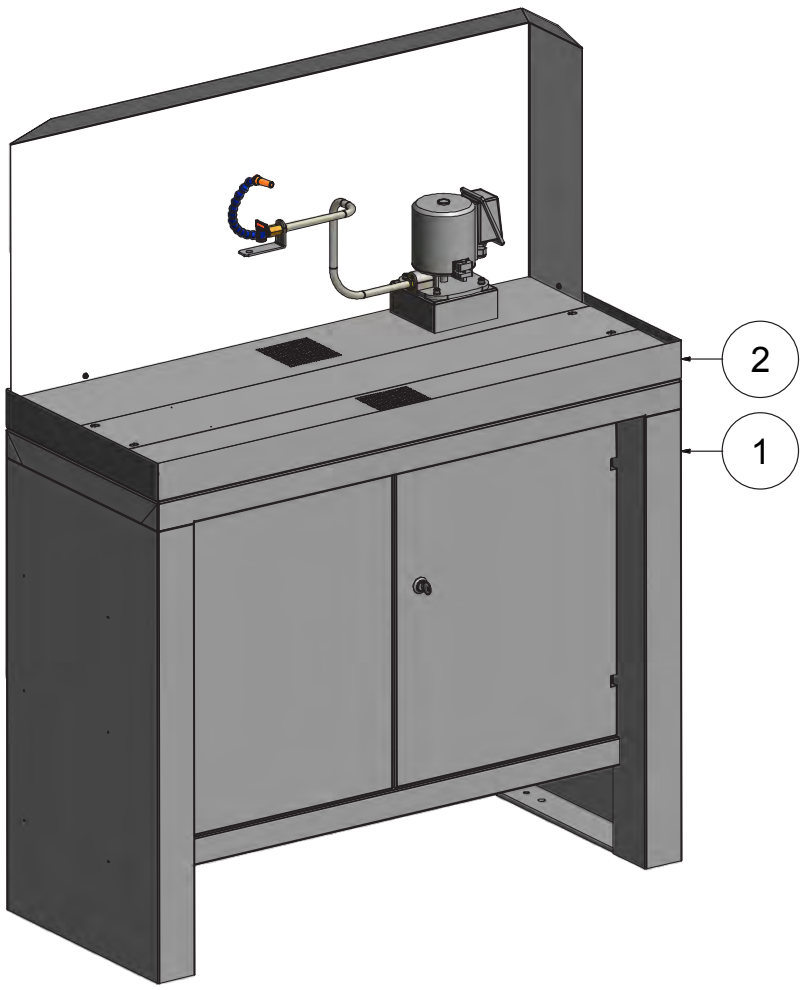
- The coolant unit (2) is positioned, as shown, on the machine base cabinet (1).
- The screws and washers required for assembly are included in the scope of delivery.

To screw the coolant unit to the machine base cabinet proceed as follows:

1. Combine each screw with a washer.
2. Open the doors of the machine base cabinet.
3. Push the screws from below, through the bored holes in the machine base cabinet, into the fixture threaded sockets and tighten using an Allen key of size 6.

22. Coolant unit (optional)

22.2 Mounting of the coolant unit to the machine base cabinet (optional)



22.3 Safety regulations for the handling of cooling lubricant

1. Pay particular attention to leaked coolant as this can quickly cause people to slip and caused accidents as a result.
2. Secure your coolant unit in such a way that it cannot be switched on by children. Persons who have not been trained may not operate the coolant unit.
3. Ensure you have a clean workplace, dirty areas can quickly lead to accidents.
4. Never use the coolant unit when processing magnesium alloys. In combination with water-mixed coolants, this may result in flammable gas mixtures which may explode under certain circumstances.
5. Avoid longer skin contact with the coolant.
6. Use skin protecting creams when handling coolants.
7. Regularly monitor the concentration of the water-mixed coolant.
8. Regularly monitor the pH value of the coolant.
9. Make sure that the coolant is only disposed of in an environmentally friendly way in accordance with the relevant guidelines. Coolant is a special waste product

22. Coolant unit (optional)

22.4 Filling the coolant unit

A number of protective measures must be observed and taken in order to ensure that the handling of coolant does not cause health risks or environmental loads.

- Always observe the datasheet and the safety regulations of the coolant being used (can be obtained from the supplier or manufacturer).
- Observe all safety regulations set out in these operating instructions, in particular those that refer to the safe handling of coolants.
- In order to ensure reliable operation of the coolant pump, a minimum coolant filling level is required in the coolant tank.
- The capacity of the coolant unit is approximately 19 liters.
- The maximum filling level should be just below the shelf insert.
- The minimum filling level is approximately 15 mm below that.
- To fill, remove the shelf insert and fill to the maximum filling level with a suitable coolant whilst observing all safety regulations.
- After filling, replace the shelf insert.

22.5 Operating the coolant unit without CNC controller

The switch shown below is located on the mains cable of the coolant pump.

Switch position (0) → Pump switched off

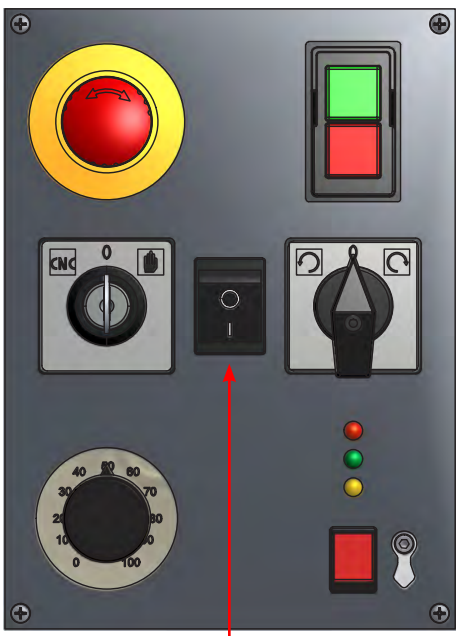
Switch position (I) → Pump switched on

(Caution: Coolant flow is controlled with the coolant shut-off valve)

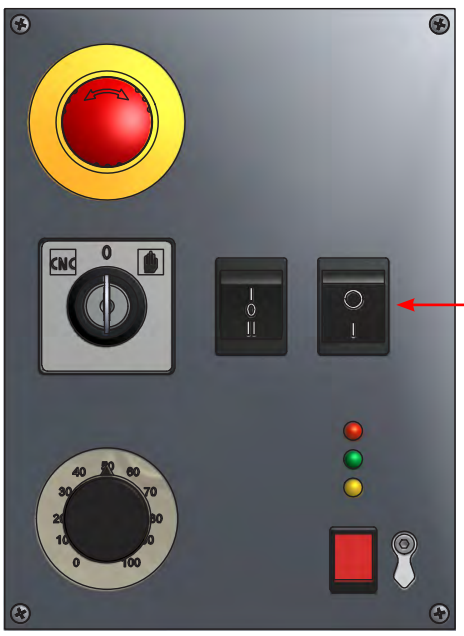
22. Coolant unit (optional)

