

BERNARDO®

www.bernardo.at



TRANSLATION OF THE ORIGINAL USER MANUAL

Universal milling machine UWF 150 V Servo



EN

2/2



PWA Handelsges.m.b.H.
4020 Linz | Nebingerstraße 7a | Austria
phone: +43.732.66 40 15 | fax: +43.732.66 40 15-9
e-mail: bernardo@pwa.at | www.bernardo.at

Edition 05/2021

© COPYRIGHT 2021 Bernardo PWA Ltd.
Changes and copies (and extracts) only permitted by written consent from PWA Ltd.
Any infringement to these provisions will be prosecuted without exception.

Table of contents

1. General	4
1.1 Information for this manual and safety booklet	4
1.2 Applicable documents	4
2. Intended Use	4
2.1 Surrounding conditions	4
3. Technical Data	5
3.1 Specifications	5
3.2 Standard accessories	5
3.3 Optional accessories UWF 150 V Servo (recommended)	6
4. Machine Transportation	7
4.1 Symbols on packaging	7
4.2 Damage in transit	8
4.3 Incorrect handling	8
4.4 Lifting devices and attachments	8
5. Machine Assembly	9
5.1 Incorrect assembly and initial start up	9
5.2 Selection of installation site	9
5.3 Foundation plan	10
5.4 Unpacking of machine	11
5.5 Removal of protective coating	11
5.6 Machine installation	12
6. Initial start up	13
7. Machine description	14
7.1 Main parts and control elements	14
7.2 Mill table feed ways	16
7.3 Control panel	16
8. Operation	17
8.1 Inspection of safety devices	17
8.2 Tool clamping	18
8.3 Tool removal	18
8.4 Work piece clamping and removal	19
8.5 Mill head adjustment	20
8.6 Mill table tilt	22
8.7 Adjustment of taper gibs (guide clearance)	22
8.8 Adjustment of protective cover	24
8.9 Spindle speed setting	25
8.10 Manual table feed	26
8.11 Automatic table feed	27
8.12 Vertical milling mode	29
8.13 Horizontal milling mode	29
8.14 Adjustment of coolant fluid	31
9. Care and maintenance	32
9.1 Servicing plan	32
9.2 Lubrication chart	33
9.3 Check oil level in vertical mill head	34
9.4 Replacement or refill of oil in vertical mill head unit	34
9.5 Check oil level and oil pressure in horizontal spindle	35
9.6 Replacement or refill of oil in horizontal spindle	35
9.7 Check central lubrication of x, y-axis	36
9.8 Refilling central lubrication of x, y-axis	36
9.9 Check coolant fluid level	37
9.10 Refill coolant container	37
9.11 Clean coolant filter	37
9.12 Replace coolant fluid	38
10. Disassembly and disposal	39
11. Trouble shooting	40
12. Wiring Diagram	41
13. Spare parts list	44
14. Declaration of conformity	51

1. General

1.1 Information for this manual and safety booklet

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

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

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

1.2 Applicable documents

- User manual
- Safety booklet
- User manual for 3-axis digital readout

2. Intendend use

The UWF 150 V Servo universal milling machine is suitable for milling of metals, wood and plastics.

Do not use this machine for the following materials:

- Elastic plastic (eg. Rubber)
- Inflammable materials (eg. Magnesium)

Type of usage: Professional

The UWF 150 V Servo universal milling machine is designed for an average use of 3 hours per day / 90% operating time. This equals to a maximum of 600 hours per year.

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

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

2.1 Surrounding physical conditions

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

Guidelines for these conditions are:

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

3. Technical Data

3.1 Specifications

Table size	1600 x 360 mm
Spindle taper horizontal	ISO 50
Spindle taper vertical	ISO 50
Horizontal spindle speed	(12) 60 - 1800 rpm
Vertical spindle speed	(2) 60 - 350 / 350 - 1750 rpm
Longitudinal travel (x)	1300 mm
Cross travel (y)	300 mm
Vertical travel (z)	400 mm
Distance spindle/ table horizontal	15- 415 mm
Distance spindle/ table vertical	185 - 585 mm
Distance spindle to column	215 - 840 mm
Table tilt	-45° bis +45°
Max. workpiece weight	300 kg
Feed range longitudinal	(8) 30 - 750 mm/min
Feed range cross	(8) 20 - 500 mm/min
Feed range vertical	(8) 15 - 375 mm/min
Rapid feed x-, y- and z-axis	1200 / 800 / 600 mm/min
T-slots (number/ width/ distance)	3 / 18mm / 80 mm
Motor power horizontal	5,5 kW
Motor power vertical	5,5 kW
Servo motor (torque/ output)	10 Nm / 1,5 kW
Coolant pump output	90 W
Coolant pump flow rate	25 l/min
Machine dimensions (WxDxH)	2530 x 2200 x 2300 mm
Weight approx.	2695 kg
Sound pressure level (no load)	83 dB(A)
Acoustic level (no load)	98,5 dB(A)
Machine number	see serial plate
Year of manufacture	see serial plate

3.2 Standard accessories

3-axis position display ES-12 H
Drawbar M24
LED machine lamp
Coolant device
Horizontal counter bearings
Coolant tray
Feed for x-,y- and z-axis
Universal protective cover
Long milling arbor ISO 50/27 mm, ISO 50/32 mm
Taper shell end mill holder ISO 50/32 mm
Morse taper drill sleeve ISO 50 / MT4
Central lubrication for x-, y-axis
Tools

3.3 Optional accessories UWF 150 V Servo (recommended)

<p>Vise feat. extra wide opening FJ 150</p>  <p>Art. Nr. 28-2087</p>	<p>Hydro machine vise VH 150 with swivel base</p>  <p>Art. Nr. 28-2090</p>	<p>Hydraulic machine vise with swivel base PHV 160</p>  <p>Art. Nr. 28-2121</p>	<p>Mill chuck set ER 40, ISO 40. 3 - 25 mm, 16 pcs.</p>  <p>Art. Nr. 26-1012</p>
<p>Semi-universal dividing head BS-1</p>  <p>Art. Nr. 27-1046</p>	<p>Horizontal and Vertical rotary table HV 10</p>  <p>Art. Nr. 27-1002</p>	<p>Deluxe clamping kit set 58 pcs., 14 mm, M16</p>  <p>Art. Nr. 28-1003</p>	<p>Standard steel parallel support bars, 28 pc.</p>  <p>Art. Nr. 35-1020</p>
<p>TiN-coated roughing end mills, 10 pcs., 6 - 25 mm</p>  <p>Art. Nr. 42-1016</p>	<p>Carbide 90° indexable face milling cutter diam. 125 mm / B 32</p>  <p>Art. Nr. 42-1061</p>	<p>Boring head combo package, 75 mm dia., incl. boring bars</p>  <p>Art. Nr. 25-1020</p>	<p>Machine mount NE 160</p>  <p>Art. Nr. 53-2011</p>
<p>Universal coolant fluid MN 1103, 5 l canister</p>  <p>Art. Nr. 54-1206</p>	<p>Bigger range</p>  <p>www.bernardo.at</p>		

4. Transportation

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

4.1 Symbols on packaging

Symbols, such as following are located on packaging:



This side up

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



Fragile

Shows packaging containing fragile and/ or breakable goods.

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

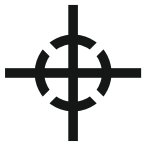


Keep dry

Protect packaging from getting wet



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



Centre of gravity

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

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



Fix here

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

4.2 Damage in transit

Inspection on delivery

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

In the event of visible damage before unpacking proceed as follows

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

Return of goods

! NOTE



Damage of goods on return shipment!

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

4.3 Incorrect handling



WARNING

Property damage caused by incorrect handling!

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

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

4.4 Lifting devices and attachments

Use suitable lifting devices and attachments.

5. Assembly

5.1 Incorrect assembly and initial start-up

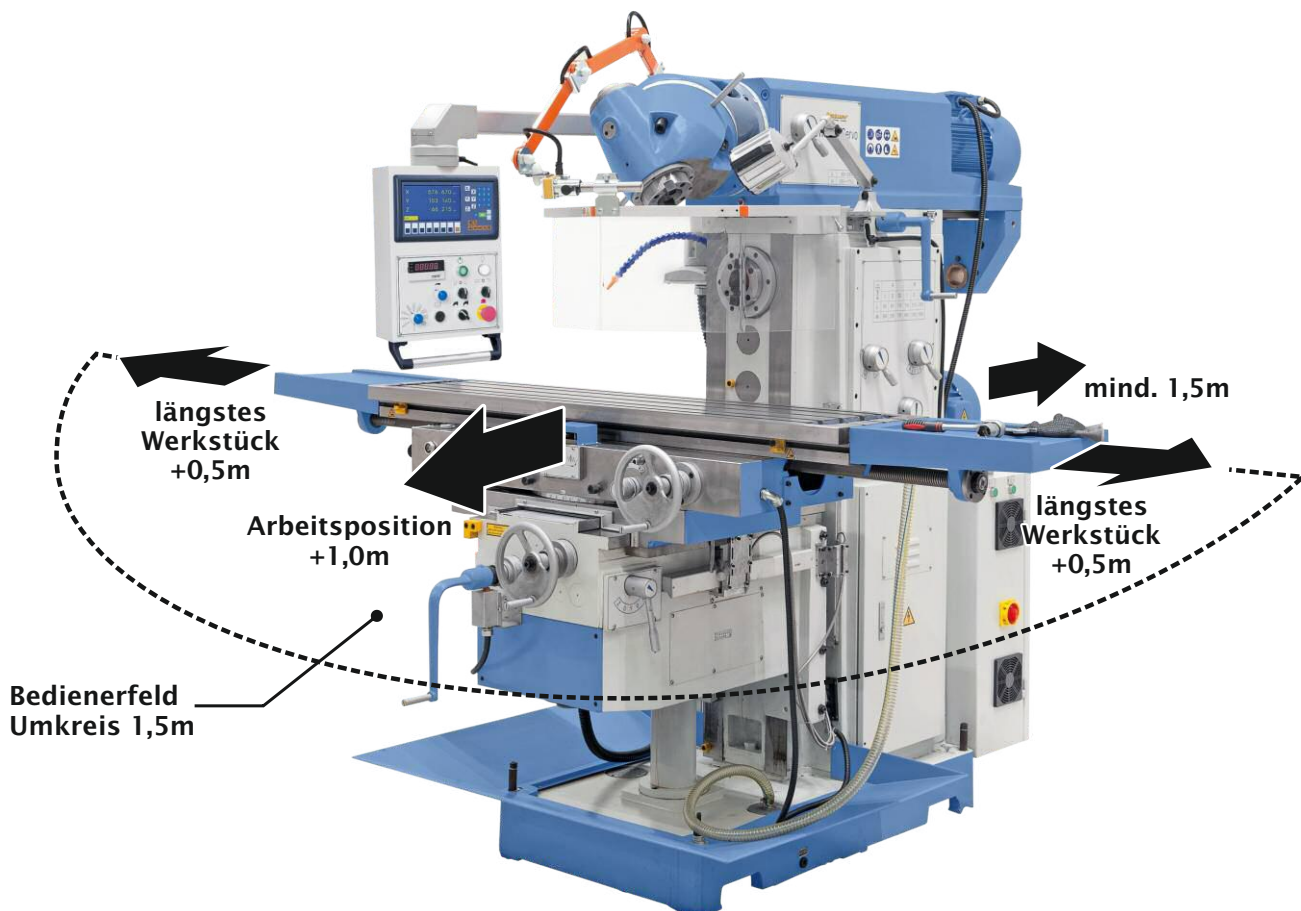
Incorrect assembly and initial start-up can lead to serious injuries and significant property damage.

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

5.2 Selection of installation site

Following aspects should be taken under consideration:

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



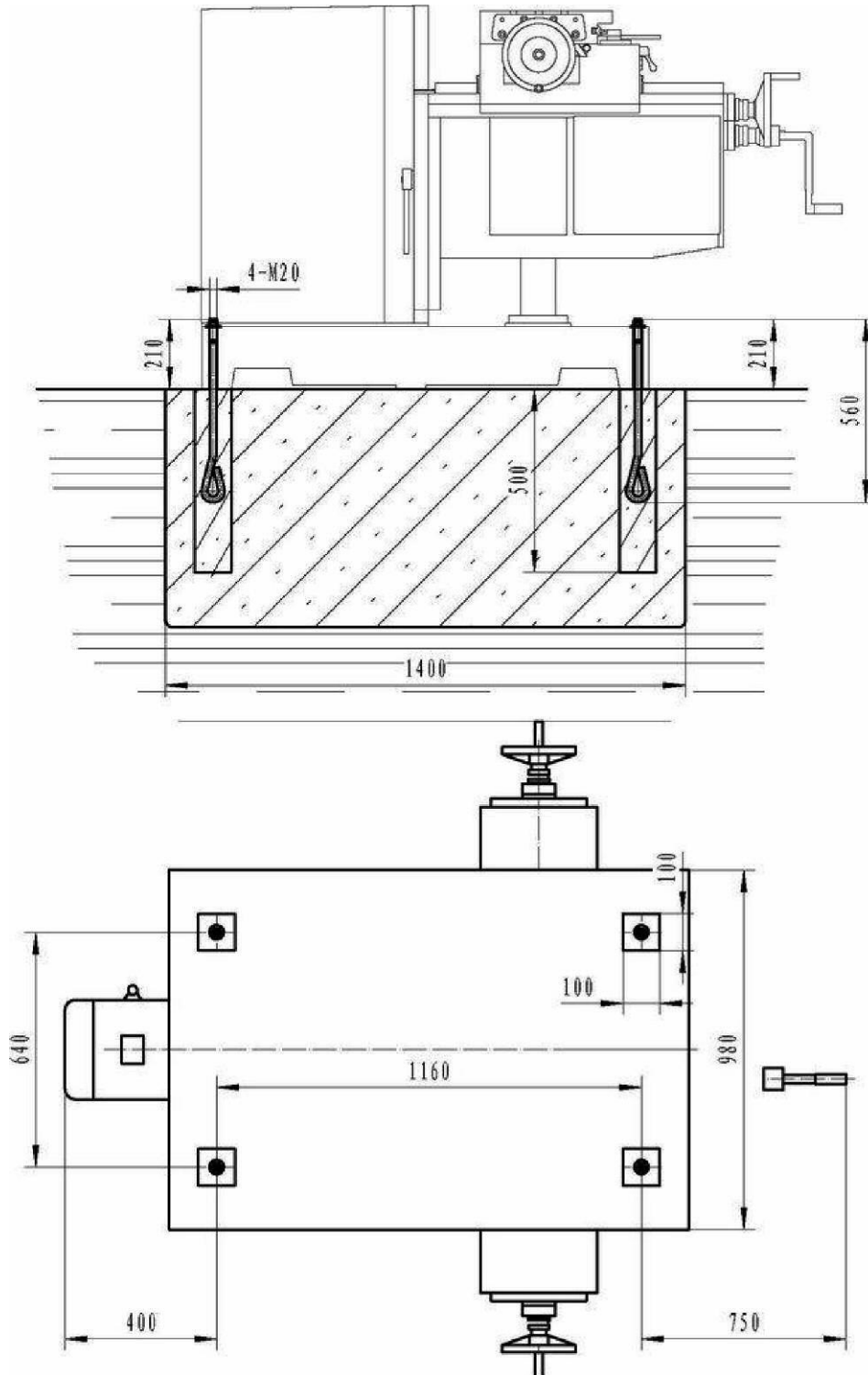
5.3 Foundation plan

WARNING

The dimensions given in this plan are the minimum requirements for the foundation.

The foundation depth depends on the quality of the ground.

In order to achieve a high level of quality, the horizontal level of tolerance must not exceed 0.04 mm/ 1000 mm.



5.3 Unpacking of machine

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

5.4 Removal of protective coating

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

DANGER



Cleaning agents can cause injury when not handled appropriately!

Cleaning agents are a health hazard and can be extremely harmful with regards to chemical components and temperature.

Serious injuries that may lead to death can be caused.

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

Use:

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

Remove protective coating:

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

5.6 Machine installation

- 1 Detach the machine from the shipping crate
- 2 Clamp and secure milling table and arm
- 3 Remove coolant tray
- 4 Use lifting device to lift machine onto site
- 5 Secure machine to site
- 6 Re-attach coolant tray



6. Initial start-up

DANGER



Compliance to the following is of high importance:

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

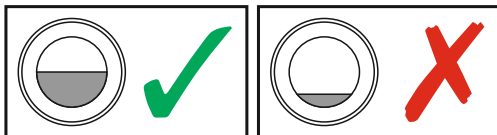
DANGER



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

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

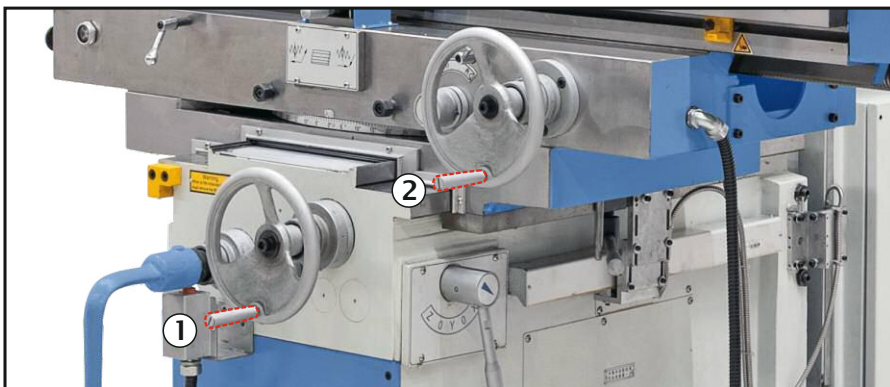
- 1 Check oil level (see 9.3 / 9.5 / 9.7)



- 2 Check oil pressure – while horizontal spindle is rotating (see 9.5)

