



## Operating manual

Version 1.1.5

## Drilling-milling machine

**OPTI**mill®  
BF 30V





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## Preface

Dear customer,

Thank you very much for purchasing a product made by OPTIMUM.

OPTIMUM metal working machines offer a maximum of quality, technically optimum solutions and convince by an outstanding price performance ratio. Continuous enhancements and product innovations guarantee state-of-the-art products and safety at any time.

Before commissioning the machine please thoroughly read these operating instructions and get familiar with the machine. Please also make sure that all persons operating the machine have read and understood the operating instructions beforehand.

Keep these operating instructions in a safe place nearby the machine.

### Information

The operating instructions include indications for safety-relevant and proper installation, operation and maintenance of the machine. The continuous observance of all notes included in this manual guarantee the safety of persons and of the machine.

The manual determines the intended use of the machine and includes all necessary information for its economic operation as well as its long service life.

In the paragraph "Maintenance" all maintenance works and functional tests are described which the operator must perform in regular intervals.

The illustration and information included in the present manual can possibly deviate from the current state of construction of your machine. Being the manufacturer we are continuously seeking for improvements and renewal of the products. Therefore, changes might be performed without prior notice. The illustrations of the machine may be different from the illustrations in these instructions with regard to a few details. However, this does not have any influence on the operability of the machine.

Therefore, no claims may be derived from the indications and descriptions. Changes and errors are reserved!

Your suggestion with regard to these operating instructions are an important contribution to optimising our work which we offer to our customers. For any questions or suggestions for improvement, please do not hesitate to contact our service department.

**If you have any further questions after reading these operating instructions and you are not able to solve your problem with a help of these operating instructions, please contact your specialised dealer or directly the company OPTIMUM.**

Optimum Maschinen Germany GmbH

Dr.- Robert - Pflieger - Str. 26

D-96103 Hallstadt

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## 1 Safety

### Glossary of symbols

	gives further advice
	calls on you to act
	enumerations

This part of the operating instructions

- explains the meaning and use of the warning notices included in these operating instructions,
- defines the intended use of the drilling-milling machine,
- points out the dangers that might arise for you or others if these instructions are not observed,
- informs you about how to avoid dangers.

In addition to these operation instructions, please observe

- the applicable laws and regulations,
- the legal regulations for accident prevention,
- the prohibition, warning and mandatory signs as well as the warning labels on the drilling-milling machine.

**Always keep this documentation close to the drilling-milling machine.**

### INFORMATION

If you are unable to solve a problem using these operating instructions, please contact us for advice:



Optimum Maschinen Germany GmbH

Dr. Robert-Pfleger-Str. 26

D- 96103 Hallstadt

Email: [info@optimum-maschinen.de](mailto:info@optimum-maschinen.de)

### 1.1 Type plate

<p>DE Bohr-Fräsmaschine                  GB Drilling-milling machine                  ES Taladradora-Fresadora                  FR Fraiseuse                  IT Fresatrice                  CZ Vrtáčko frézka                  DK Boor-freesmachine                  FI Porajursin                  GR Φρεζοβραπανο                  HU Fűrő- marógép                  NL Boor-en freesmachine                  PL Wiertarko - frezarka                  PT Máquina de fresar e furar                  RO Mașină de găurit și frezat                  SL Stebni vrtnali stroj                  TR Freze Tezgahı</p>	<p><b>OPTIMUM</b><sup>®</sup>                  MASCHINEN - GERMANY</p> <p><b>BF 30 Vario</b></p> <p>Optimum Maschinen                  Germany GmbH                  Dr.-Robert-Pfleger-Str. 26                  D-96103 Hallstadt</p> <p><b>NO.</b> 333 8430 <b>NO.</b> 3100 U/min</p> <p><b>Power</b> 2,2 kW <b>SN</b> J</p> <p><b>Weight</b> 265 kg <b>Year</b> 20</p> <p><a href="http://www.optimum-maschinen.de">www.optimum-maschinen.de</a> </p>
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## 1.2 Safety instructions (warning notes)

### 1.2.1 Classification of hazards

We classify the safety warnings into various levels. The table below gives an overview of the classification of symbols (ideogram) and the warning signs for each specific danger and its (possible) consequences.

Ideogram	Warning alert	Definition / consequence
	<b>DANGER!</b>	Threatening danger that will cause serious injury or death to people.
	<b>WARNING!</b>	A danger that might cause severe injury to the staff or can lead to death.
	<b>CAUTION!</b>	Danger or unsafe procedure that might cause injury to people or damage to property.
	<b>ATTENTION!</b>	Situation that could cause damage to the drilling-milling machine and products and other types of damage. No risk of injury to people.
	<b>INFORMATION</b>	Application tips and other important or useful information and notes. No dangerous or harmful consequences for people or objects.

In case of specific dangers, we replace the pictogram by





## 1.2.2 Other pictograms



Activation forbidden!



Warning of flammable substances!



Warning of suspended loads!



Warning risk of stumbling!



Warning tilting danger!



Warning of automatic start-up!



Warning of biological hazard!