22.6 Operating the coolant unit with CNC controller

For machines with 1.4 kW drive motor



For machines with 2.5 kW (hs) drive motor



Switch for cooling system

Switch position (0) → Pump switched off

Switch position (I) → Pump switched on

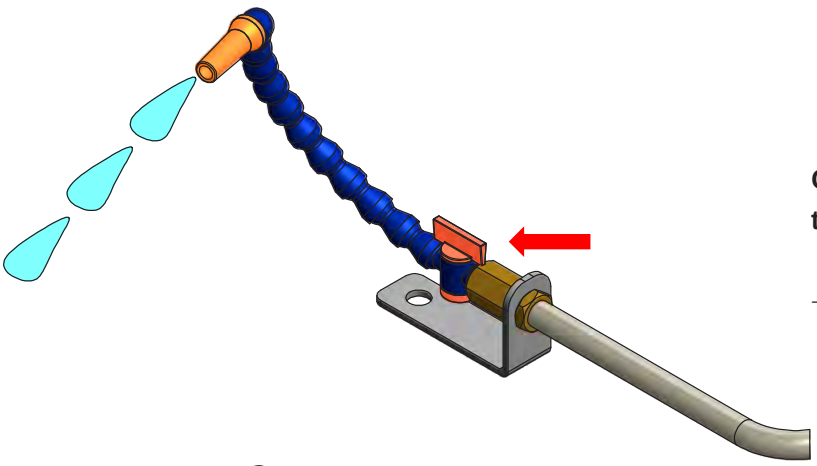
(Caution: Coolant flow is controlled with the coolant shut-off valve)

22. Coolant unit (optional)

22.7 Positioning the segmented coolant hose

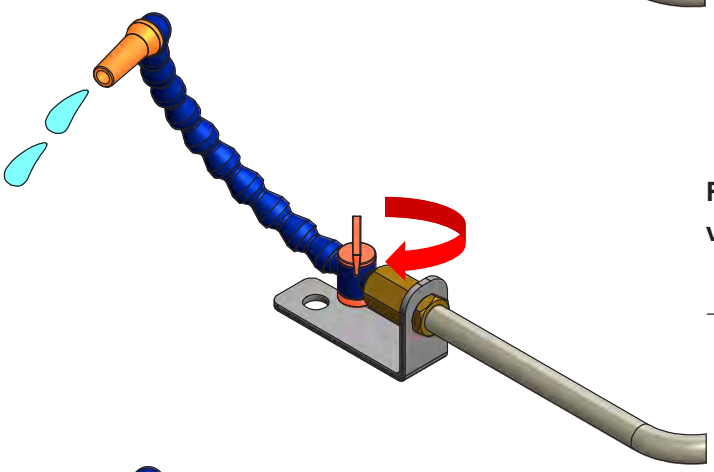
The flexible segmented hose (shown in blue) is made up of individually adjustable elements and can be shaped by hand or set as required. The segmented hose and the nozzle are to be positioned in such a way that the coolant flows as directly as possible onto the blade of the cutting tool of the lathe. Attention should be paid to ensure that the nozzle does not come into contact with the cutting tool.

22.8 Controlling the flow of coolant using the coolant shut-off valve



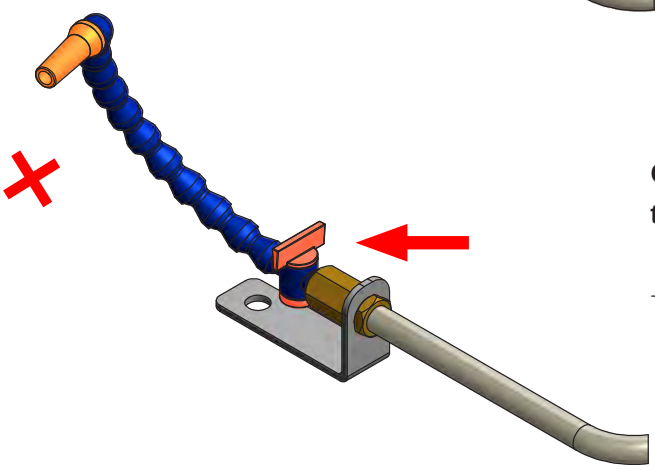
Coolant shut-off valve in the "open" position