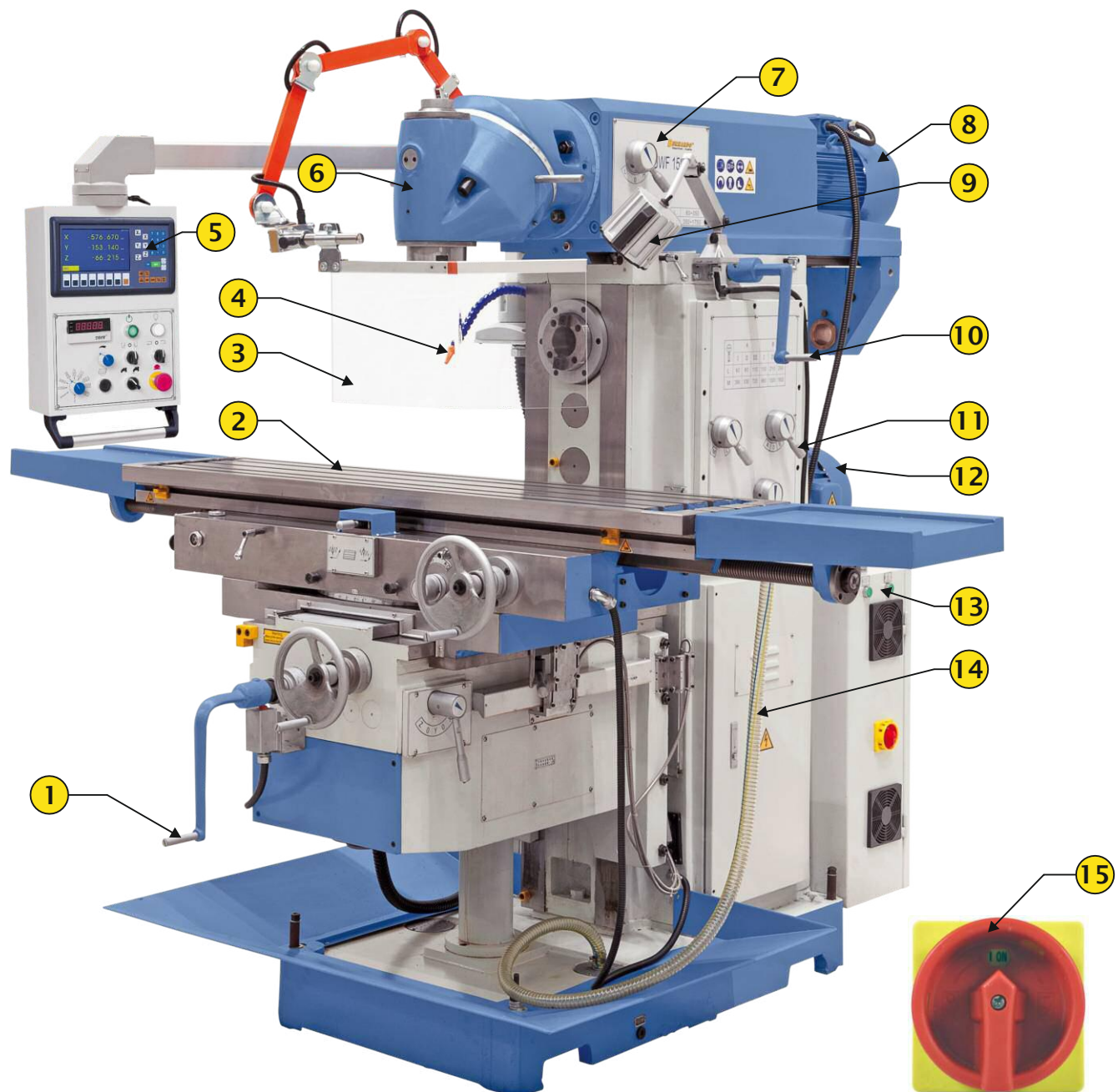


- 3 Connect to power source
- 4 Check spindle rotation
- 5 Fill in coolant fluid (see 9.10)
- 6 Check rotation of coolant pump – ensure coolant flows
- 7 Attach handles to hand wheels

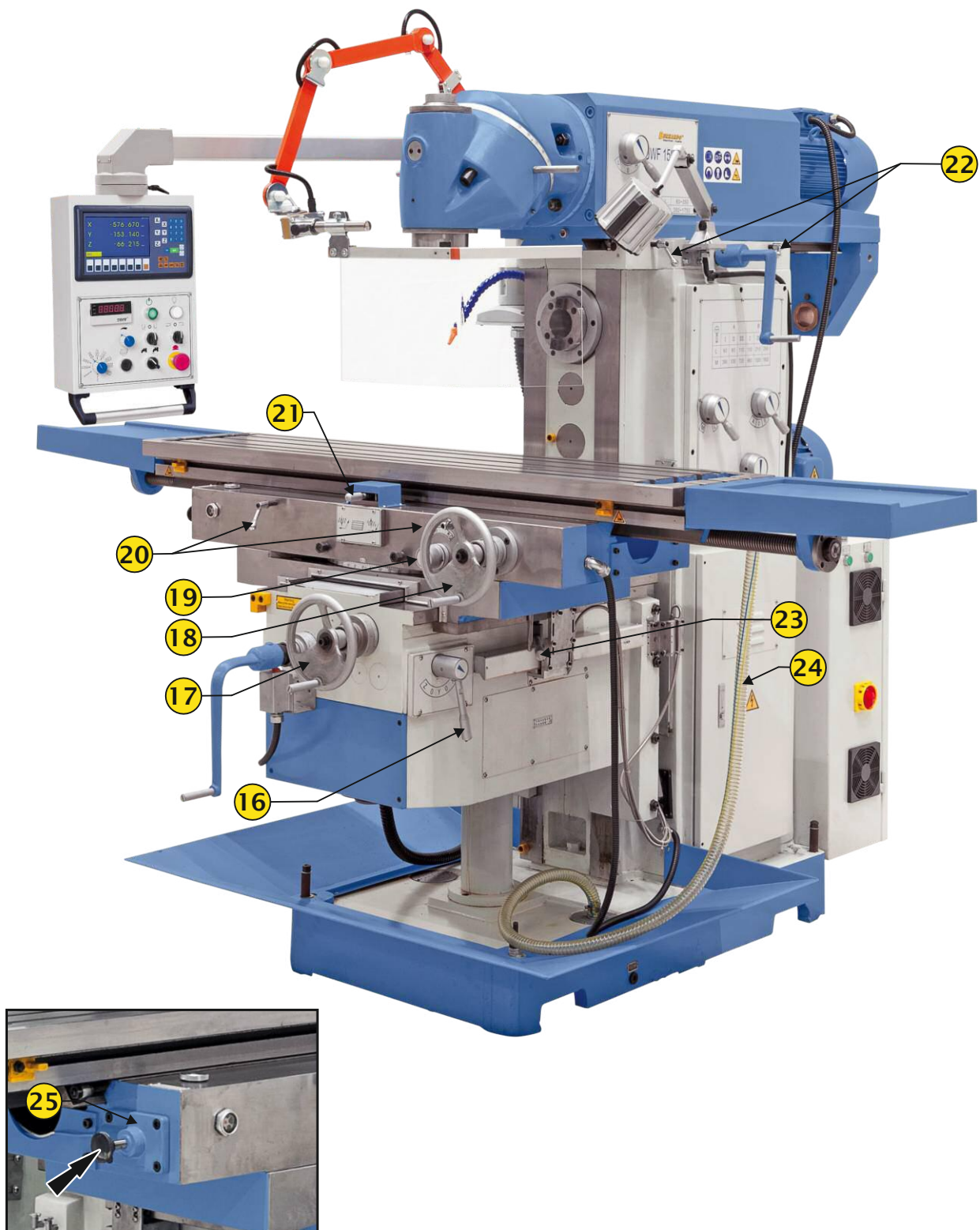


7. Machine Description

7.1 Parts and control elements

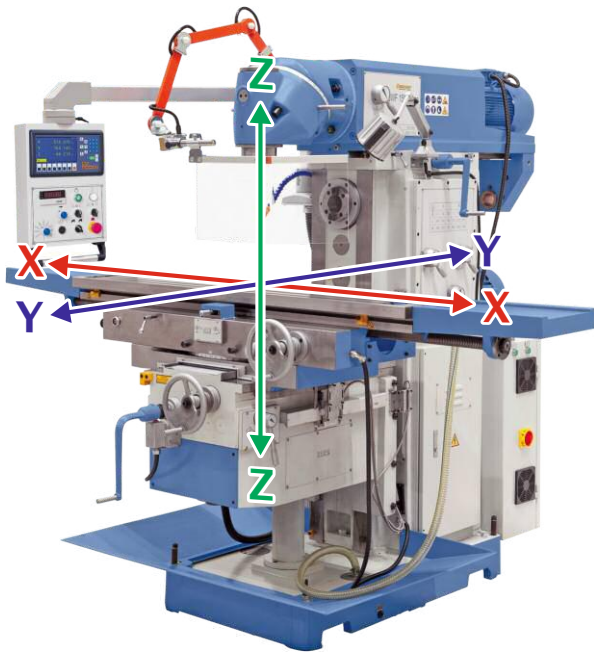


- 1 Crank for mill table adjustment in z-axis
- 2 Mill table
- 3 Adjustable protective cover
- 4 Coolant device
- 5 Control panel
- 6 Universal mill head
- 7 Gear unit vertical spindle
- 8 Motor vertical spindle
- 9 LED - machine lamp
- 10 Crank radial arm adjustment
- 11 Gear unit horizontal spindle
- 12 Motor horizontal spindle
- 13 Jog button horizontal/ vertical spindle
- 14 Return hose - coolant fluid
- 15 Main switch

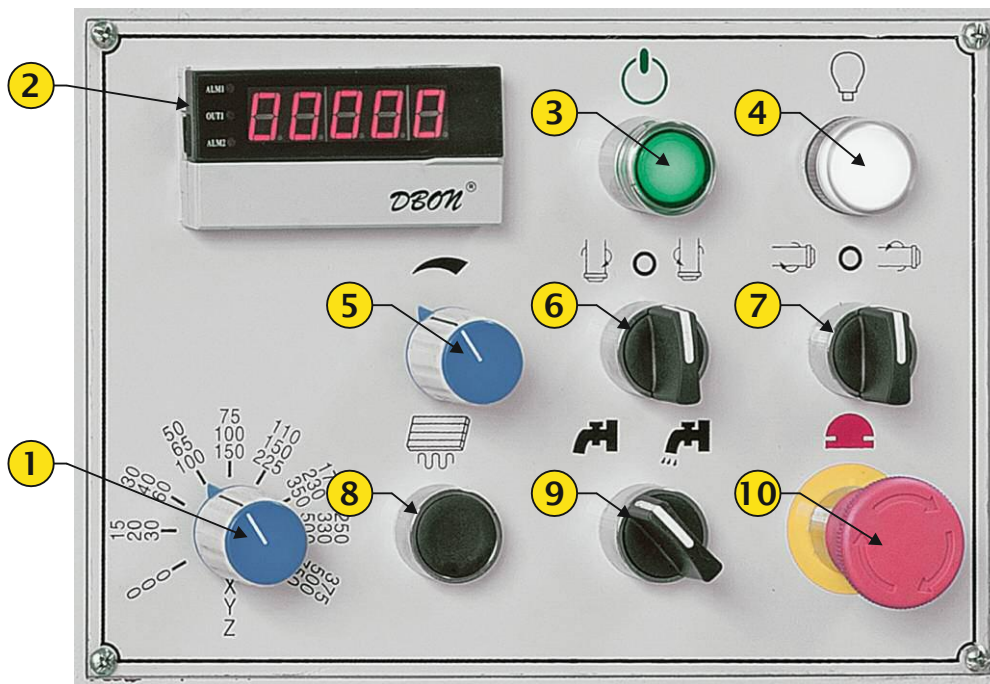


- 16 Lever- feed way selection
- 17 Hand wheel for mill table travel in y-axis
- 18 Hand wheel for mill table travel in x-axis
- 19 Lever- select manual/ automatic table feed
- 20 Clamping lever mill table travel x-axis
- 21 Lever – select table feed axis
- 22 Clamping screws for radial arm travel
- 23 Clamping lever for mill table travel y-axis
- 24 Clamping lever for mill table travel z-axis
- 25 Central lubrication

7.2 Mill table feed ways



7.3 Control panel



- 1 Feed rate setting
- 2 Digital speed indicator
- 3 On-button (control circuit)
- 4 Indicator lamp - power supply
- 5 Speed setting
- 6 Left/right rotation selector VS
- 7 Left/right rotation selector HS
- 8 Rapid mode button
- 9 Coolant on/off
- 10 Emergency Off-button

VS = vertical spindle; HS = horizontal spindle

8. Operation

WARNING

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

ATTENTION



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

8.1 Inspection of safety devices

Inspect Emergency - Off Button



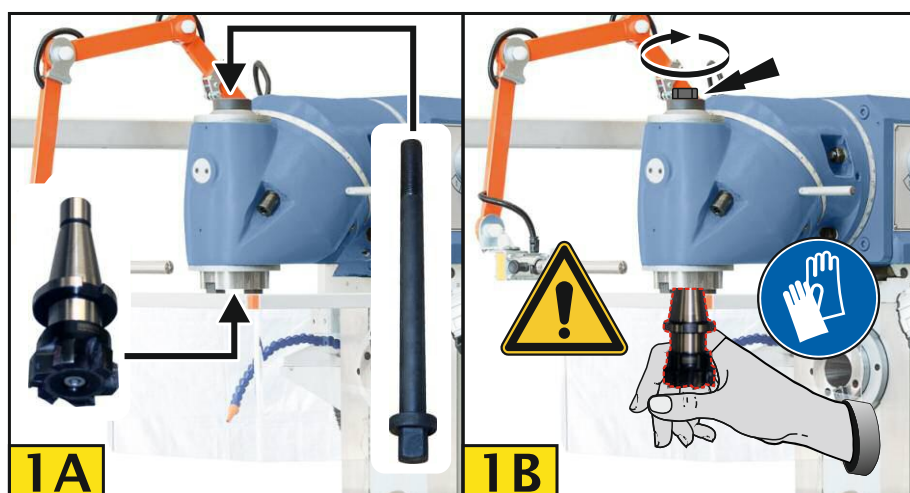
Inspect mill guard - tilt safety glass



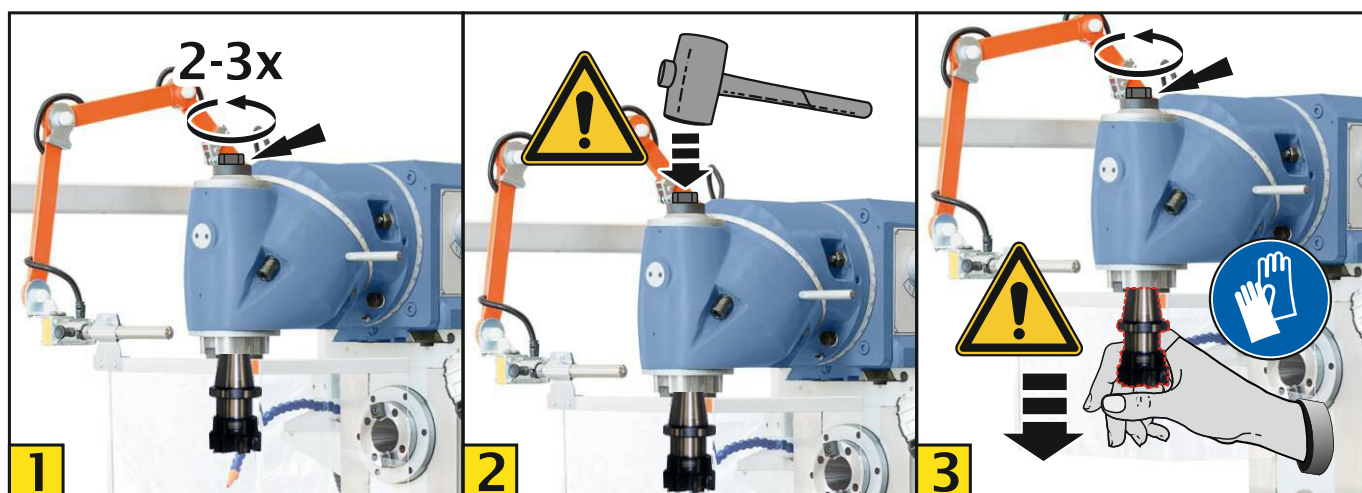
Inspect mill guard – tilt the entire mill guard



8.2 Tool clamping



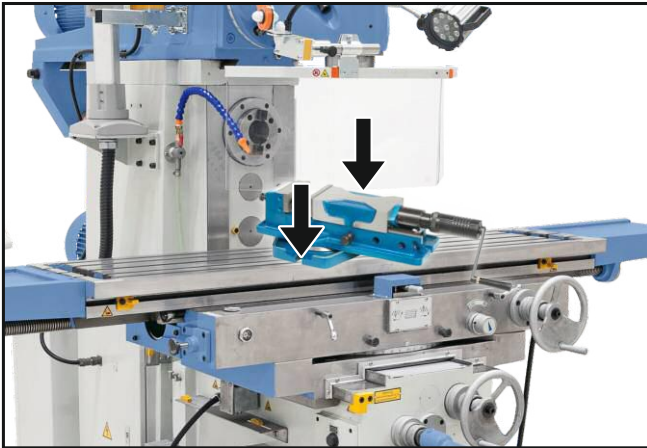
8.3 Tool removal



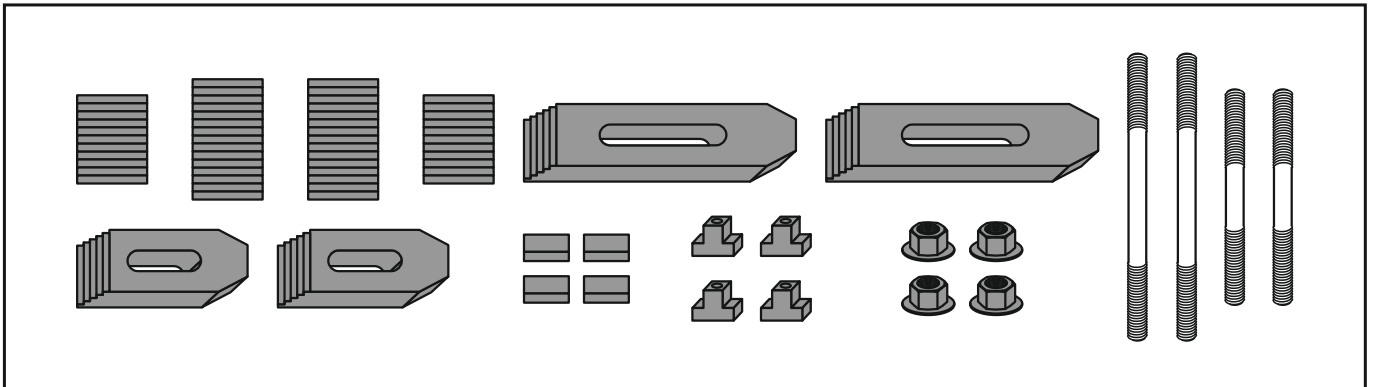
8.4 Work piece clamping/ removal

Using the machine vise

- 1 Use a machine vise of suitable size
- 2 Attach vise by fixing it to the drill table/ base plate with bolts or clamps
- 3 Clamp work piece



Use of clamping kit set



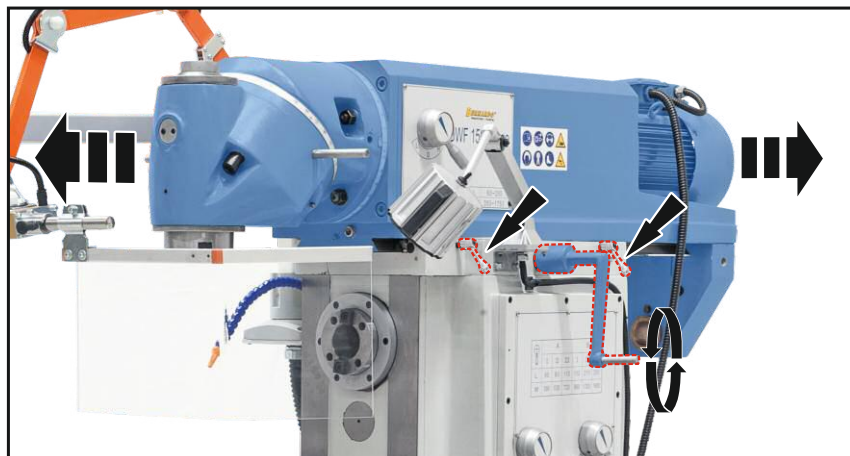
When operating on large work pieces use the clamping tools to firmly attach the work piece to the drill table/ base plate.