Read the operating instruction!



Pull the main plug!



Use safety glasses! protection



Use face shield!



Use protective boots!



Use protective suit!



Use ear protection!



Protect the environment!



Contact address

## 1.3 Intended use

### WARNING!

**In the event of improper use, the drilling-milling machine**

- **will endanger personnel,**
- **the drilling-milling machine and other material property of the operating company will be endangered,**
- **the correct function of the drilling-milling machine may be affected.**



The drilling-milling machine is designed and manufactured to be used for milling and drilling cold metals or other non-flammable materials or materials that do not constitute a health hazard by using commercial milling and drilling tools.

The drilling-milling machine must only be installed and operated in a dry and well-ventilated place.

If the drilling-milling machine is used in any way other than described above, modified without the approval of the company Optimum Maschinen Germany GmbH then the drilling-milling machine is being used improperly.

We will not be held liable for any damages resulting from any operation which is not in accordance with the intended use.

We expressly point out that the guarantee or CE conformity will expire due to any constructive technical or procedural changes which had not been performed by the company Optimum Maschinen Germany GmbH. It is also part of intended use that

- the maximum values for the drilling-milling machine are complied with,
- the operating manual is observed,
- the inspection and maintenance instructions are observed.

"Technical data" on page 17



## WARNING!

**Heaviest injuries through improper use.**

**It is forbidden to make any modifications or alterations to the operating values of the drilling-milling machine. These could endanger the staff and cause damage to the drilling-milling machine.**



## INFORMATION

The drilling-milling machine is built according to the standard DIN EN 55011 class A.



## WARNING!

**The class A (machine tools) is not intended to be used in residential facilities, where the power is supplied via a public low voltage supply system. In these areas it may possibly be difficult to guarantee electromagnetic compatibility due to lead bound as well as emitted interferences.**



## ATTENTION!

**If the drilling-milling machine is not used as intended or if the safety directives or the operating instructions are ignored the liability of the manufacturer for any damages to persons or objects resulting hereof is excluded and the claim under guarantee is becoming null and void!**



### 1.4 Reasonably foreseeable misuses

Any other use as the one determined under the "Intended use" or any use beyond the described use shall be deemed as not in conformity and is forbidden.

Any other use has to be discussed with the manufacturer.

It is only allowed to process metal, cold and non-inflammable materials with the milling-machine.

In order to avoid misuses it is necessary to read and understand the operating instructions before the first commissioning.

The operators must be qualified.

#### 1.4.1 Avoiding misuses

- Use of suitable cutting tools.
- Adapting the speed adjustment and feed to the material and workpiece.
- Clamp workpieces firmly and vibration-free.

#### For the drilling-milling machine there are conversion kits.

The attachments are provided as a kit to computer-controlled milling (CNC Computerized numerical control). However, the control of the step motors can also be done manually via a special controller (control, potentiometer). A step motor control is required in each case.

The BF30Vario must only be installed and operated in a dry and well-ventilated place.

The machine BF30Vario covered by the standard DIN EN 13128 (milling machines, including drilling machines). Therein, the manually controlled machines are divided into two classes with different protection levels, depending on the travel speed of a single power-driven axis. In addition, the requirements for automatically controlled machines listed (highest level of protection).

The one who changed the manually controlled BF30Vario on CNC control is legally the manufacturer of a new machine due to the significant change in the machine and is therefore responsible for compliance with the requirements of the Machinery Directive and the DIN EN 13128.





The tool follows a path of movement which is normally not predictable by the operator. Because of the additional hazards caused by flying parts the standard defines protective devices. It does not matter what speeds are available on the axes.

We expressly point out that the guarantee will expire due to any constructive technical or procedural changes which had not been performed by the company Optimum Maschinen Germany GmbH.

With the conversion of the machine BF30Vario an cabinet is required.

A suitable cabinet for these machines you can order:

- Cabinet SHC 3 for BF30Vario, item no. 353 9085

### ATTENTION!

**The workpiece is always to be fixed by a machine vice, jaw chuck or by another appropriate clamping tool such as for the clamping claws.**



### WARNING!

#### Risk of injury caused by workpieces flying off.

Clamp the workpiece in the machine vice. Make sure that the workpiece is firmly clamped in the machine vice resp. that the machine vice is firmly clamped on the machine table.

- Use cooling and lubricating agents to increase the durability of the tool and to improve the surface quality.
- Clamp the cutting tools and workpieces on clean clamping surfaces.
- Sufficiently lubricate the machine.
- Correctly adjust the bearing clearance and the guidings.

It is recommended:

- Insert the drill in a way that it is exactly positioned between the three clamping jaws of the quick action chuck.
- Clamp and mills by means of the collet chuck and the corresponding collets.
- Clamp end face mills by means of shell end mill arbors.

When drilling make sure that

- the suitable speed is set depending on the diameter of the drill,
- the pressure must only be such that the drill can cut without load
- in case of too strong pressure the drill will get worn early or even might break resp. get jammed in the hole. If the drill gets jammed immediately stop the main motor by pressing the emergency stop button,
- for hard materials, e.g. steel, use commercial cooling / lubricating agents,
- generally always drive the turning spindle out of the workpiece.