→ Maximum coolant flow



Rotation of the coolant shut-off valve clockwise

→ Flow is reduced

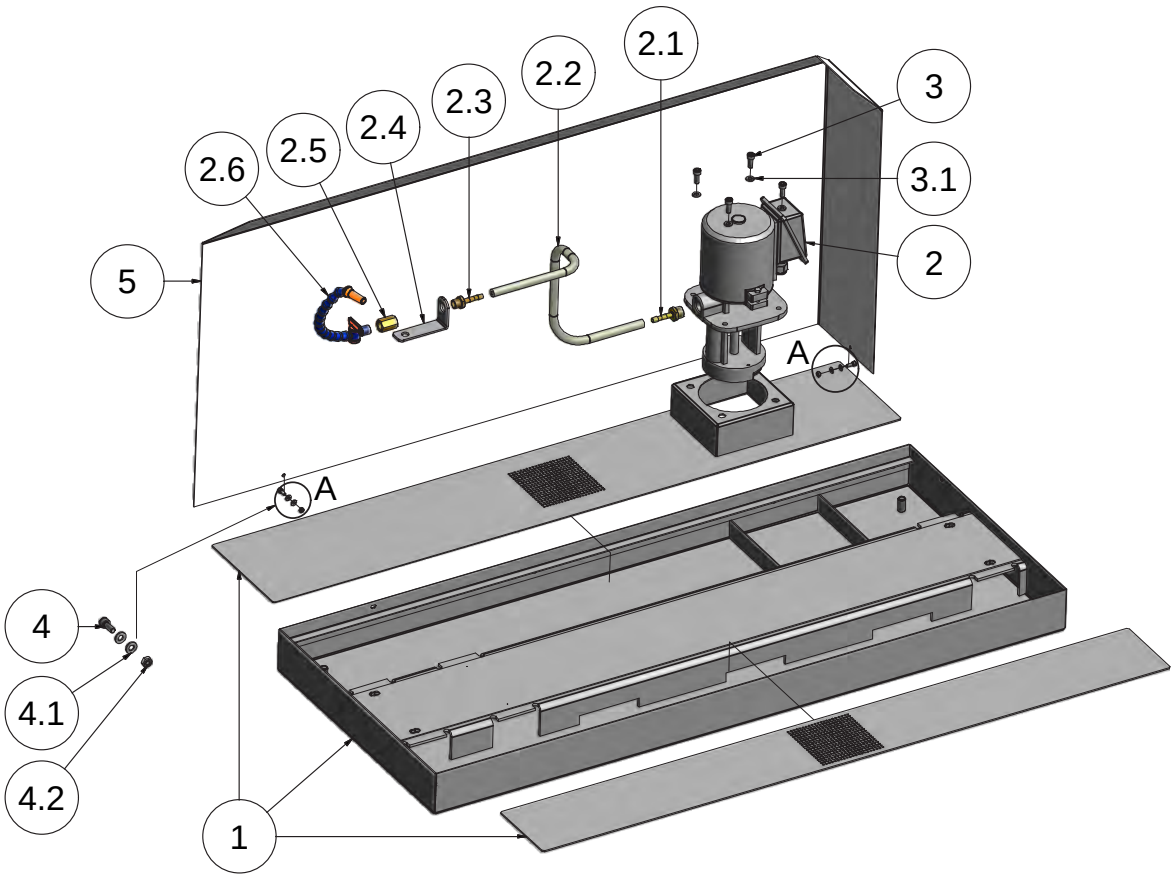


Coolant shut-off valve in the "closed" position

→ Coolant flow stopped

22. Coolant unit (optional)

22.9 Drawing and legend

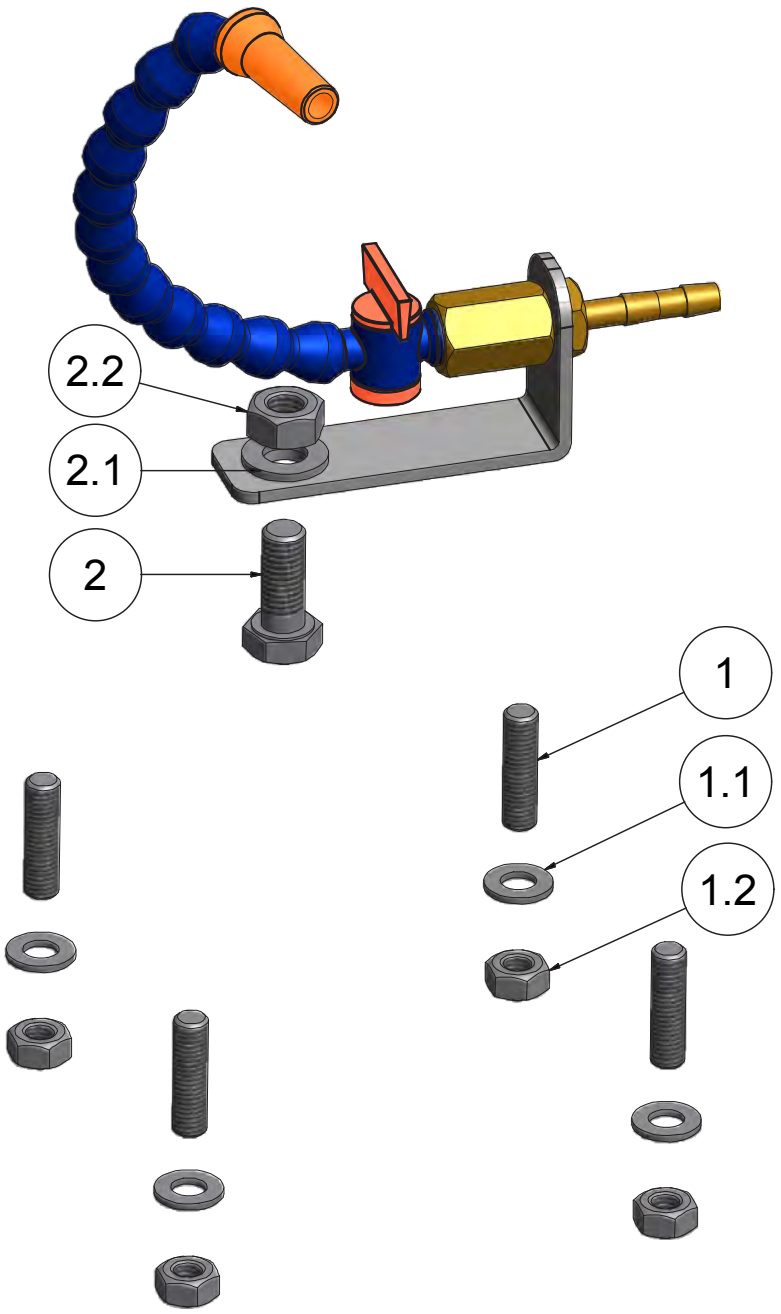


Part No.	Items	Order No.	Description
1	1	51400482-0001	Coolant unit (tank and two shelf inserts)
2	1	51500119	Coolant pump
2.1	1	51504320	Screw-fitted hose bush
2.2	1	51504218	PVC fabric hose
2.3	1	51504318	Screw-fitted hose bush
2.4	1	51400400-0001	Bracket
2.5	1	51504349	Collar
2.6	1	51502507	Coolant hose with shut-off valve
3	4	16191200006016	Screw
3.1	4	16112500006001	Washer
4	2	16191200004010	Screw
4.1	4	16112500004000	Washer
4.2	2	16193400004000	Nut
5	1	51400235-0001	Splash guard 1060x445

22. Coolant unit (optional)

22.9 Drawing and legend

Screws for securing the lathe to the coolant unit and for securing the segmented coolant hose



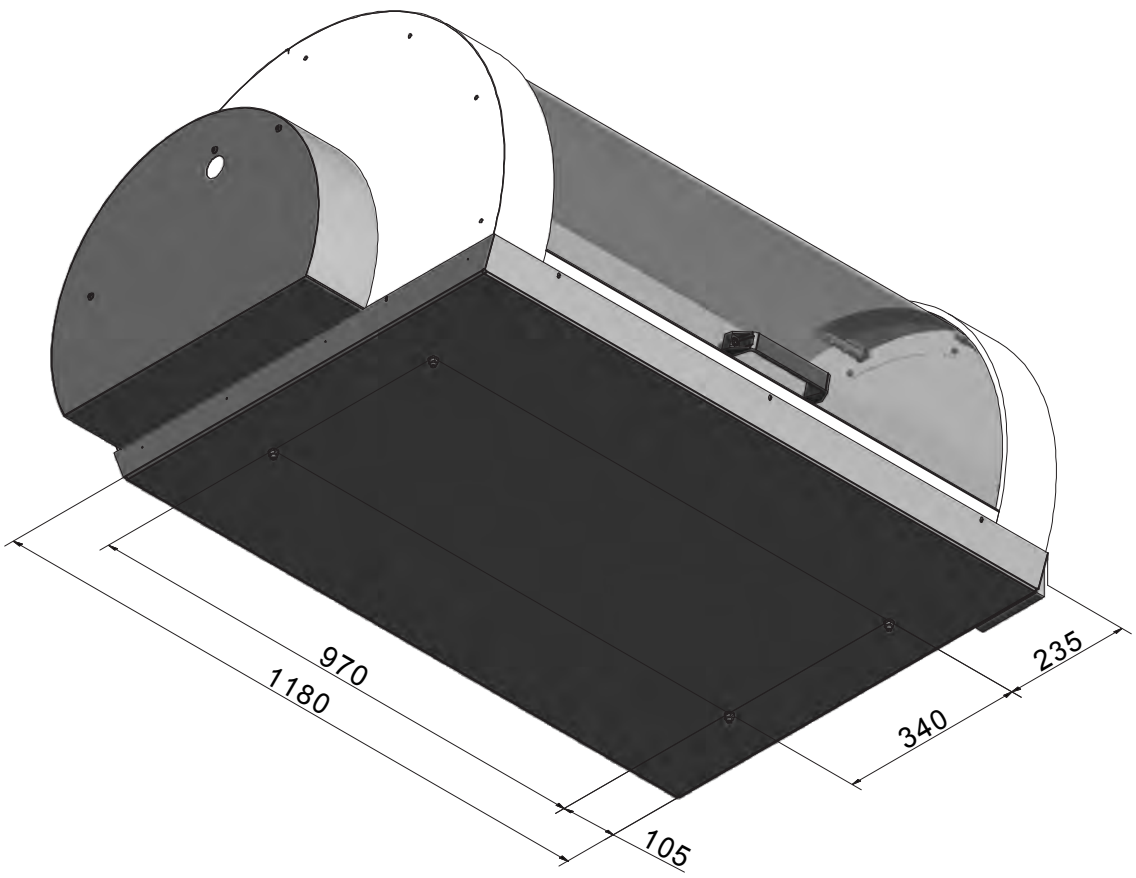
Part No.	Items	Order No.	Description
1	4	16091300008030	Threaded pin
1.1	4	16112500008001	Washer
1.2	4	16193400008000	Nut
2	1	16193300010025	Screw
2.1	1	16112500010000	Washer
2.2	1	16193400010000	Nut

23. Machine safety cabin (optional)

23.1 Setting up the machine safety cabin

When mounting the machine safety cabin to a WABECO machine base cabinet, the appropriate bored holes are already present. The machine base cabinet ensures a safe base for the lathe or machine safety cabin.

If the machine safety cabin is placed and screwed to another suitable surface, the 4 through holes must be bored into the surface by the client. For the positions of the 4 fixture threaded sockets (thread M8) of the machine safety cabin, see diagram. The diameter of the through holes in the surface must be at least 9 mm.