Example for attaching the work piece with clamping brackets.

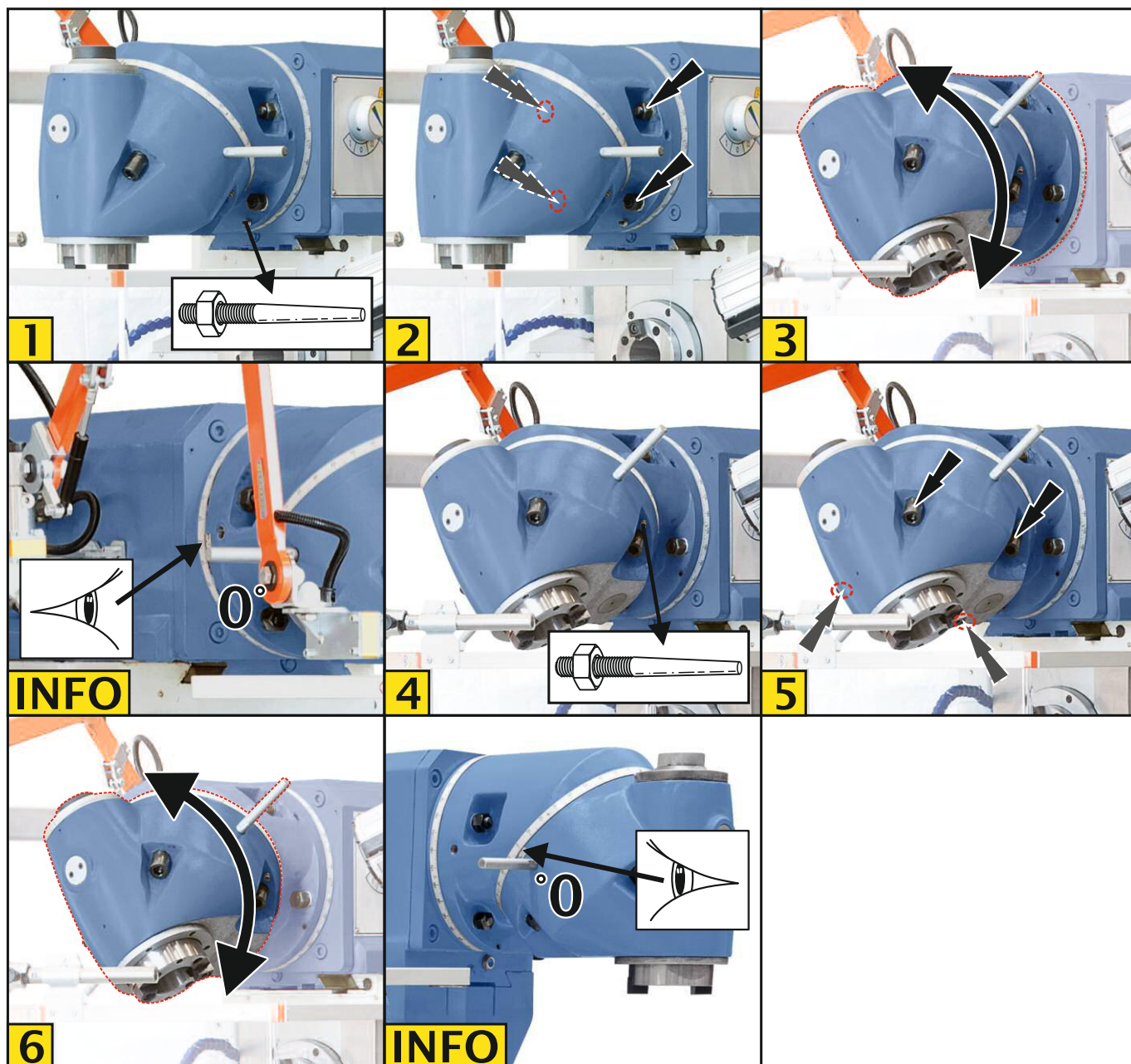


8.5 Mill head adjustment

Moving the radial arm

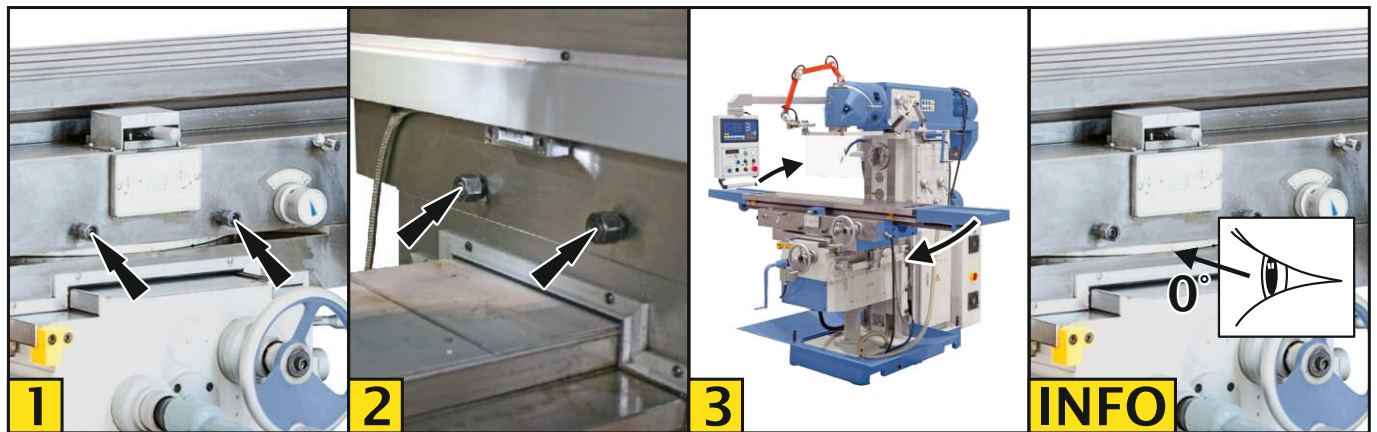


Tilting universal mill head

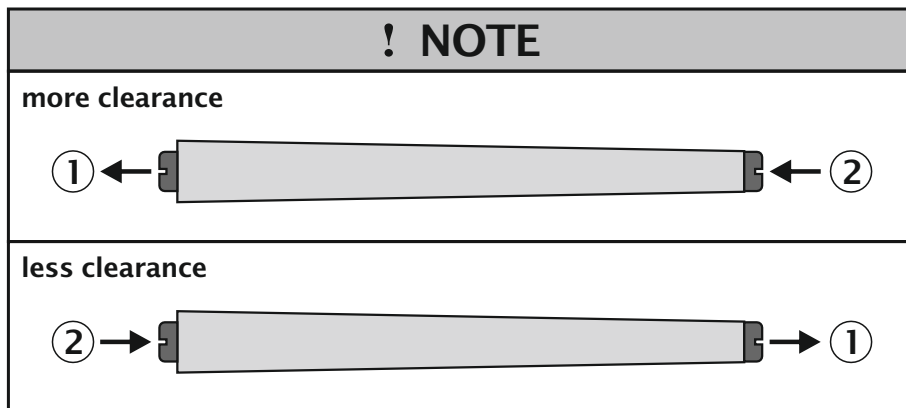


Spindle Angle θ	Front Shell Angle β	Rear Shell Angle α	Spindle Angle θ	Front Shell Angle β	Rear Shell Angle α
1°	1° 24'51"	0° 30'00"	9°	12° 44'28"	4° 30'50"
2°	2° 49'43"	1° 00'00"	10°	14° 09'37"	5° 01'09"
3°	4° 14'35"	1° 30'02"	11°	15° 35'50"	5° 31'32"
4°	5° 39'29"	2° 00'05"	12°	17° 00'08"	6° 01'59"
5°	7° 04'24"	2° 30'09"	13°	18° 25'28"	6° 32'32"
6°	8° 29'21"	3° 00'15"	14°	19° 50'56"	7° 03'10"
7°	9° 54'20"	3° 30'24"	15°	21° 16'29"	7° 33'54"
8°	11° 19'22"	4° 00'35"	16°	22° 42'08"	8° 04'45"
17°	24° 07'54"	8° 35'42"	47°	68° 39'15"	25° 46'24"
18°	25° 33'46"	9° 06'47"	48°	70° 13'44"	26° 26'17"
19°	26° 59'46"	9° 38'00"	49°	71° 48'47"	27° 06'42"
20°	28° 25'54"	10° 09'21"	50°	73° 24'24"	27° 47'42"
21°	29° 52'11"	10° 40'51"	51°	75° 00'38"	28° 28'17"
22°	31° 18'36"	11° 12'31"	52°	76° 37'30"	29° 11'30"
23°	32° 45'12"	11° 44'20"	53°	78° 15'02"	29° 54'22"
24°	34° 11'56"	12° 18'20"	54°	79° 53'17"	30° 37'56"
25°	35° 38'52"	12° 48'31"	55°	81° 32'17"	31° 22'13"
26°	37° 05'58"	13° 20'53"	56°	83° 12'04"	32° 07'16"
27°	38° 33'17"	13° 53'28"	57°	84° 52'40"	32° 53'06"
28°	40° 00'48"	14° 26'15"	58°	86° 34'10"	33° 39'47"
29°	41° 28'32"	14° 59'17"	59°	88° 16'35"	34° 27'22"
30°	42° 56'29"	15° 32'32"	60°	90°	35° 15'51.8"
31°	44° 24'41"	16° 06'02"	61°	91° 44'28"	36° 05'21"
32°	45° 53'07"	16° 39'48"	62°	93° 30'02"	36° 55'54"
33°	47° 21'50"	17° 13'49"	63°	95° 17'47"	37° 47'33"
34°	48° 50'48"	17° 48'08"	64°	97° 04'48"	38° 40'21"
35°	50° 20'04"	18° 22'44"	65°	98° 54'11"	39° 34'25"
36°	51° 49'38"	18° 57'38"	66°	100° 45'01"	40° 29'49"
37°	53° 19'31"	19° 32'52"	67°	102° 07'23"	41° 26'38"
38°	54° 49'44"	20° 08'27"	68°	104° 31'26"	42° 24'57"
39°	56° 20'17"	20° 44'22"	69°	106° 27'18"	43° 24'55"
40°	57° 51'12"	21° 20'39"	70°	108° 25'08"	44° 26'37"
41°	59° 22'30"	21° 57'20"	71°	110° 25'04"	45° 30'13"
42°	60° 54'10"	22° 34'23"	72°	112° 27'20"	46° 35'50"
43°	62° 54'10"	23° 11'52"	73°	114° 32'08"	47° 43'41"
44°	63° 58'50"	23° 49'48"	74°	116° 39'43"	48° 53'57"
45°	65° 31'49"	24° 28'11"	75°	118° 30'23"	50° 05'52"
46°	67° 05'17"	25° 07'03"	76°	121° 04'29"	51° 22'41"

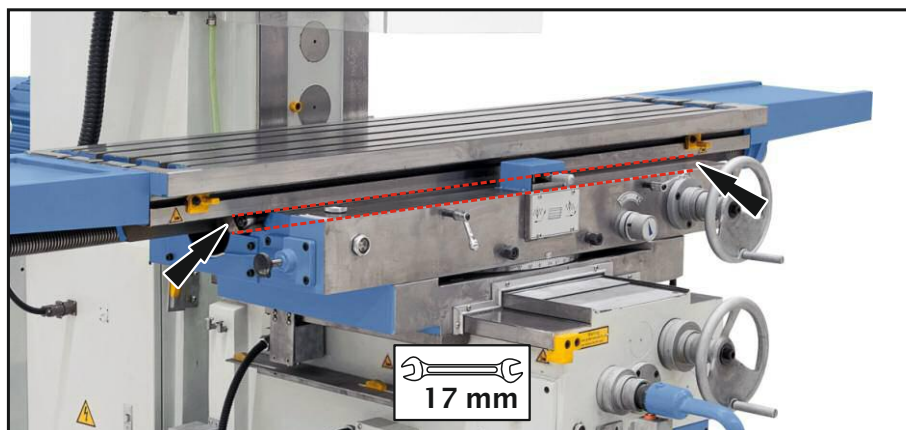
8.6 Mill table tilt



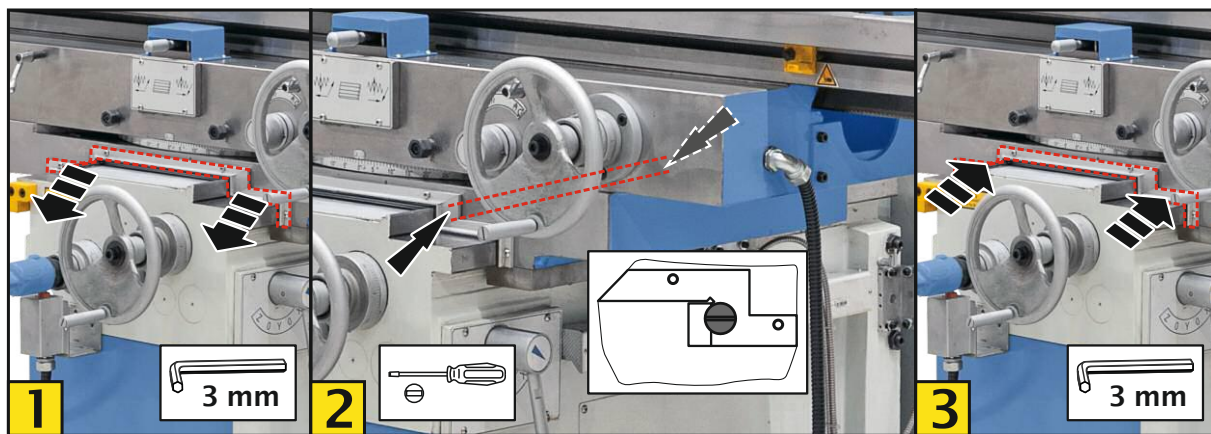
8.7 Adjustment of taper gibs (guide clearance)