23.2 Mounting of the machine safety cabin to the machine base cabinet (optional)

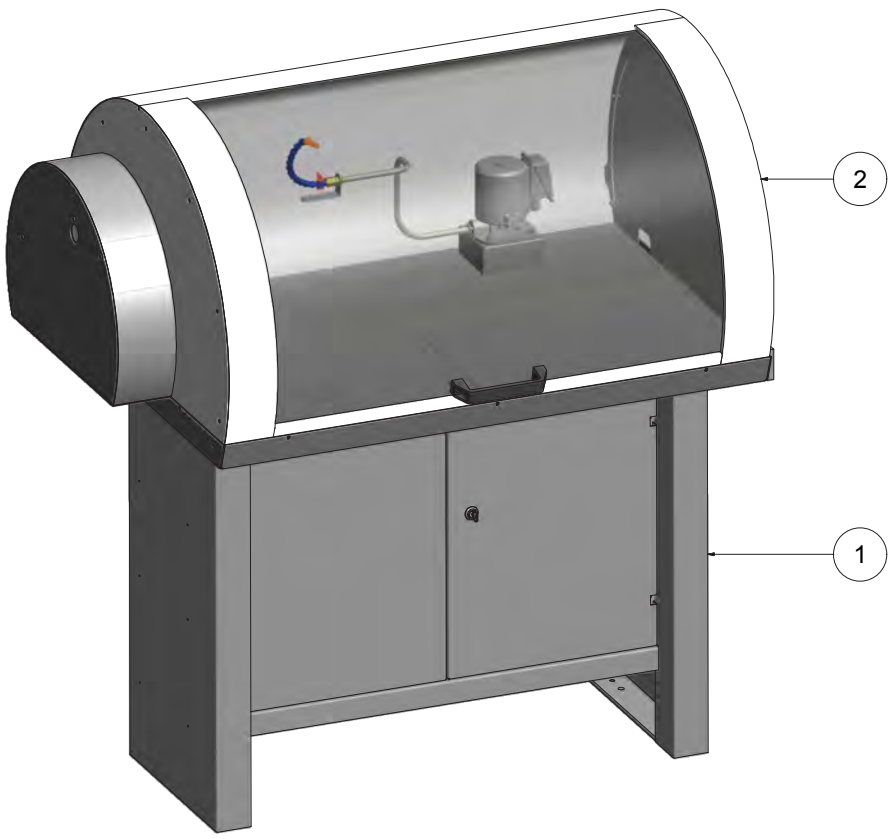
- The machine safety cabin (2) is positioned, as shown, on the machine base cabinet (1).
- The screws and washers required for assembly are included in the scope of delivery.

To screw the machine safety cabin to the machine base cabinet proceed as follows:

1. Combine each screw with a washer.
2. Open the door or the under cabinet.
3. Push the screws from below, through the bored holes in the under cabinet, into the fixture threaded sockets and tighten using an Allen key of size 6.

23. Machine safety cabin (optional)

23.2 Mounting of the machine safety cabin to the machine base cabinet (optional)



23.3 Safety regulations for the handling of cooling lubricant

See point 22.3

23.4 Filling the coolant unit integrated in the machine safety cabin

See point 22.4
The capacity of the coolant unit integrated in the machine safety cabin is approximately 36 liters.

23.5 Operating the coolant unit with CNC controller

See point 22.6

23.6 Positioning the segmented coolant hose

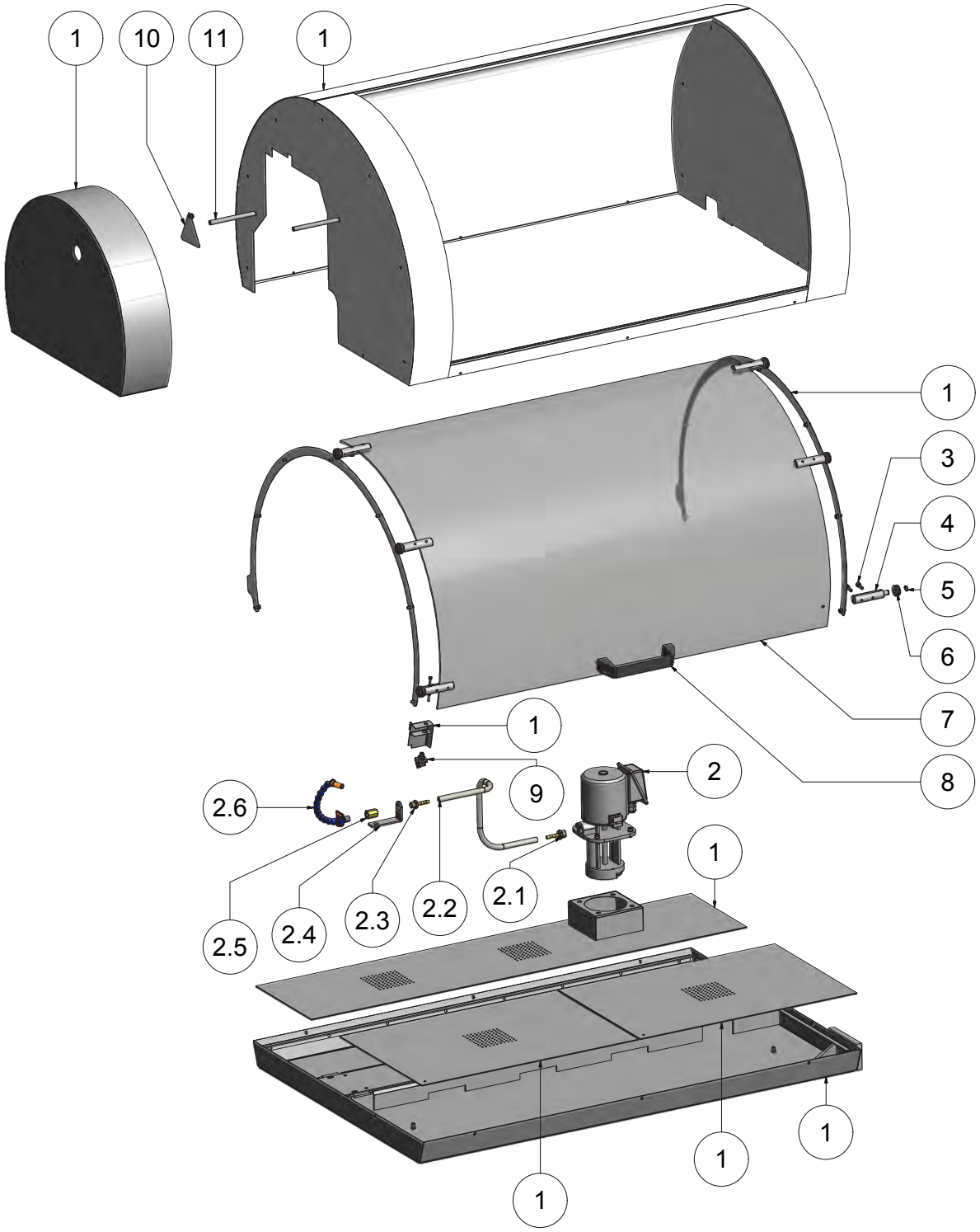
See point 22.7

23.7 Controlling the flow of coolant using the coolant shut-off valve

See point 22.8

23. Machine safety cabin (optional

23.8 Drawing and legend



23. Machine safety cabin (optional)

23.8 Drawing and legend

Part No.	Items	Order No.	Description
1	1	51400440-00011	Machine safety cabin (tank, three inserts, hood, gear cover sheet, two guide rails and holder for limit switch)
2	1	51500119	Coolant pump
2.1	1	51504320	Screw-fitted hose bush
2.2	1	51504218	PVC fabric hose
2.3	1	51504318	Screw-fitted hose bush
2.4	1	51400400-0001	Bracket
2.5	1	51504349	Collar
2.6	1	51502507	Coolant hose with shut-off valve
3	12	16191200006016	Screw
4	6	51004020-0001	Plexiglas holder
5	6	16147100010000	Securing ring
6	6	51008630-0001	Castor
7	1	51400415-0001	Disk for round hood
8	1	51507006	Bar handle
9	1	51500619	Limit switch
10	1	51400485-0001	Protective plate, spindle aperture
11	2	51004010-0006	Spacer bolt

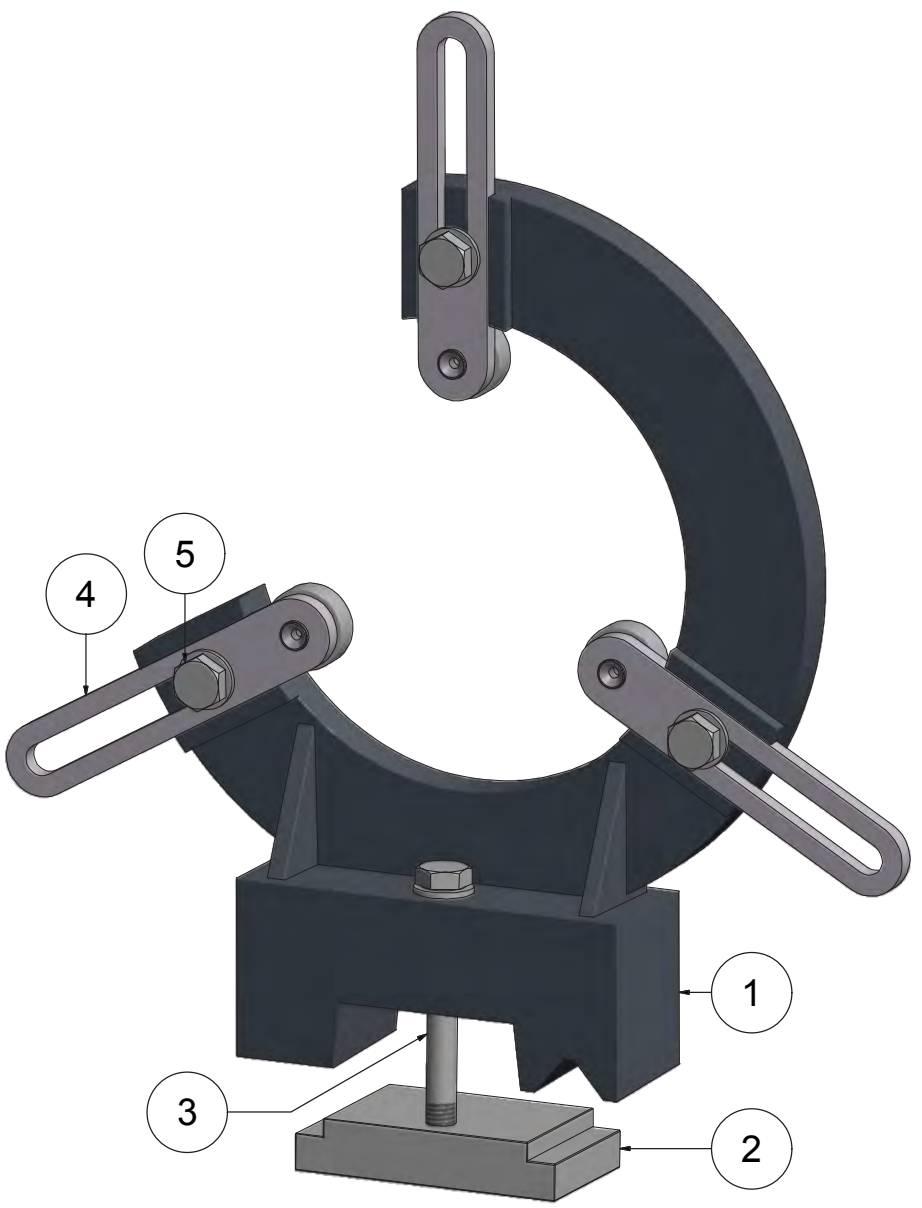
24. Fixed stay (optional)

Stays counteract the bending of longer shafts that is caused by shaving forces. The roll jaws prevent the bending of the turning elements.

They are to be set in such a way that the rotating axis of the workpiece is precisely flush with the rotating axis of the machine. At eth support position, the turning parts must be accurately rounded.

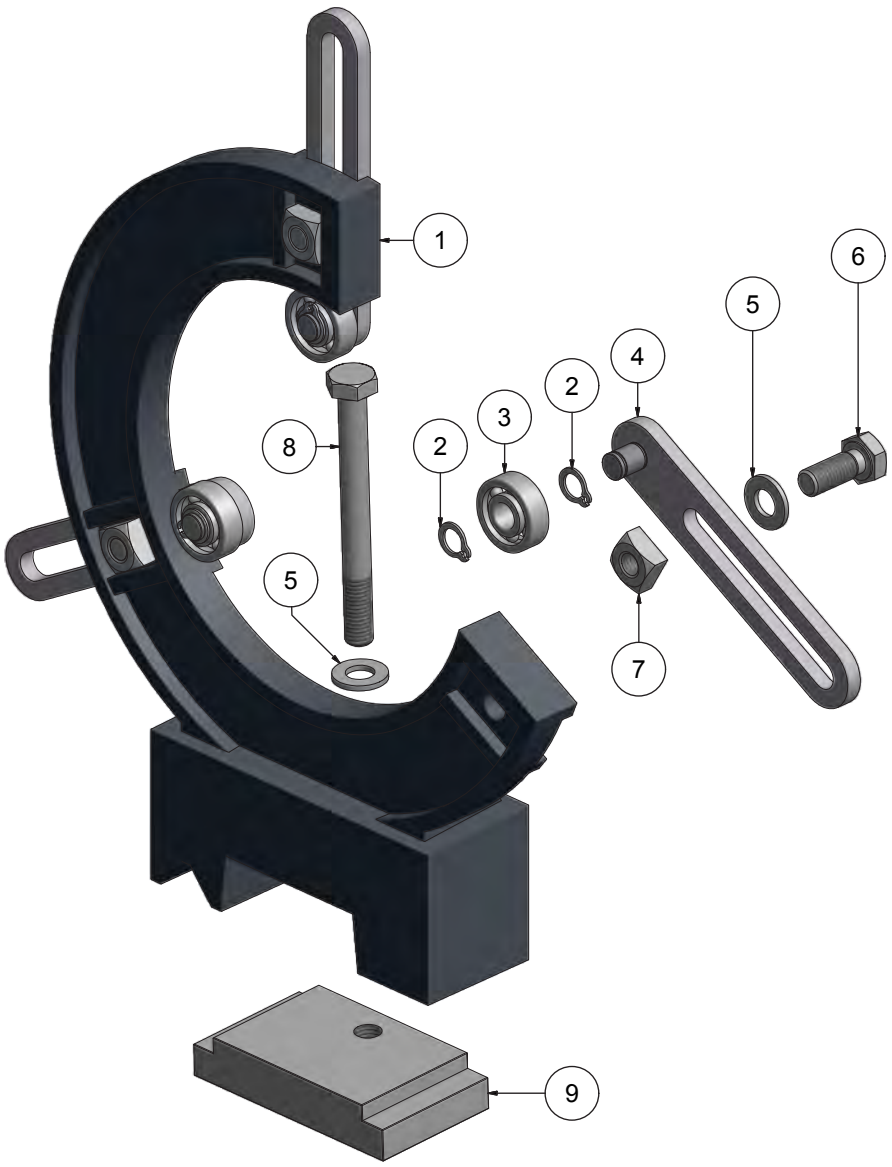
24.1 Operating the fixed stay

1. The fixed stay can be secured at any position on the prismatic bed.
2. The stay (1) is fitted to the prismatic guide.
3. The clamping plate (2) is inserted, from below, into the prismatic bed and secured with the clamping screw (3).
4. The slider (4) can be moved by opening the clamping screws (5), afterwards the clamping screws (5) must be tightened up again.