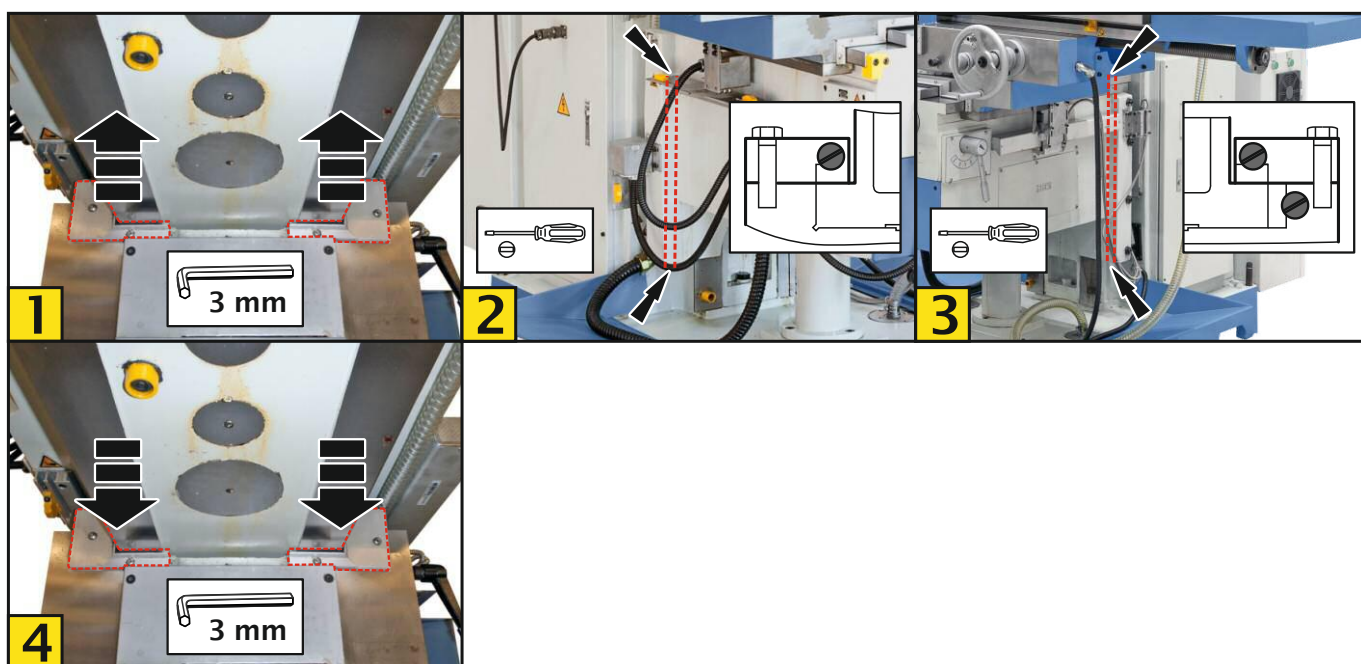
Position of adjustment screws x-axis



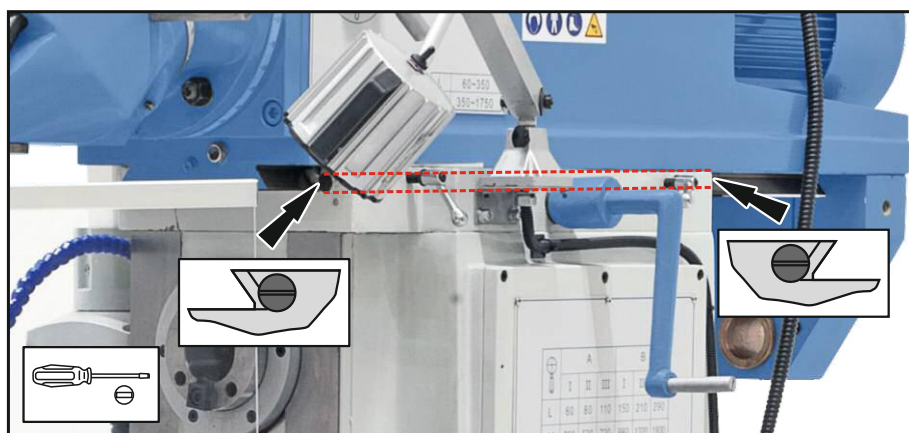
Position of adjustment screws y-axis



Position of adjustment screws z-axis



Position of adjustment screws radial arm

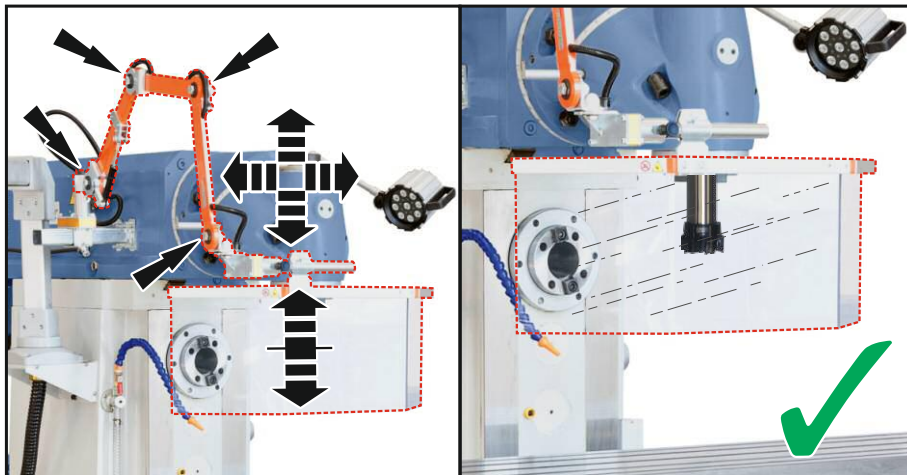


8.8 Adjustment of protective cover

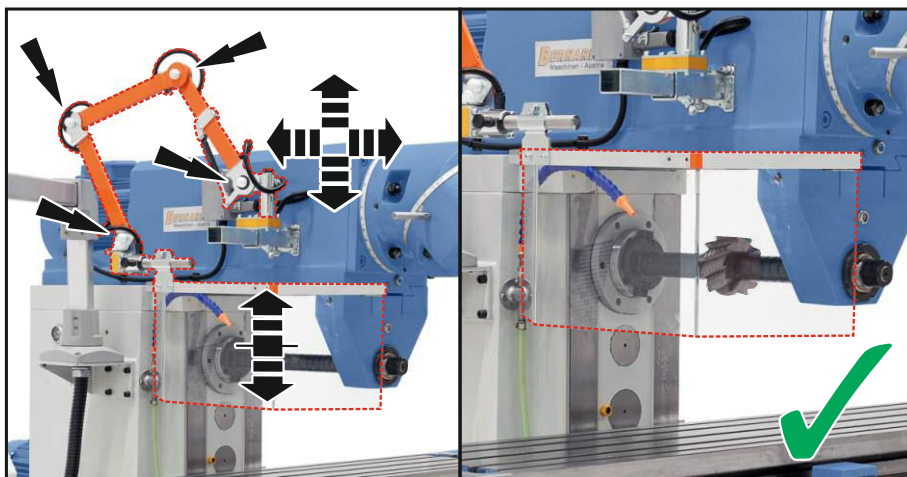
ATTENTION

After tool insert the mill guard must be set at a height to cover the rotating spindle and entire tool when in standstill.

Operating mode: Vertical milling



Operating mode: Horizontal milling



8.9 Spindle speed setting

⚠ ATTENTION



The machine must be in standstill when adjusting the speed.

⚠ ATTENTION

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

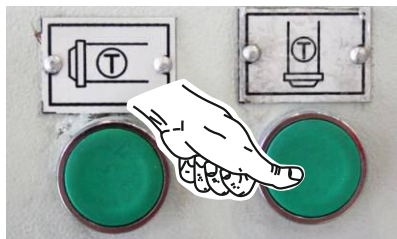
Vertical milling

Example: 80 rpm



! NOTE

Pressing the jog button allows for easier gear selection.



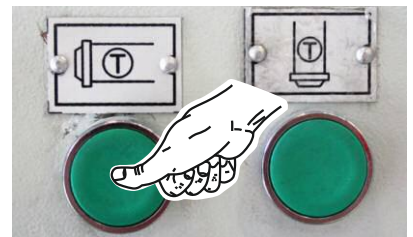
Horizontal milling

Example: 390 rpm



! NOTE

Pressing the jog button allows for easier gear selection.



	A			B		
	I	II	III	I	II	III
L	60	80	110	150	210	290
M	390	530	720	980	1320	1800

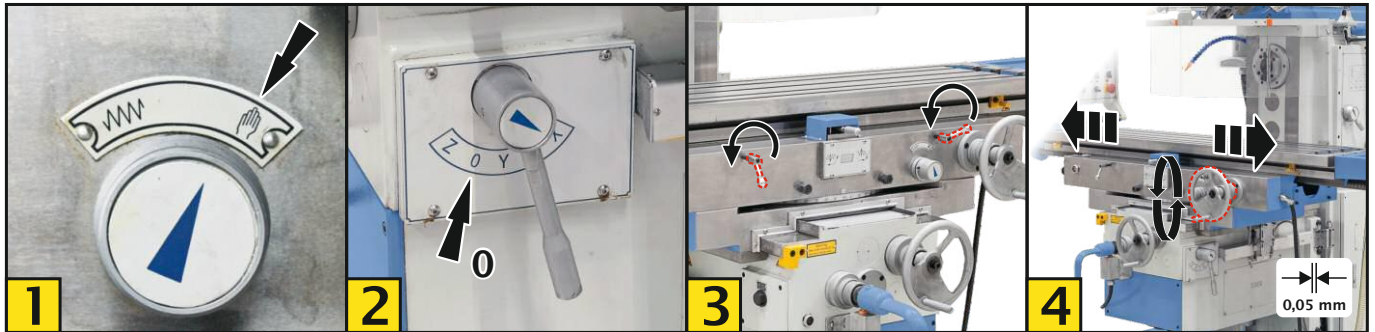
8.10 Manual table feed

ATTENTION

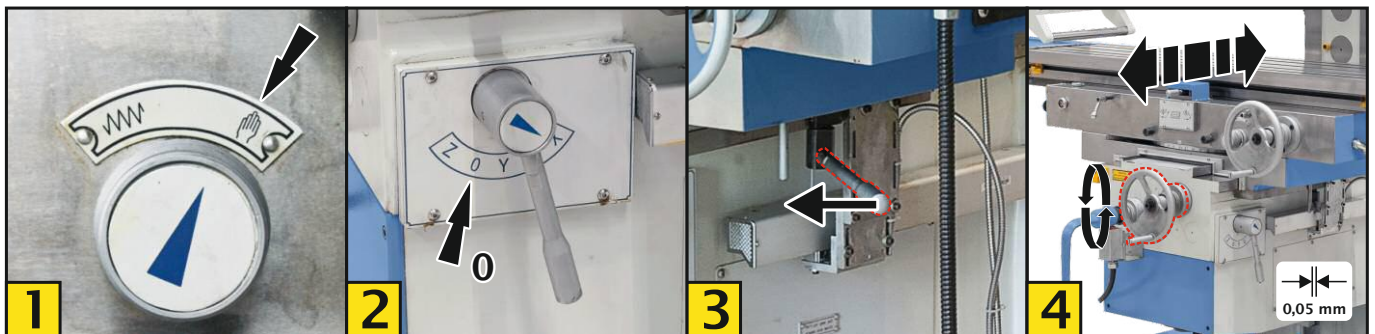
The feed rate must be selected in accordance with

- Spindle speed
- Tool and
- Work piece which is being processed!

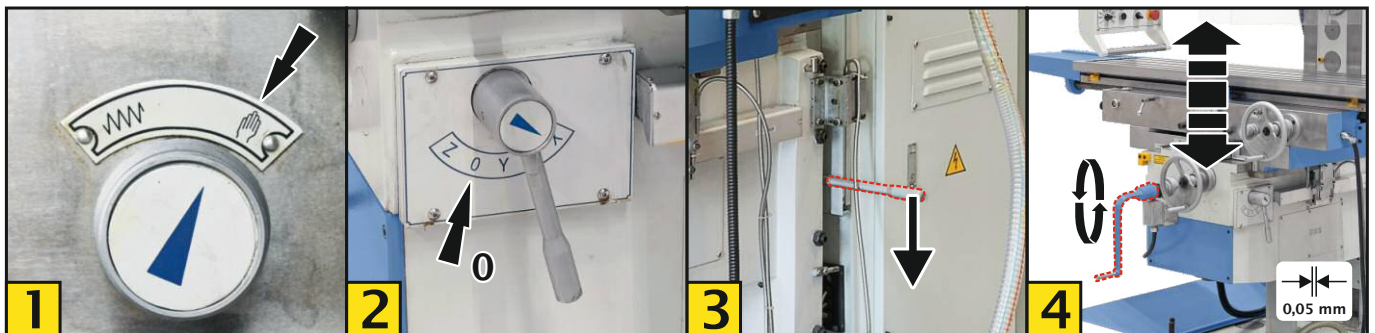
x-axis



y-axis



z-axis



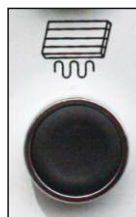
8.11 Automatic table feed

⚠ ATTENTION

The feed rate must be selected in accordance with

- Spindle speed
- Tool and
- Work piece which is being processed!

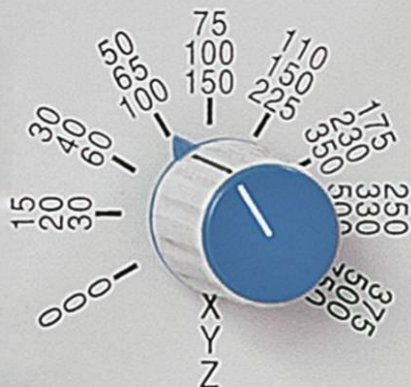
⚠ WARNING



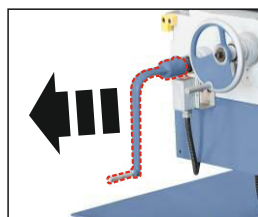
Rapid feed

Rapid feed must only be used for work piece adjustment.

! NOTE

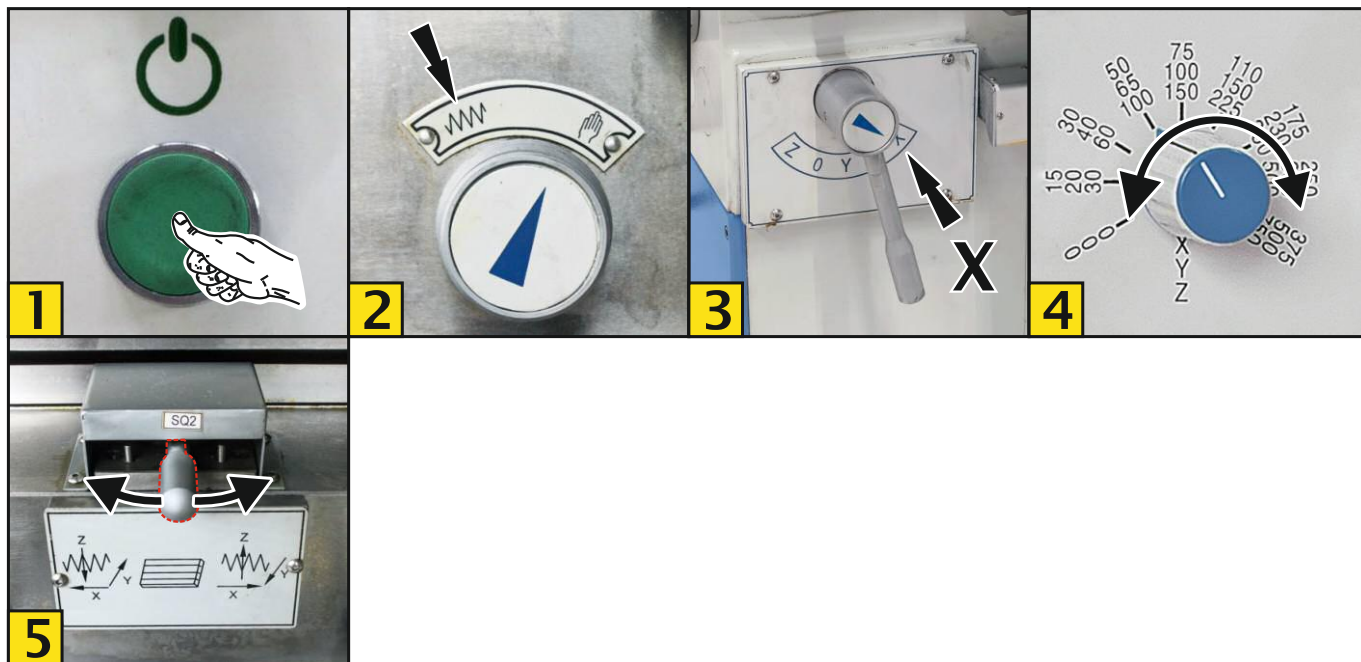


! NOTE

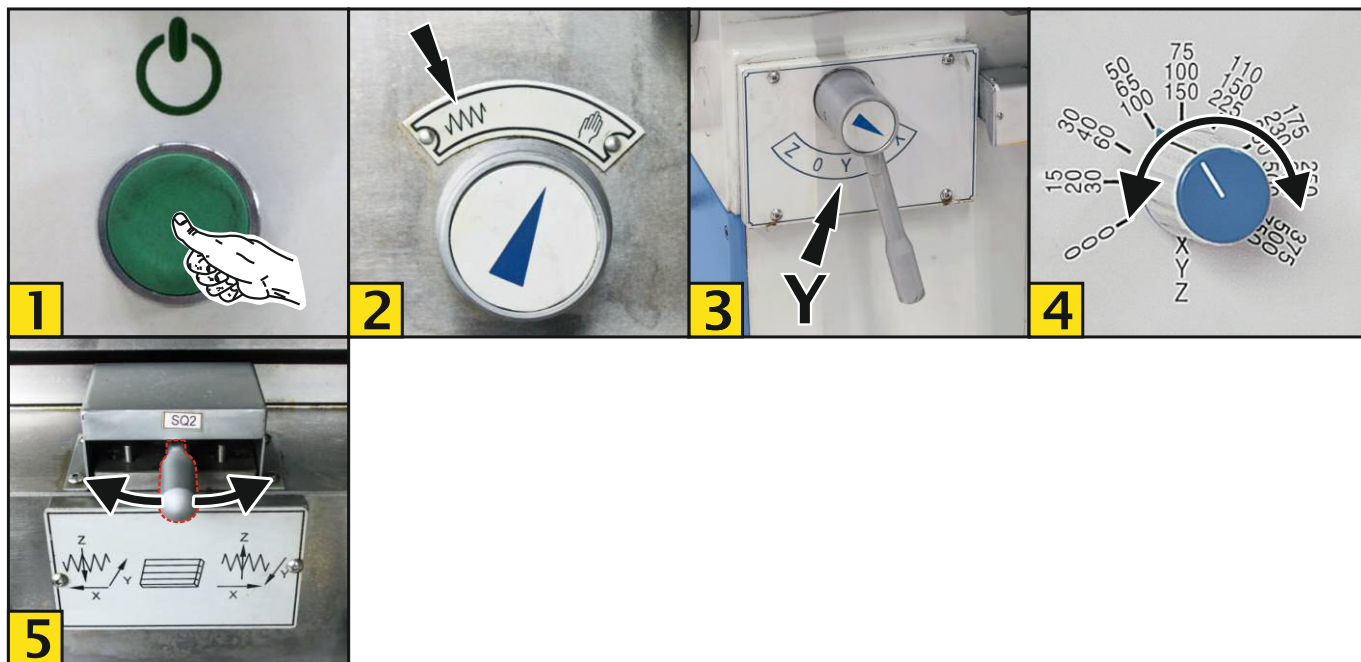


The crank for manual table height adjustment must be removed!