24. Fixed stay (optional)

24.2 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51006831-0031	Basic body
2	6	16147100008000	Securing ring
3	3	51502117	Ball bearing
4	3	51401533-0001	Slider with axis
5	4	16112500008001	Washer
6	3	16193300008020	Screw
7	3	16155700008000	Nut
8	1	16193100008080	Screw
9	1	51001075-0001	Clamping bar

25. Live stay (optional)

Stays counteract the bending of longer shafts that is caused by shaving forces. The roll jaws prevent the bending of the turning elements.

They are to be set in such a way that the rotating axis of the workpiece is precisely flush with the rotating axis of the machine. At eth support position, the turning parts must be accurately rounded.

25.1 Operating the live stay

1. The live stay is used, primarily, when turning thin, long shafts and when turning longer threaded spindles.
2. The stay (1) is screwed to the intended threaded holes in the tool slide using the two fixture screws (2).
3. The roll jaws should be as close to the tool cutting edge of the turning chisel as possible to ensure that the workpiece cannot bend.
4. The slider (3) can be moved by opening the clamping screws (4), afterwards the clamping screws (4) must be tightened up again.

25. Live stay (optional)

25.2 Drawing and legend

Part No.	Items	Order No.	Description
1	1	51006831-0032	Basic body
2	4	16147100008000	Securing ring
3	2	51502117	Ball bearing
4	2	51401533-0001	Slider with axis
5	6	16112500008001	Washer
6	2	16193300008020	Screw
7	2	16155700008000	Nut
8	2	16193300008025	Screw
9	1	51003625-0001	Clamping bar
10	2	16191200008035	Screw

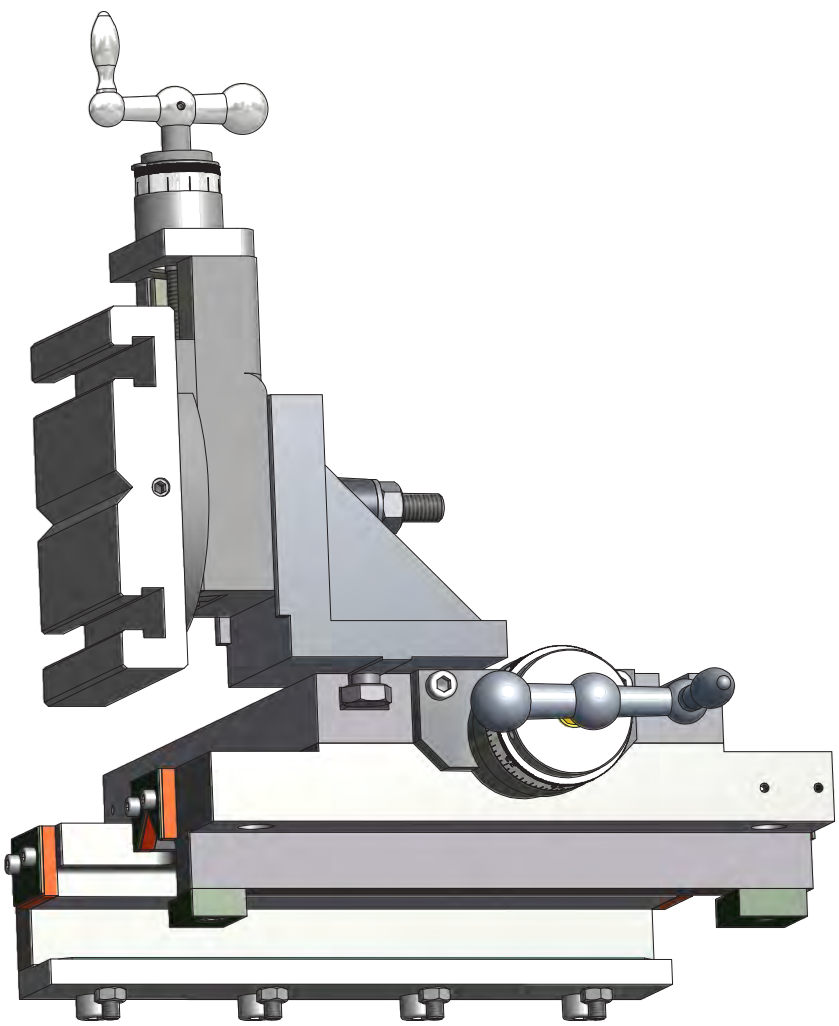
26. Clamping angle with milling attachment (optional)

For drilling and milling work

- For creating even surfaces and grooves.
- The feed and return motions are carried out by the workpiece.
- A machine vice may also be fitted to the milling attachment (6).
- The tool must be clamped as short as possible in the collect (risk of breakage).
- The width of the T-groove is 12 mm, the gap between the two T-grooves is 90 mm.
- The prismatic groove in the middle of the milling attachment is used to secure round parts.

26.1 Mounting the clamping angle with milling attachment to the lathe

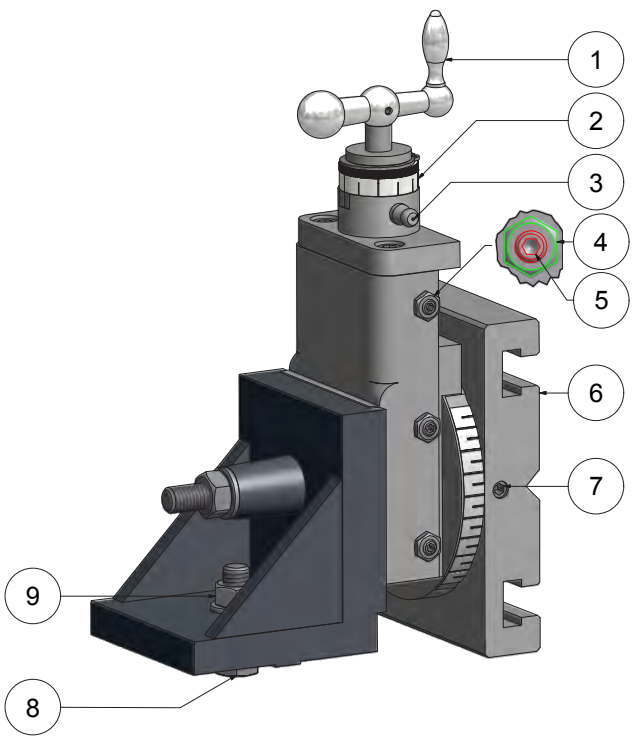
1. Remove the longitudinal slide from the cross slide of the lathe.
2. Clean the surface of the cross slide of dirt and shavings. This is the only way to ensure a flat and safe surface.
3. Place the clamping angle as shown laterally onto the cross slide. In doing so, insert the screw head on the underside of the clamping angle as shown into the T-groove of the cross slide.
4. Slide the clamping angle with milling attachment to the required position on the cross slide and secure the clamping angle.



26. Clamping angle with milling attachment (optional)

26.2 Control elements

1. Crank for adjustment of the milling attachment in the Y-axis.
2. Scale ring for reading off the travel distance of the Y-axis.
3. Lubrication nipple for greasing the spindle bearing.
4. Counter nut for securing the threaded pins (5).
5. Threaded pins for setting the guide play.
6. Milling attachment for tensioning workpieces or vices.
7. Screws for clamping the milling attachment.
8. Screw for connecting the clamping angle with the cross slide.
9. Nut for securing the clamping angle to the cross slide.