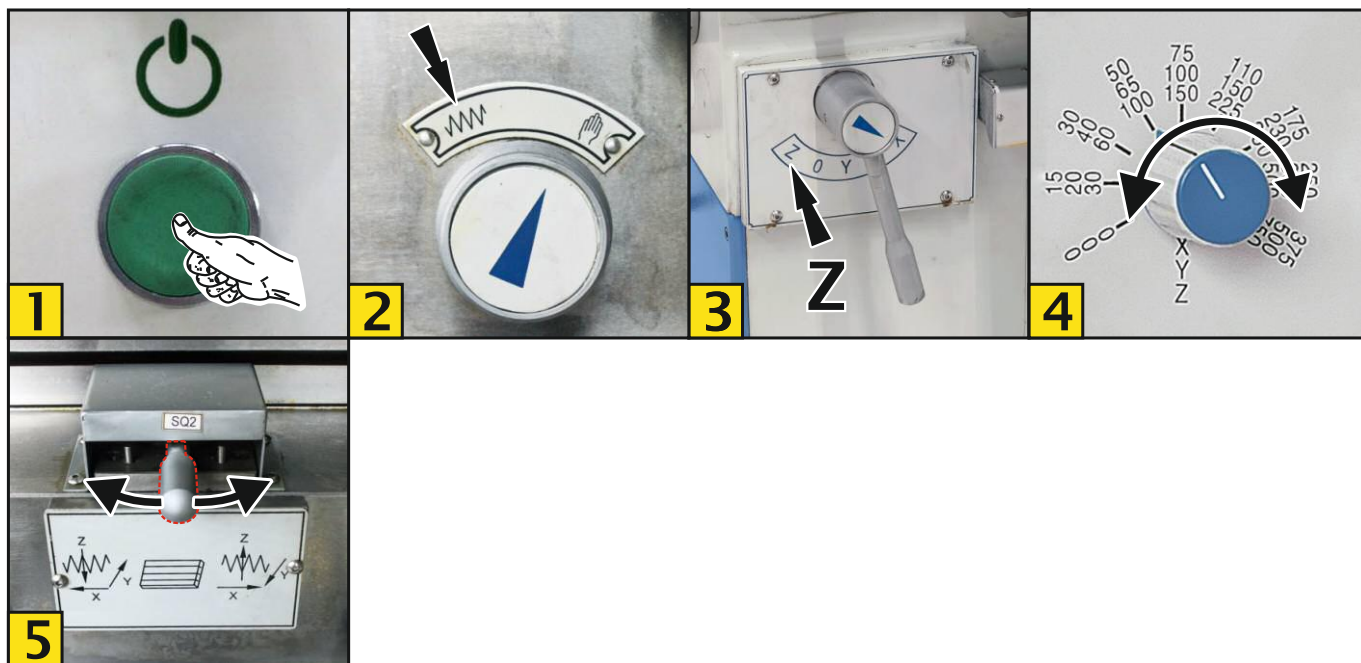
x-axis



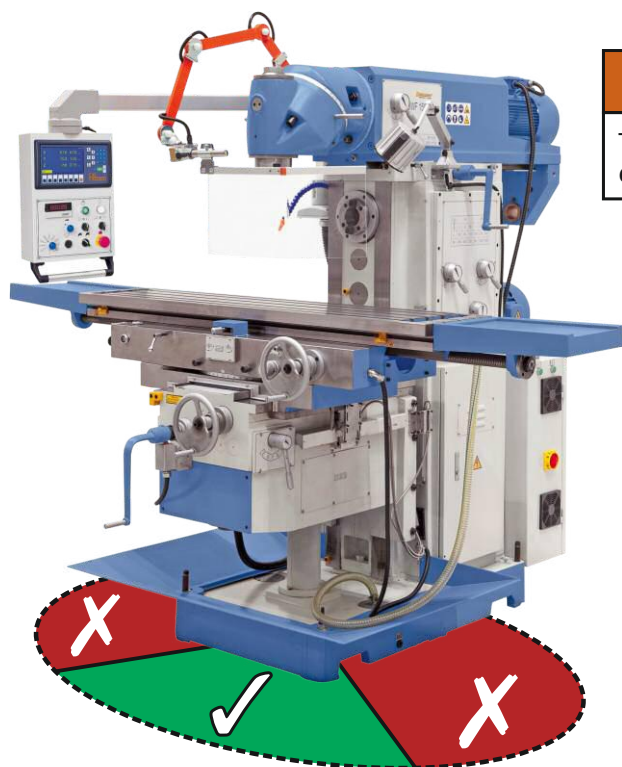
y-axis



z-axis



8.12 Vertical milling mode

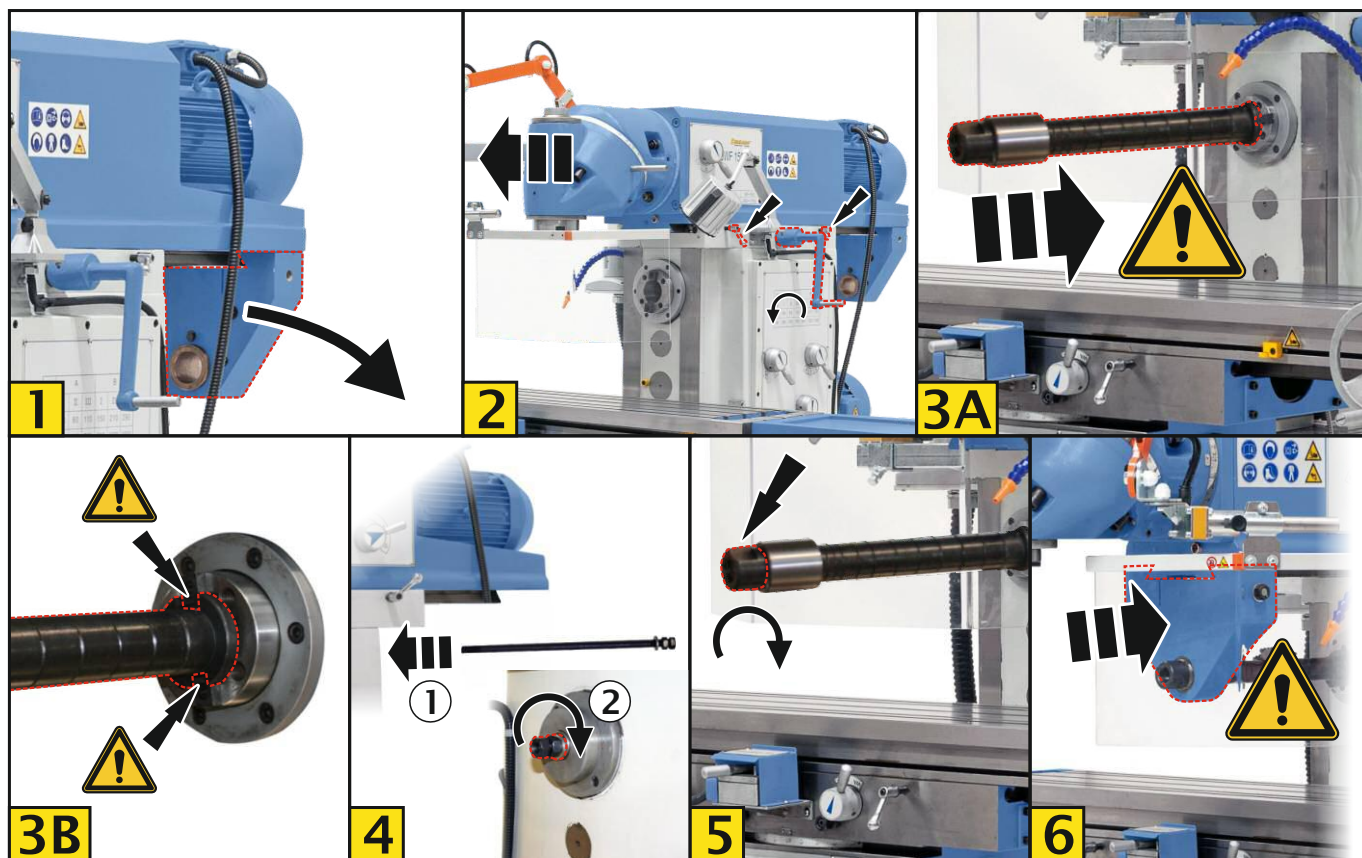


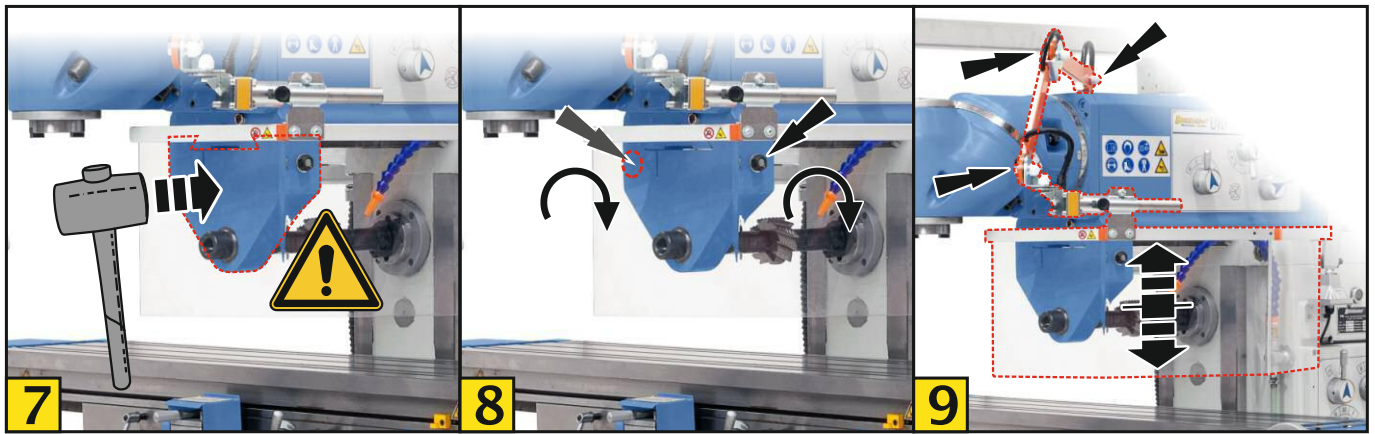
WARNING

The operator must always be in the designated area during processing!

8.13 Horizontal milling mode

Converting from vertical to horizontal milling





Horizontal milling



WARNING

The operator must always be in the designated area during processing!

Lubrication of counter bearing

WARNING

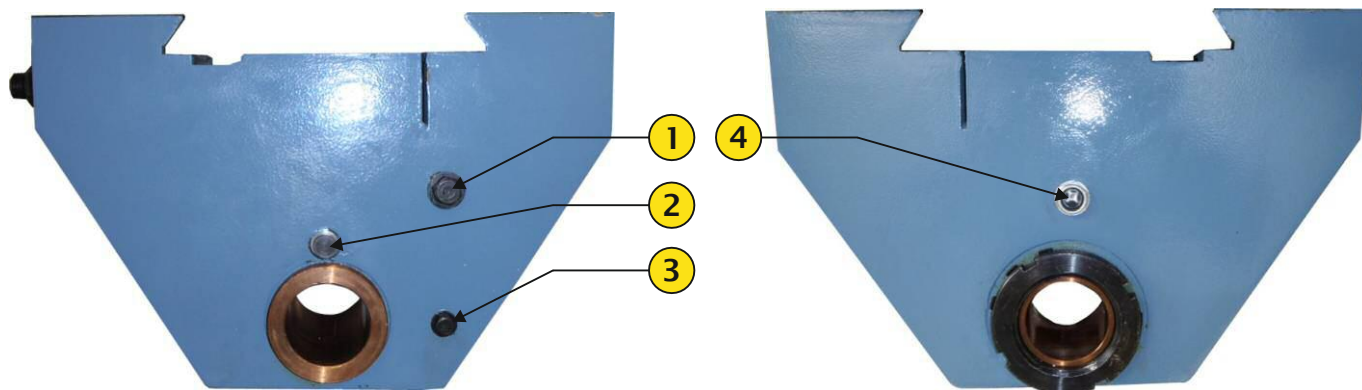
Lubrication of counter bearing!

Prior to machine use, make sure

- there is sufficient oil in the counter bearing
- that the regulating screw is open

! NOTE

If counter bearing is not used the regulating screw must be closed.



- 1 Refill screw
- 2 regulating screw
- 3 Release screw
- 4 Oil gauge

8.14 Adjustment of coolant fluid

WARNING

Growth of fungus and bacteria

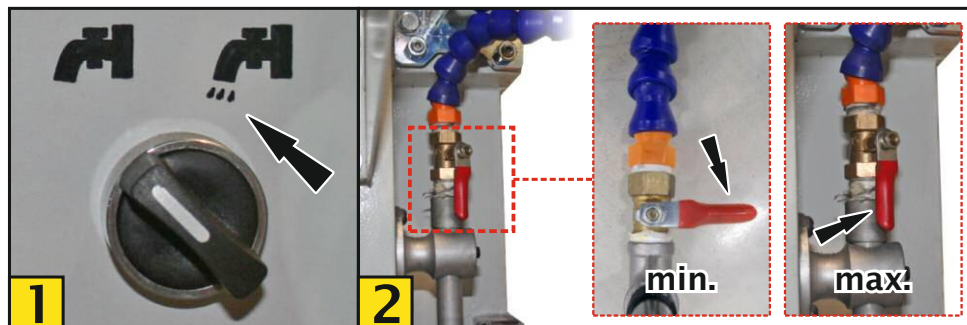
If using coolant, ensure that no coolant fluid remains in the return hose after finishing processing.

ATTENTION


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


Using the coolant has the following advantages:

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



9. Care and Maintenance

**DANGER**




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

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


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


9.1 Servicing plan

**WARNING**

Danger caused by coolant fluid

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

**WARNING**

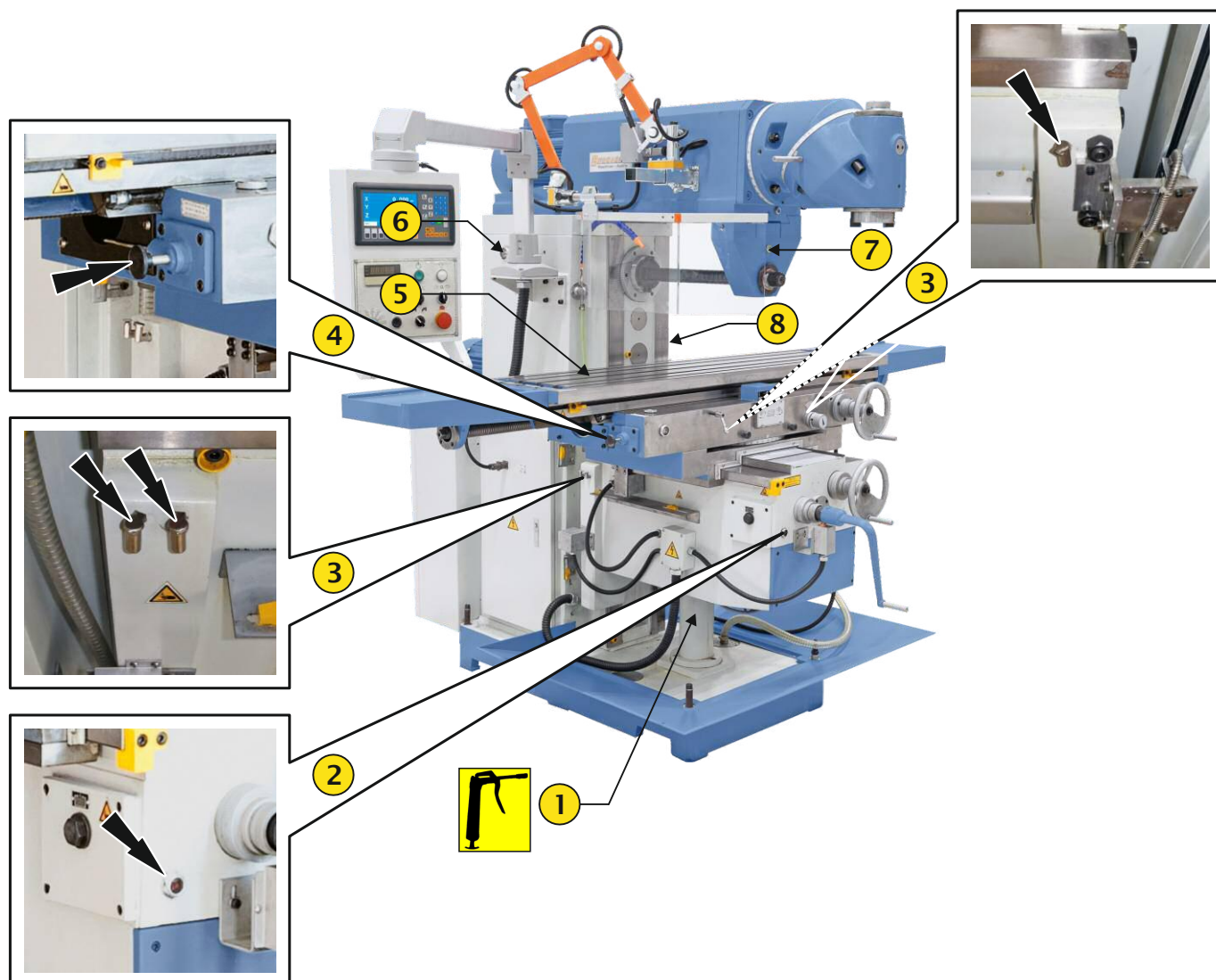
Spilt fluids and lubricants create an extremely slippery floor!

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

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

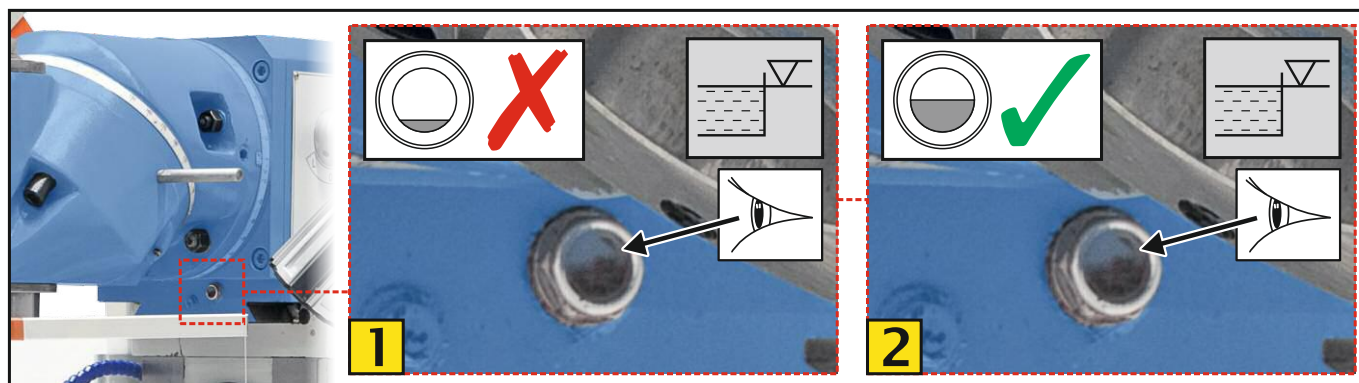
Intervals	Type of maintenance	Personnel
Once per work shift	Check oil level - gearbox vertical mill head, horizontal spindle, feed unit and central lubrication	Operator
After daily use	Wipe with a dry cloth or clean with a chip hook or magnetic stick	Operator
Weekly	Dust removal from coolant grooves of motor	Operator
Weekly	Clean coolant fluid filter	Operator
Every six months	Inspect electric functions	Qualified electrician

9.2 Lubrication Chart

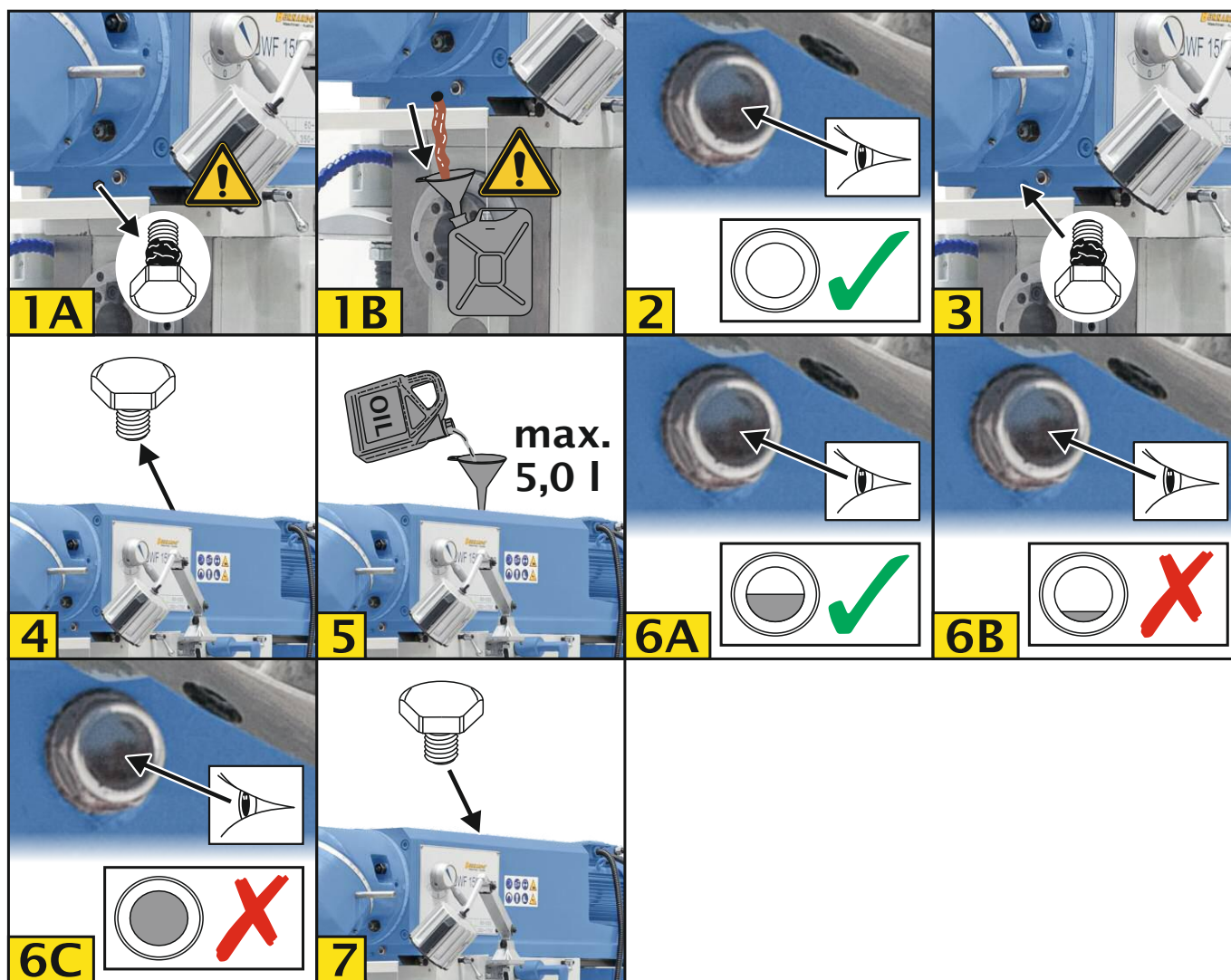


Position	Lubrication point	Periods	Lubricant
1	Lifting spindle mill table	Weekly	Long-term gear grease
2	Feed unit	Once per year	HLP ISO-VG 46
3	Lubrication z-axis	1 x per work shift	Slideway Oil CGLP 68
4	Central lubrication for x-, y-axis	4 x per work shift	Slideway Oil CGLP 68
5	Mill table	When required	Machine wax
6	Vertical mill head – gear unit	Once per year	HLP ISO-VG 46
7	Horizontal spindle – counter bearing	When being used	Slideway Oil CGLP 68
8	Horizontal spindle – gear unit	Once per year	HLP ISO-VG 46

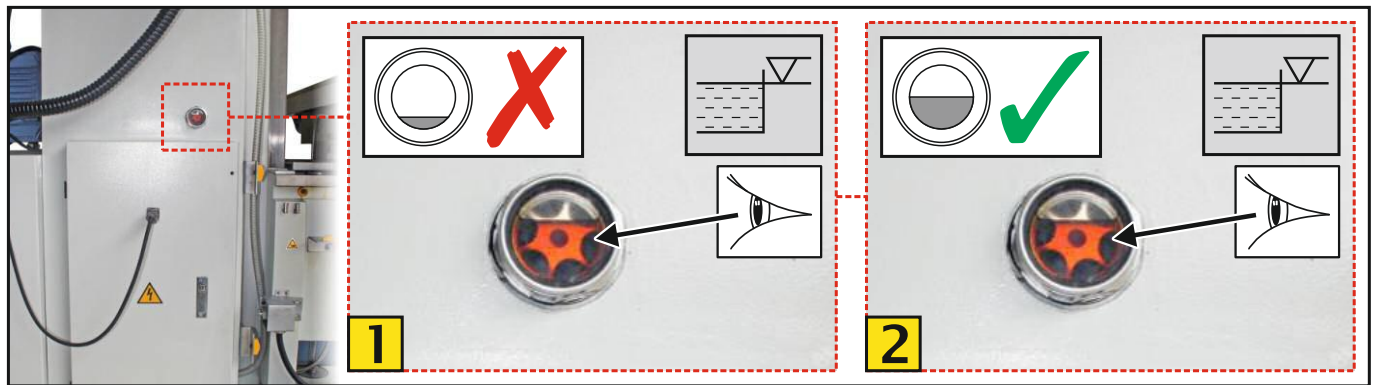
9.3 Check oil level in vertical mill head unit



9.4 Replacement or refill of oil in vertical mill head unit



9.5 Check oil level and oil pressure in horizontal spindle unit



Oil pressure



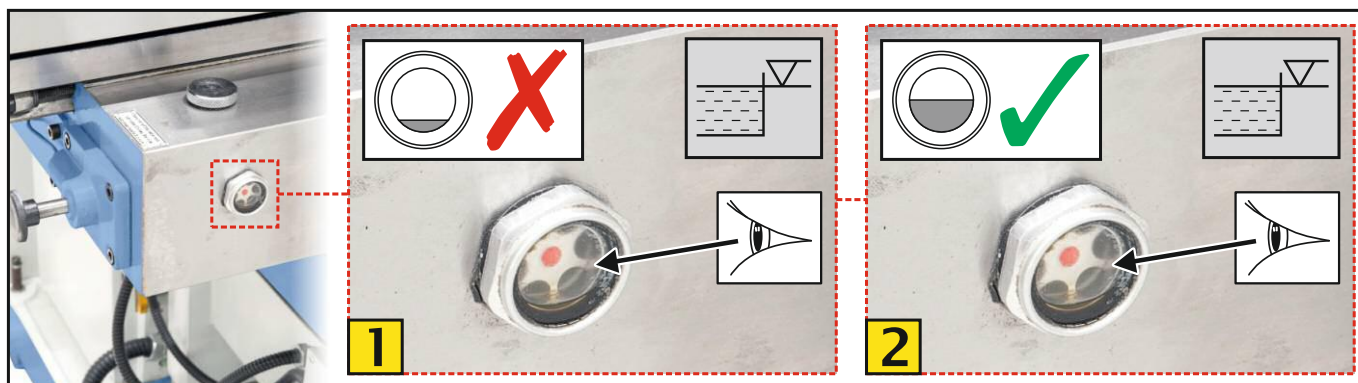
! NOTE

Inspection must be carried out while spindle is rotating.

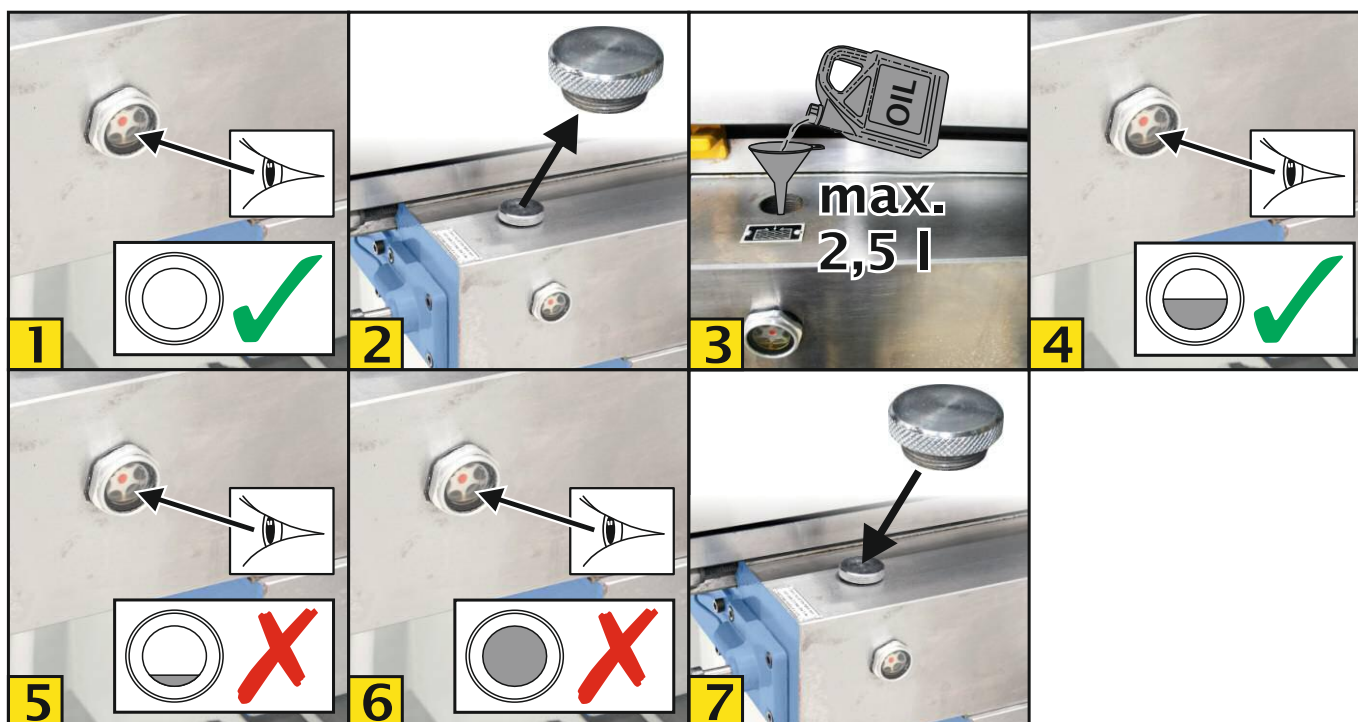
9.6 Replacement or refill of oil in horizontal spindle unit



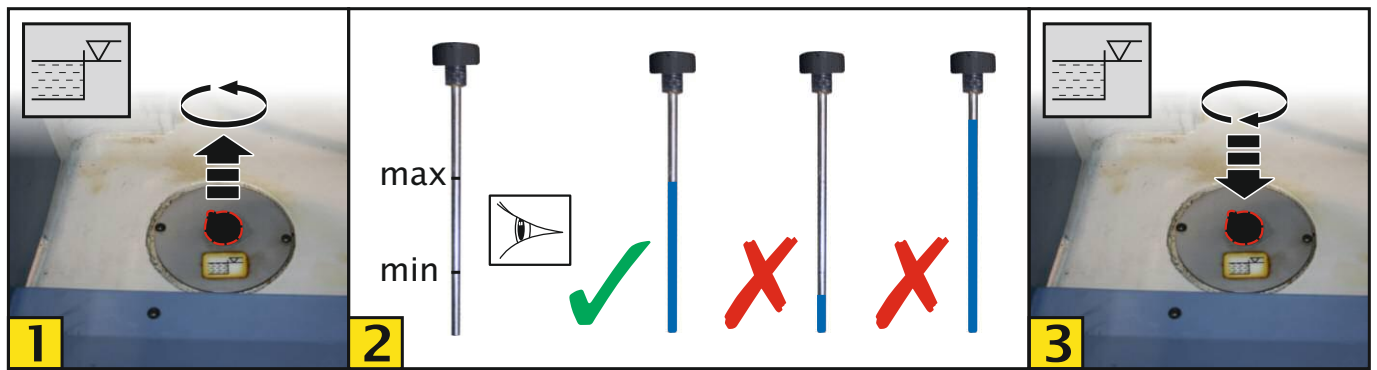
9.7 Check central lubrication of x, y-axis



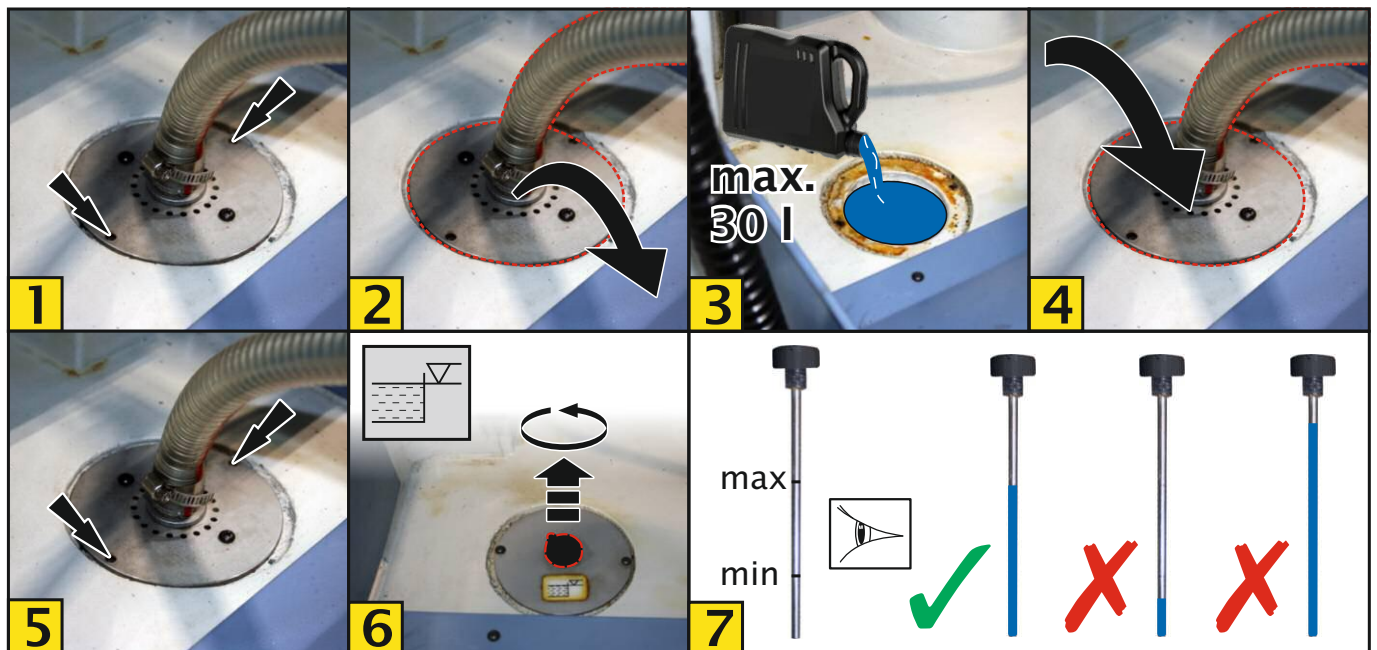
9.8 Refilling central lubrication of x, y-axis