26.3 Feed motion of the milling attachment

- Use the crank (1) to move the milling attachment in the Y-axis (vertical).
- Use the scale ring (2) to read off the distance of travel.
- One interval on the scale represents a distance of 0.05 mm. One full turn of the hand wheel is the same as a skid distance of 1 mm.
- The distance of travel of the milling attachment in the X-axis (horizontal) is carried out by adjusting the cross slide.

26. Clamping angle with milling attachment (optional)

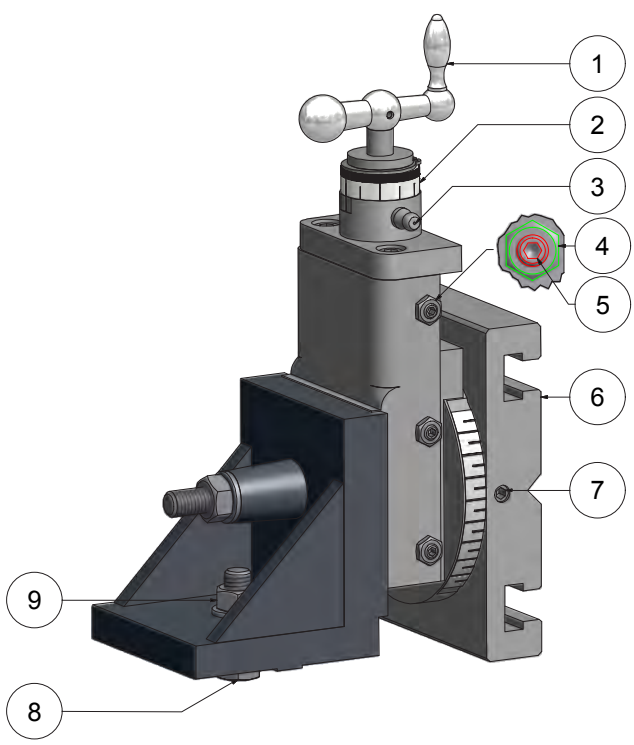
26.4 Adjustment of the dovetail guide

1. Undo the lock nuts (4).
2. Set the adjustment bar using the threaded pins (5) in such a way that the skid is free of play and can be moved with little force. To do this, the skid should be moved during the setting process and checked for play and appropriate ease of movement.
3. When the threaded pins (5) are set correctly, tighten the lock nuts (4) back up again.

Only set the threaded pins (5) if they are in the range of the counter guide! To do this, the skid may need to be moved into this area. Otherwise the dovetail guide may jam and this may cause damages.

26.5 Alignment of the milling attachment

If the milling attachment has been moved unintentionally (angle of T-groove to X-axis), this must first be realigned. To do this, open both screws (7) align the table and then tighten both screws up again (7). For the alignment work, always use a dial gauge if you have one.



26.6 Lubrication of the clamping angle with milling attachment

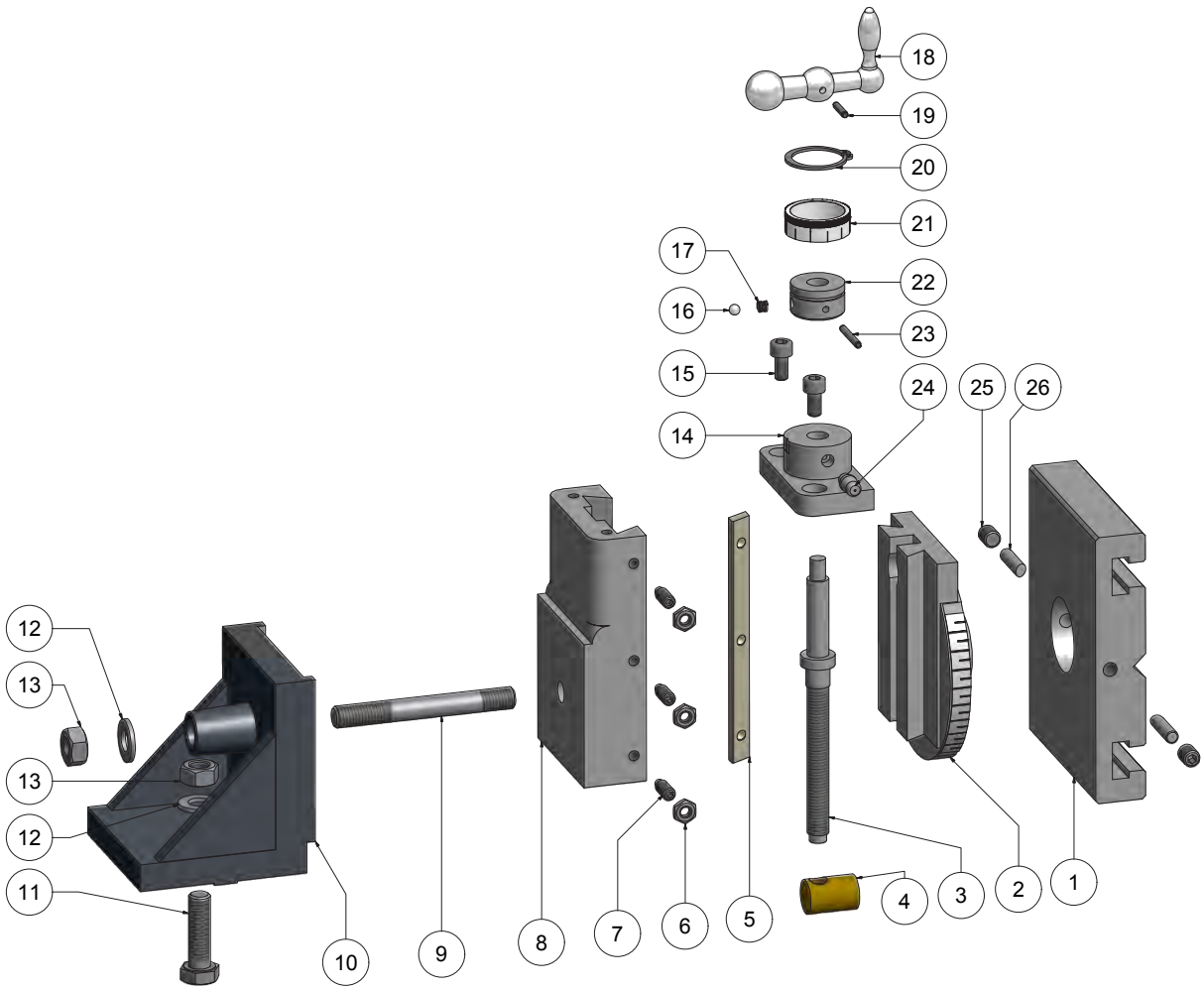
- Use a class 2NLGI multi-purpose grease for lubrication.
- Use lubricating oil with a viscosity of 100 mm²/s for lubrication.
- Prior to each use: Lubricate the spindle bearing at the lubrication nipple (3) using a grease press.

  Grease the feed spindle accessible from the front.

  Oil the dovetail guide with lubrication oil using an oil can.