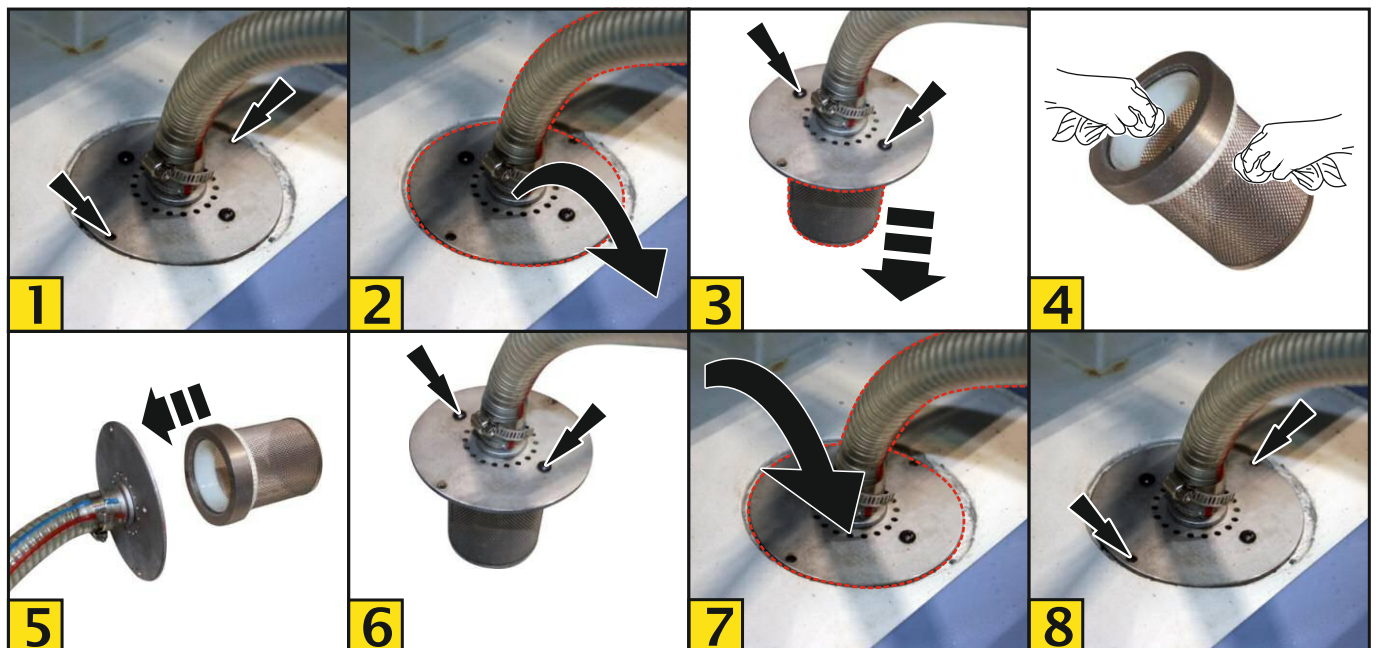
9.9 Check coolant fluid level



9.10 Refill coolant container

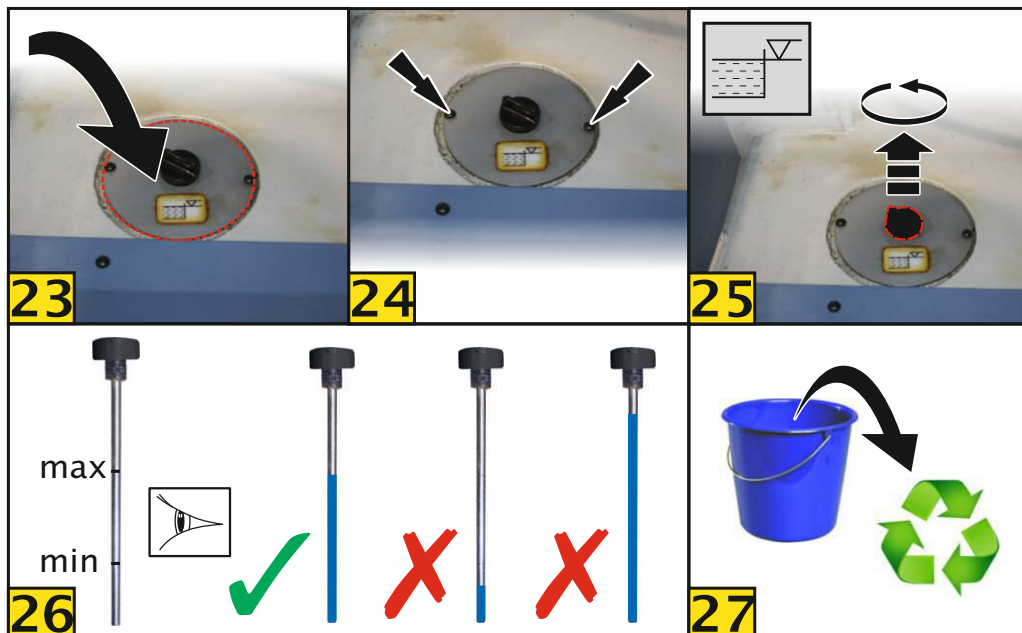


9.11 Clean coolant filter



9.12 Replace coolant fluid



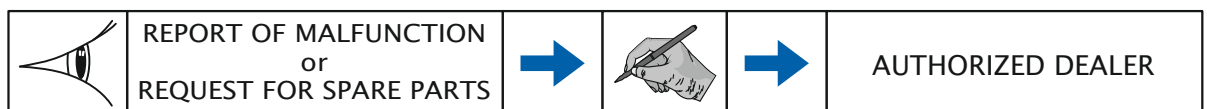


10. Disassembly and disposal

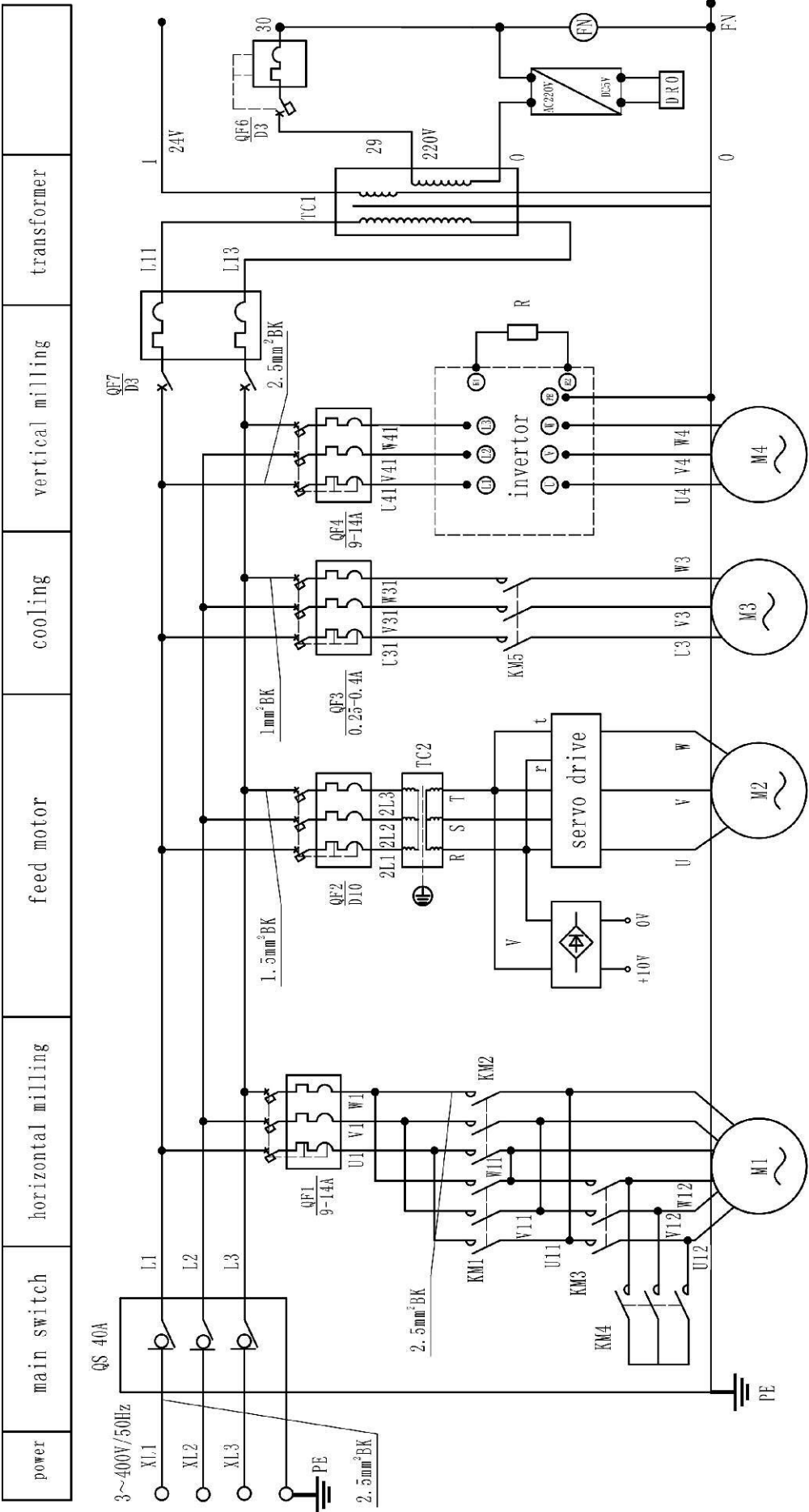
If you have no further use for the machine it has to be disassembled and disposed of in an environmentally friendly manner.

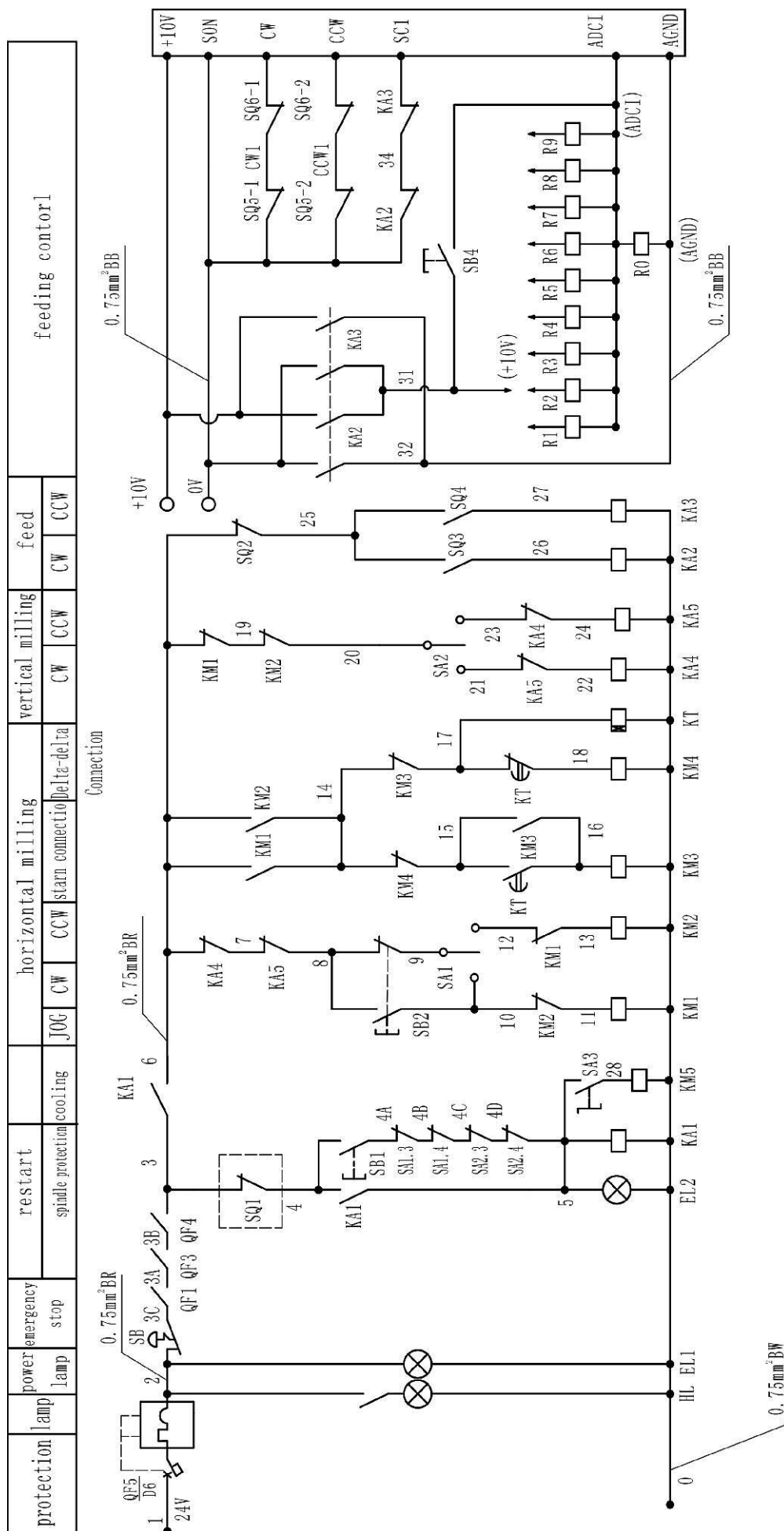
11. Trouble shooting

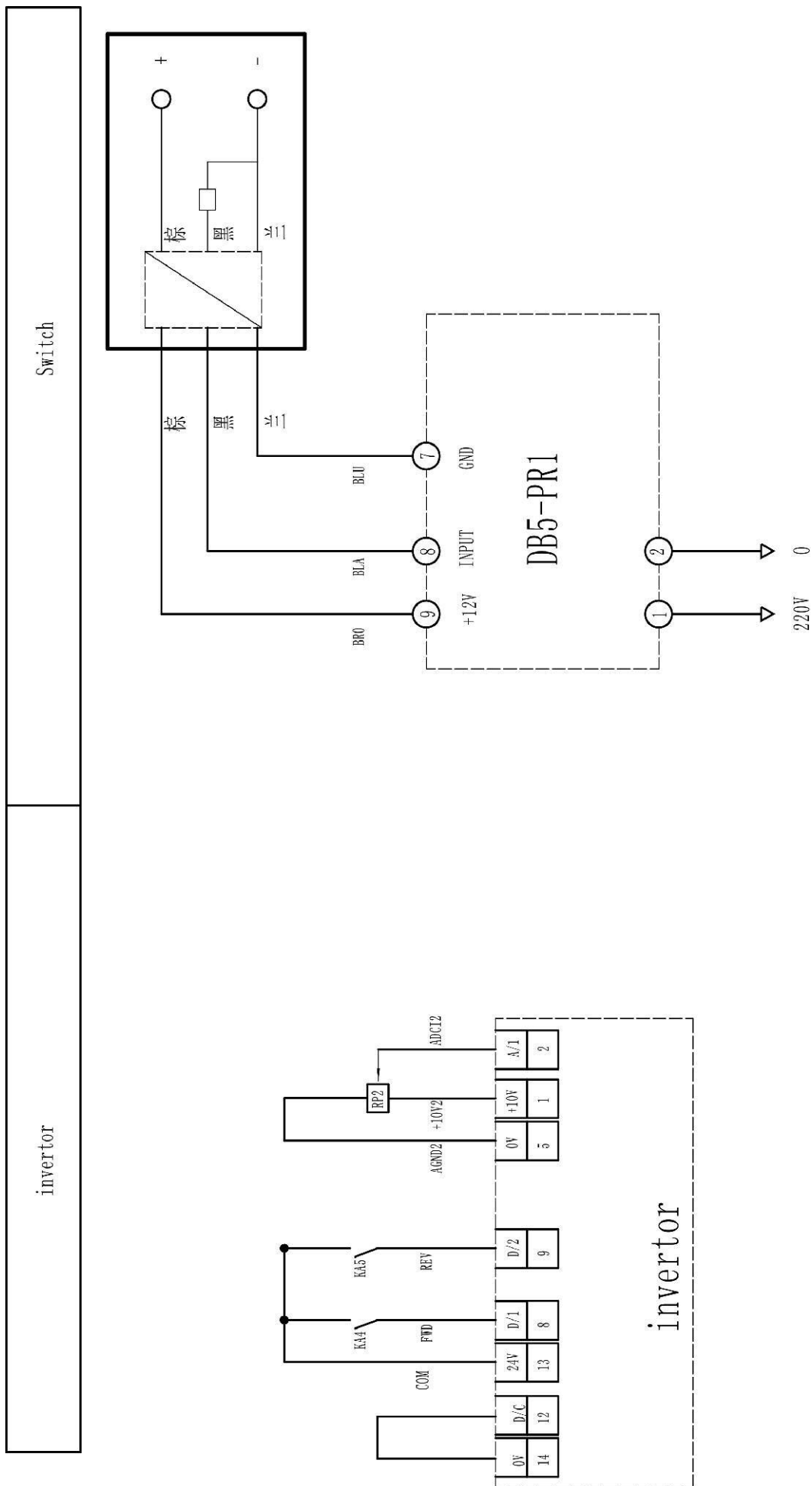
Problem	Possible causes	Solutions	Personnel
Machine not starting	<ul style="list-style-type: none"> Main switch turned off Emergency OFF button is engaged Protective cover not attached or closed properly Control voltage switched off No power supply Right/left rotation button defect Motor defect 	<ul style="list-style-type: none"> Turn main switch on Disengage emergency OFF button Attach protective cover and close properly Press on-button for control voltage Establish power supply Replace right/left rotation button Replace motor 	Operator Operator Operator Operator Qualified electrician Qualified electrician Servicing/Maintenance agent Qualified electrician
Automatic table feed not working	<ul style="list-style-type: none"> No feed axis selected z-axis crank mounted End switch activated Electric fault 	<ul style="list-style-type: none"> Select feed axis Detach crank Move table away from activated end switch Inspect electric functions 	Operator Operator Operator Qualified electrician
High noise level	<ul style="list-style-type: none"> Lever for speed selection not locked in position properly lack of oil in gearbox no oil pressure (see 9.5) Spindle bearings defect Gear bearings defect Motor defect 	<ul style="list-style-type: none"> Lock lever into position Refill oil (see 9.4 / 9.6 / 9.7) Refill oil (see 9.5) Replace spindle bearings Replace gear bearings Replace motor 	Operator Operator Servicing/Maintenance agent Servicing/Maintenance agent Servicing/Maintenance agent Qualified electrician
Tool overheats during operation	<ul style="list-style-type: none"> Wrong speed setting Tool is blunt, incorrectly sharpened or broken Lack of feed Lack of lubrication/ coolant 	<ul style="list-style-type: none"> Select correct speed Sharpen/ replace tools Increase feed Lubricate/ cool tool 	Operator Operator Operator Operator
Coolant does not flow	<ul style="list-style-type: none"> Regulator closed Lack of coolant fluid in container Coolant filter blocked On/off switch of coolant pump defect Coolant fluid pump defect 	<ul style="list-style-type: none"> Open regulator Refill coolant fluid (see 9.10) Clean coolant fluid filter (see 9.11) Replace switch Replace coolant pump 	Operator Operator Operator Qualified electrician Servicing/Maintenance agent Qualified electrician



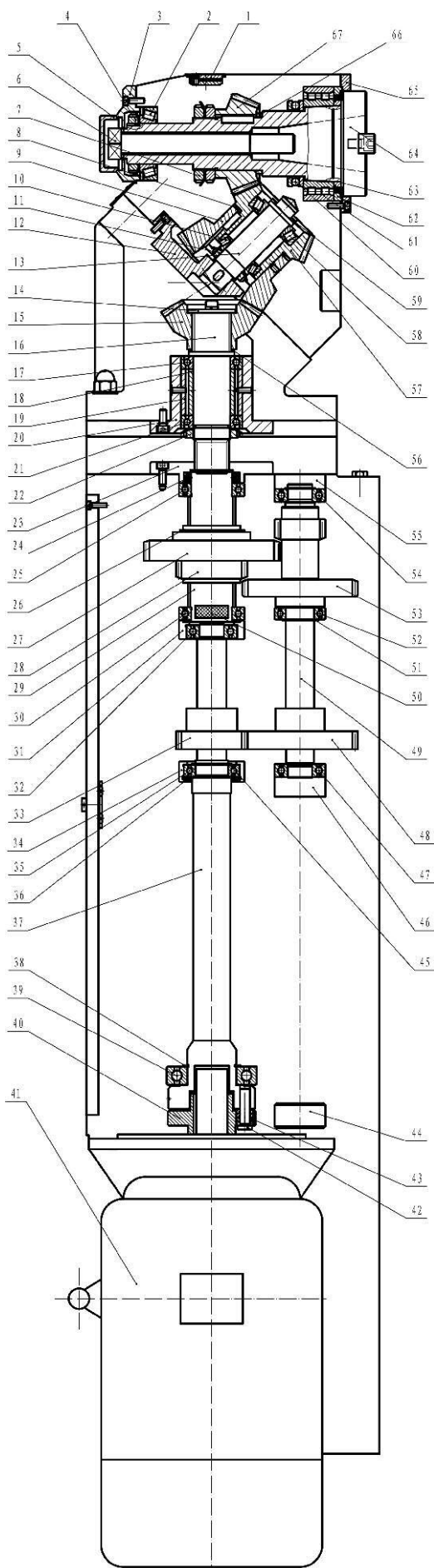
12. Wiring Diagram



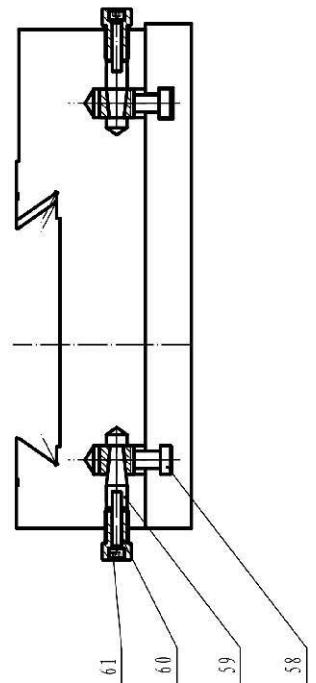
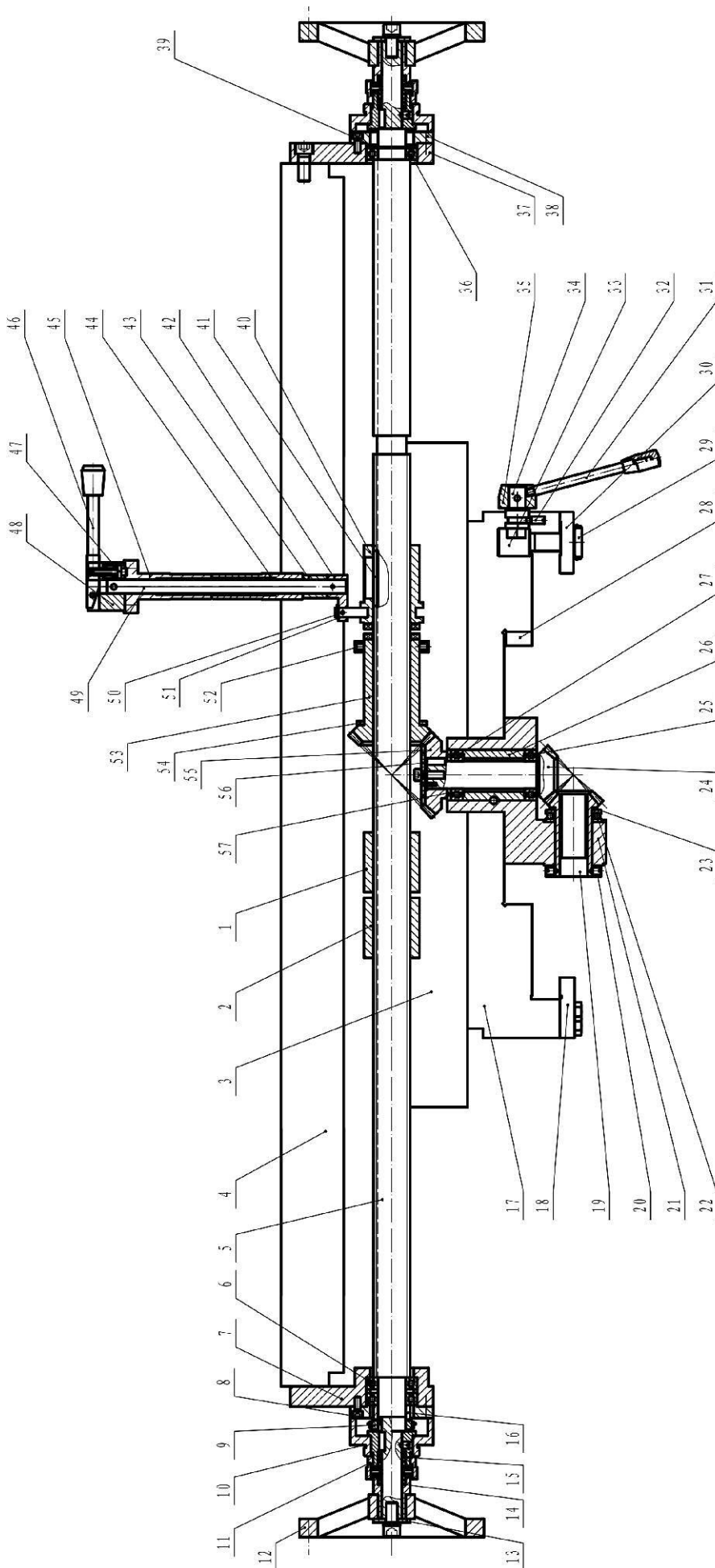