26. Clamping angle with milling attachment (optional)

26.7 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51003790-0001	Milling attachment
2	1	51400242-00011	Longitudinal support, under section
3	1	51004016-0004	Spindle
4	1	51007016-0002	Bronze nut
5	5	51001016-0006	Adjustment bar
6	3	16143900006000	Nut
7	3	16091500006016	Threaded pin
8	1	51003000-0001	Longitudinal support, upper section
9	1	16093800010070	Pin screw
10	1	51006831-00332	Clamping angle
11	1	16193300010035	Screw
12	2	16112500010000	Washer
13	2	16193400010000	Nut
14	1	51003003-0001	Spindle bearing
15	2	16191200006012	Screw
16	1	51502131	Ball
17	1	51502009	Pressure spring

26. Clamping angle with milling attachment (optional)

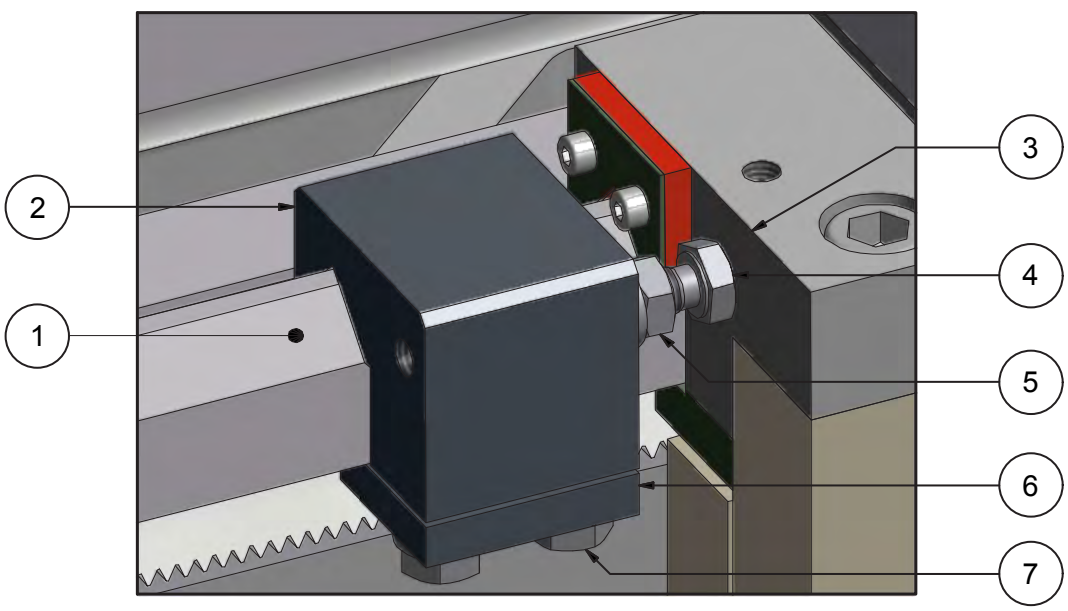
26.7 Drawing and legend

Part No.	Items	Order No.	Description
18	1	51507023-0001	Ball crank
19	1	16073430003014	Spiral tensioning pin
20	1	16147100025000	Securing ring
21	1	51006731-00021	Scale ring
22	1	51004025-0009	Adjusting ring
23	1	16073430003024	Spiral tensioning pin
24	1	51502517	Lubrication nipple
25	2	16091300008010	Threaded pin
26	2	51004006-0002	Push piece

27. Adjustable longitudinal stop (optional)

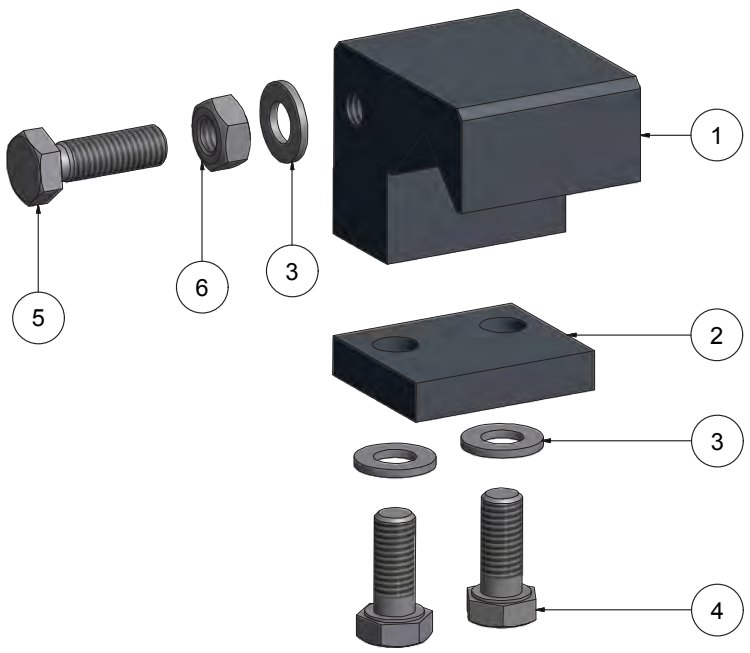
27.1 Mounting and operation of the adjustable longitudinal stop

1. Undo the two screws (7) and remove the clamping piece (6).
2. Place the longitudinal stop (2) on the front guide prism (2) of the lathe.
3. Lightly screw the clamping piece (6) with the screws (7) into place as shown.
4. The longitudinal stop can now be pushed to the desired position.
5. Tighten the screws (6) to secure the longitudinal stop to the machine bed.
6. Fine adjustment can be made using the screw (4) that acts as stop for the cross slide (3).
7. To do this, release the counter nut (5) and turn the screw (4) in the desired direction.
8. Then tighten the counter nut (5) back up again.
9. The overload clutch has to be adjust in order that the tool slide runs into the stop the tool slide stops safely (See “Overload clutch”).



27. Adjustable longitudinal stop (optional)

27.2 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51004332-0002	Longitudinal stop
2	1	51002041-0001	Clamping piece
3	3	16112500008001	Washer
4	2	16193300008020	Screw
5	1	16193300008025	Screw
6	1	16193400008000	Nut

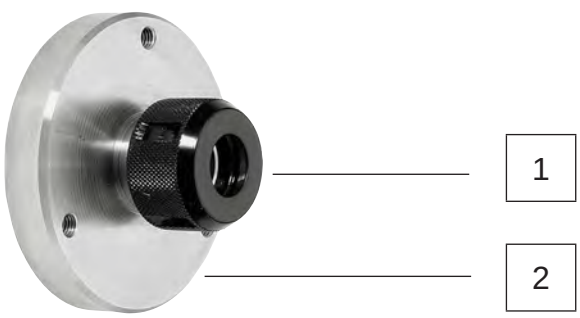
28. Collet chuck (optional)

Only use workpieces that correspond to the nominal diameter of the collet.

28.1 Mounting the collect chuck

1. Remove the lathe chuck from the main spindle. To do this, undo the 3 fixing screws using a wrench.
2. Remove the lathe chuck from the centring flange of the main spindle.
3. Secure the collet chuck in the same way as the lathe chuck.
4. Remove the cap nut (1) from the collet chuck (2).
5. Insert the required collect into the cap nut.
6. (see installing and removing collets) and screw back onto the collet chuck.
7. Insert the workpiece or tool into the collet.
8. Tighten the cap nut with the appropriate wrench.
9. Permitted **revolution range up to a maximum of 5000 rpm.**

28.2 Drawing and legend



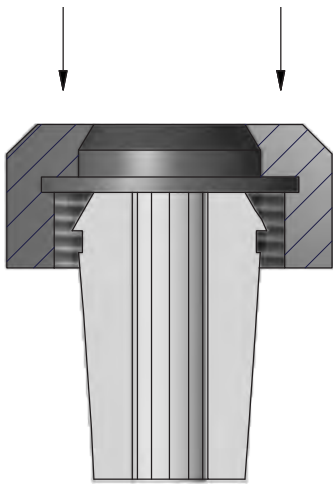
Part No.	Items	Order No.	Description
1	1	11727	Cap nut
2	1	51003505-0002	Collet chuck

28. Collet chuck (optional)

28.3 Installation and removal of collets

Installation

1. Place the collet on a flat surface.
2. Place the tensioning nut on the collet.
3. Press the tensioning nut down against the collet until it "clicks".
4. The collet can now move freely in the central take-up shoulder and does not fall out when the collet is turned upside down.



Removal

1. Hold the tensioning nut in one hand.
2. Press up against the collet.
3. The lateral pressure on the collet pushes this out of the take-up shoulder of the tensioning nut and it can now be removed from the nut.