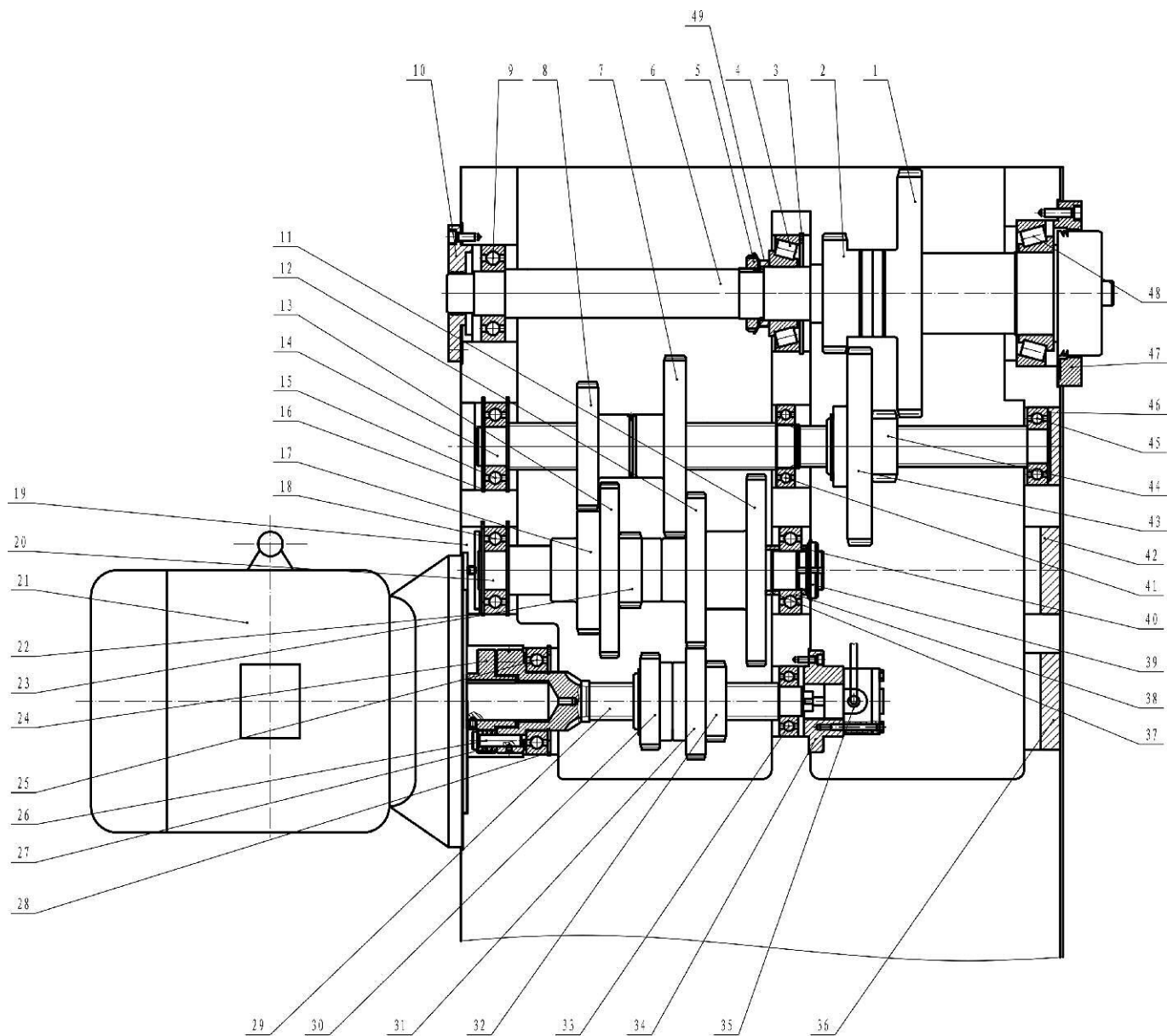
13. Spare parts list



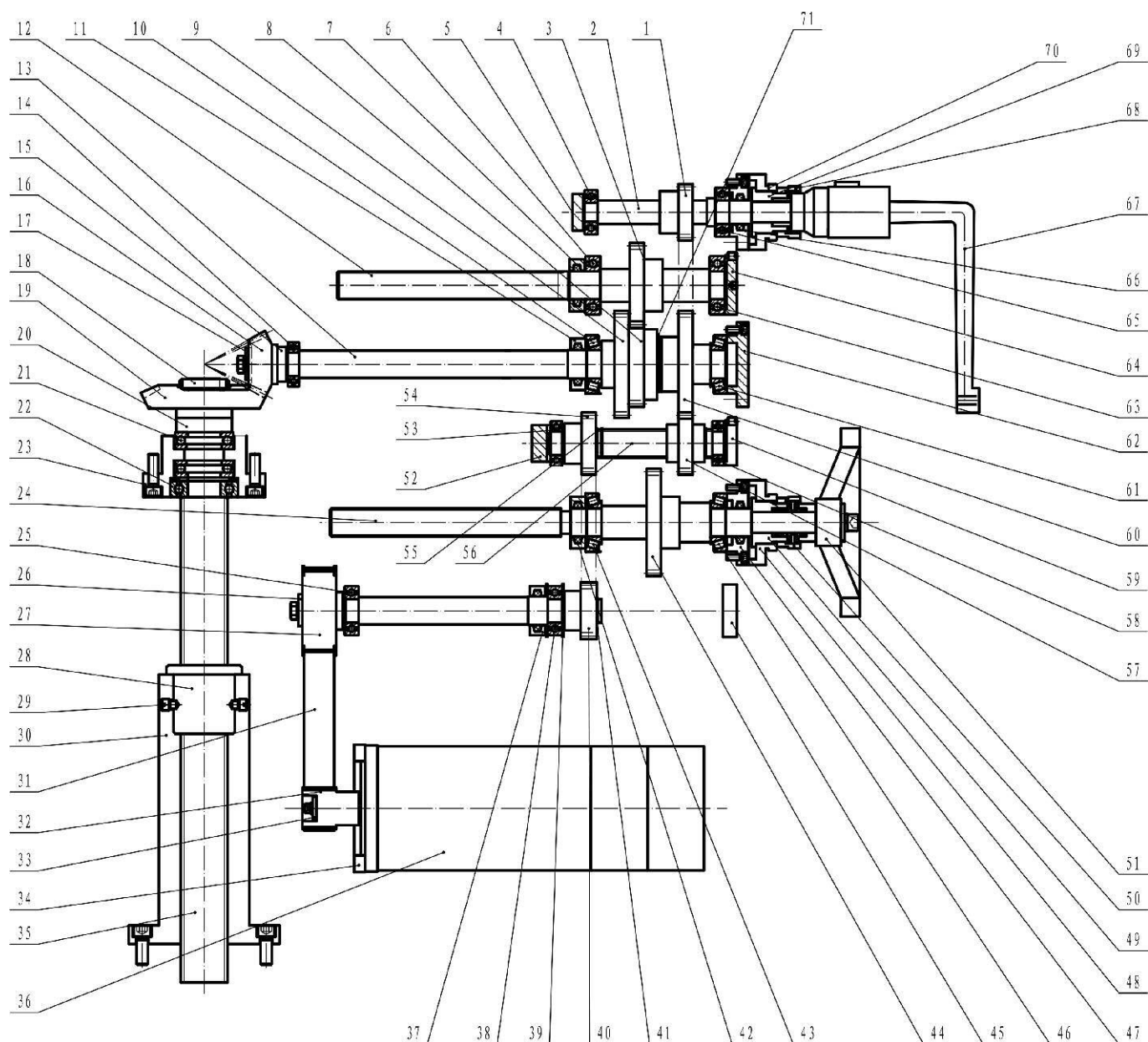
67		Gear		1
66		Pad		1
65		Flange plate		1
64		Spindle		1
63		Pad		1
62		Pad		1
61	GB/T285	Double row cylindrical roller bearing	NN3018K/P5	1
60	GB/T301	Thrust ball bearing	51116/P6	1
59		Pad		1
58	GB/T297	Tapered roller bearing	32007	1
57		Gear		1
56		Pad		1
55		Stifled		1
54	GB/T276	Deep groove ball bearing	6206-2RS	1
53		Gear		1
52	GB/T276	Deep groove ball bearing	6007-2RS	1
51	GB/T894.1	Shaft ring	35	1
50		Stifled		1
49		Gear shaft		1
48		Gear		1
47	GB/T276	Deep groove ball bearing	6206-2RS	1
46		Sleeve		1
45	GB/T894.1	Shaft ring	40	1
44		Stifled		1
43		Ring		24
42		Pin roll		6
41		Variable frequency motor	5.5kw	1
40		Flange plate		1
39	GB/T276	Deep groove ball bearing	6212-2RS	1
38	GB/T894.1	Shaft ring	60	1
37		Aris		1
36	GB/T893.1	Hole ring	68	1
35	GB/T276	Deep groove ball bearing	6008-2RS	1
34		Sleeve		1
33		Gear		1
32	GB/T276	Deep groove ball bearing	6206-2RS	1
31		Sleeve		1
30	GB/T276	Deep groove ball bearing	6010	1
29		Spline housing		1
28		Gear		1
27		Gear		1
26	GB/T894.1	Shaft ring	70	1
25	GB/T276	Deep groove ball bearing	6010	1
24	GB/T13871	Framework oil seal	FB50×68×8	1
23		Flange plate		1
22	GB/T812	Round nut	M45×1.5	1
21	GB/T292	Angular contact ball bearing	7009AC	1
20		Flange plate		1
19		Sleeve		1
18		Sleeve		1
17	GB/T292	Angular contact ball bearing	7009AC	1
16		Spline shaft		1
15		Gear		1
14		Pad		1
13		Axis		1
12		Flange plate		1
11	GB/T812	Round nut	M35×1.5	1
10	GB/T297	Tapered roller bearing	32007	1
9		Gear		1
8		Pad		1
7	GB/T812	Round nut	M64×2	2
6		Bar		1
5		Cover		1
4	GB/T812	Round nut	M50×1.5	1
3		Flange plate		1
2	GB/T297	Tapered roller bearing	30210/P5	1
1		Cover		1
No	Code	Name	Specification	Unit



61	GB/T70.1-2000	hexagon socket cap screws		M8X50
60		bolt	4	
59		Tight pin	4	
58		bolts	4	
57		washer	1	
56		washer	1	
55		bevel gear	1	
54		washer	1	
53		bevel gear	1	
52		round nut	1	
51		clip		10
50		shifting fork	1	
49		shaft	1	
48		handle seat	1	
47		pin roll	1	
46		knub	1	
45		bush	1	
44		bush	1	
43		bush	1	
42		swing arm	1	
41		key	1	
40		clutch	1	
39		clip		30
38		flange	1	
37		bracket	1	
36	GB/T276	deep groove ball bearing	1	6006
35		handle seat	1	
34		shaft	1	
33		bolt	1	
32	GB75-1985	screw		M8X20
31		knub	1	
30		clamping plate	1	
29	GB/T812	round nut	1	M20×1.5
28		Angle iron	1	
27	GB/T276	deep groove ball bearing	1	6006
26		sleeve	1	
25	GB/T276	deep groove ball bearing	1	6006
24		bevel gear	1	
23		washer	1	
22	GB/T301	thrust ball bearing	1	51112
21		bracket	1	
20		round nut	1	
19		bevel gear	1	
18		clamping plate	1	
17		saddle	1	
16		sleeve	1	
15		coupling	1	
14		coupling	1	
13		washer	1	
12		hand wheel	2	
11		sleeve	1	
10		ring dial	1	
9	GB/T812	round nut	1	M30×1.5
8		flange	1	
7		bracket	1	
6	GB/T292	angular contact ball bearing	2	7006AC
5		horizontal leadscrew	1	
4		table	1	
3		rotary disk	1	
2		horizontal leadscrew nut	1	
1		horizontal leadscrew nut	1	
N0	code	name	quantity	Specification



49		washer	1	
48	GB/T297	taper roller bearing	1	32217/P5
47		flange	1	
46		plug	1	
45	GB/T276	deep groove ball bearing	1	6307
44		gear	1	
43		gear	1	
42		plug	1	
41	GB/T276	deep groove ball bearing	1	6209
40		washer	1	
39	GB/T812	round nut	1	M40×1.5
38	GB/T276	deep groove ball bearing	1	6308
37		washer	1	
36		plug	1	
35		oil pump	1	KBBY-0.84
34		flange	1	
33	GB/T276	deep groove ball bearing	1	6306
32		gear	1	
31		gear	1	
30		gear	1	
29		shaft	1	
28	GB/T893.1	washer	1	110
27		washer	24	
26		small shaft	1	
25	GB/T276	deep groove ball bearing	1	6212-2RS
24		flange	1	
23		gear	1	
22	GB/T893.1	washer	2	96
21		three-phase asynchronous motor	1	Y132S-4/B5
20		shaft	1	
19		plug	1	
18	GB/T276	deep groove ball bearing		
17		gear	1	
16	GB/T893.1	washer	2	96
15	GB/T276	deep groove ball bearing		
14		shaft	1	
13		gear	1	
12		gear	1	
11		gear	1	
10		flange	1	
9	GB/T276	deep groove ball bearing	1	6309
8		gear	1	
7		gear	1	
6		spindle	1	
5	GB/T812	round nut	1	M52×1.5
4	GB/T297	taper roller bearing	1	30311/P5
3	GB/T893.1	washer	1	120
2		gear	1	
1		gear	1	
NO	code	name	quantity	Specification



71	GB/T894.1	clip	1	58
70		ring dial	1	
69		sleeve	1	
68		coupling	1	
67		lifting crank	1	
66		flange	1	
65	GB/T276	deep groove ball bearing	1	6205
64		plug	1	
63	GB/T276	deep groove ball bearing	1	
62		flange	1	
61	GB/T297	taper roller bearing	1	30206
60		gear	1	
59		plug	1	
58	GB/T276	deep groove ball bearing	1	6005
57		gear	1	
56		spline shaft	1	
55	GB/T893.1	washer	3	65Mn
54		gear	1	
53	GB/T276	deep groove ball bearing	1	6005
52		plug	1	
51		cross hand wheel	1	
50		sleeve	1	
49		coupling	1	
48	GB/T893.1	ring dial	1	
47		flange	1	
46	GB/T297	taper roller bearing	1	30206
45		plug	1	
44		gear	1	
43	GB/T297	taper roller bearing	1	30206
42		sleeve	1	
41	GB/T894.1	clip	1	25
40		gear	1	
39	GB/T893.1	washer	2	52
38	GB/T276	deep groove ball bearing	1	6205
37		sleeve	1	
36		servo motor		QS130A100B15-4EL
35		lifting leadscrew	1	
34		motor mounting plate	1	
33		washer	1	
32		small synchronous pulley	1	
31		pulley	1	HTD-645-5M-30
30		lifting nut house	1	
29	GB/T775	slotted cylindrical and locking screw	2	M12×16
28		lifting nut	1	
27		large synchronous pulley	1	
26		washer	1	
25	GB/T276	deep groove ball bearing	1	6205
24		cross leadscrew	1	
23		bearing house	1	
22	GB/T276	deep groove ball bearing	1	6207
21	GB/T301	thrust ball bearing	2	51207
20		washer	1	
19		bevel gear	1	
18	GB/T812	round nut	1	M33×1.5
17		washer	1	
16		bevel gear	1	
15		sleeve	1	
14	GB/T276	deep groove ball bearing	1	6005
13		shaft	1	
12		spline shaft	1	
11		sleeve	1	
10	GB/T297	taper roller bearing	1	30206
9		gear	1	
8		gear	1	
7		sleeve	1	
6	GB/T276	deep groove ball bearing	1	6206
5		plug	1	
4	GB/T276	deep groove ball bearing	1	6204
3		gear	1	
2		shaft	1	
1		gear	1	
NO	code	name	quantity	Specification

14. Declaration of conformity

PWA HandelsgmbH
Nebingerstraße 7a A-4020 Linz - Austria
Tel.: +43 732 66 40 15 - Fax: +43 732 66 40 15-9
bernardo@pwa.at www.bernardo.at

EG - KONFORMITÄTSERKLÄRUNG

Declaration of Conformity

nach

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

according to

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

Hiermit erklären wir, dass die nachfolgend bezeichnete Maschinen aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung sämtlichen, grundlegenden Sicherheits- und Gesundheitsanforderungen folgender EG-Richtlinien entsprechen: 2006/42/EG, 2014/35/EU und 2014/30/EU. Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.

Hereby we declare that the following machines meet all essential health and safety requirements of the following EC Directives: 2006/42/EC, 2014/35/EU, 2014/30/EU. Any by us unauthorized changes of the machine cause losing of the declaration validity.

**Die Technische Dokumentation wird
verwaltet von:**

The technical documentation is managed by:

PWA HandelsgmbH
Nebingerstraße
A-4020 Linz

Bezeichnung der Maschine:

Product:

Universalfräsmaschine
Universal milling machine

Maschinentype/typen:

Type/Types:

UWF 150 Servo
UWF 150 V Servo

Baujahr:

Year of manufacture:

ab August 2018

Angewandte harmonisierte Normen:

Applied harmonized European standards:

EN ISO 12100: 2010
EN 13128:2001+A2:2009/AC:2010
EN 60204-1:2006+AC:2010
EN 61000-6-2:2005/AC:2005
EN 61000-6-4:2007/A1

Ort / Datum:

Linz, 08.08.2018

PWA HandelsgmbH
Nebingerstraße 7a, A-4020 Linz

Name und Funktion des zu Unterzeichnenden:

Name and Function of the Signatory:

Bernhard Pindeus, Geschäftsführer
Bernhard Pindeus, Manager



PWA Handelsges.m.b.H.
4020 Linz | Nebingerstraße 7a | Austria
phone: +43.732.66 40 15 | fax: +43.732.66 40 15-9
e-mail: bernardo@pwa.at | www.bernardo.at