### ATTENTION!

**Do not use the quick action drill chuck for milling tools. Never clamp a milling cutter into the quick action drill chuck. Use a collet chuck and the corresponding collets for the end mill.**



When milling make sure that

- the corresponding cutting speed is selected,
  - for workpieces with normal strength values, e.g. steel 18-22 m/min,
  - for workpieces with high strength values 10-14 m/min,
  - the pressure is selected in a way that the cutting speed remains constant,
- for hard materials commercial cooling / lubricating agents are used.



## 1.5 Possible dangers caused by the drilling-milling machine

The drilling-milling machine was built using the latest technological advances.

Nonetheless there remains a residual risk, since the drilling-milling machine operates with

- at high speeds,
- with rotating parts and tools,
- with electrical voltages and currents.

We have used construction resources and safety techniques to minimize the health risk to persons resulting from these hazards.

If the drilling-milling machine is used and maintained by personnel who are not duly qualified, there may be a risk by the drilling-milling machine resulting from incorrect operation or unsuitable maintenance.

### INFORMATION

Everyone involved in the assembly, commissioning, operation and maintenance must

- be duly qualified,
- strictly follow these operating instructions.

Always disconnect the drilling-milling machine from the electrical power supply when performing cleaning or maintenance works.



### WARNING!

**The drilling-milling machine may only be used with functional safety devices.**

**Disconnect the drilling-milling machine immediately, whenever you detect a failure in the safety devices or when they are not fitted!**

**All additional devices installed by the operator have to be equipped with the prescribed safety devices.**

**This is your responsibility being the operating company!**

👉 "Safety devices" on page 12



## 1.6 Qualification of personnel

### 1.6.1 Target group

This manual is addressed to

- the operating companies,
- the users,
- the staff for maintenance works.

Therefore, the warning notes refer to both, operation and maintenance staff of the drilling-milling machine.

Disconnect the drilling-milling machine always from the electrical power supply. This will prevent it from being used by unauthorized staff.

The qualifications of the staff for the different tasks are mentioned below:

#### Operator

The operator is instructed by the operating company about the assigned tasks and possible risks in case of improper behaviour. Any tasks which need to be performed beyond the operation in the standard mode must only be performed by the operator if it is indicated in these instructions and if the operating company expressly commissioned the operator.





## Electrical specialist

Due to his professional training, knowledge and experience as well as his knowledge of respective standards and regulations the electrical specialist is able to perform works on the electrical system and to recognise and avoid any possible dangers himself.

The electrical specialist is specially trained for the working environment in which he is working and knows the relevant standards and regulations.

## Specialist staff

Due to their professional training, knowledge and experience as well as their knowledge of relevant regulations the specialist staff is able to perform the assigned tasks and to recognise and avoid any possible dangers themselves.

## Instructed persons

Instructed persons were instructed by the operating company about the assigned tasks and any possible risks in case of improper behaviour.

## INFORMATION

Everyone involved in the assembly, commissioning, operation and maintenance must

- be duly qualified,
- strictly follow these operating instructions.

In the event of improper use

- there may be a risk to the staff,
- there may be a risk to the drilling milling machine and other material values,
- the correct function of the drilling-milling machine may be affected.

## 1.7 Operator positions

The operator's position is in front of the drilling-milling machine.



Img.1-1: Operator positions

## 1.8 Safety measures during operation

### CAUTION!

**Risk due to inhaling of health hazardous dusts and mist.**

**Dependent on the material which need to be processed and the used auxiliaries dusts and mist may be caused which might impair you health.**

**Make sure that the generated health hazardous dusts and mist are safely sucked off at the point of origin and is dissipated or filtered from the working area. To do so, use a suitable extraction unit.**





## CAUTION!

**Risk of fire and explosion by using flammable materials or cooling lubricants.**

**Before processing inflammable materials (e.g. aluminium, magnesium) or using inflammable auxiliary materials (e.g. spirit) it is necessary to take additional preventive measures in order to safely avoid health risks.**



## 1.9 Safety devices

Use the drilling-milling machine only with properly functioning safety devices.

Stop the drilling-milling machine immediately if there is a failure on the safety device or if it is not functioning for any reason.

It is your responsibility!

If a safety device has been activated or has failed, the drilling-milling machine must only be used if you

- have removed the cause of the failure,
- have verified that there is no danger resulting for the staff or objects.

## WARNING!

**If you bypass, remove or deactivate a safety device in any other way, you are endangering yourself and other staff working with the drilling-milling machine. The possible consequences are**

- injuries due to components or parts of components flying off at high speed,
- contact with rotating parts,
- fatal electrocution.



The drilling-milling machine includes the following safety devices:

- an EMERGENCY-STOP button,
- a protective cover on the drilling / milling head.
- a separating protective device on the milling spindle,

## WARNING!

**The separating protective equipment which is made available and delivered together with the machine is designed to reduce the risk of workpieces or fractions of them which being expelled, but not to remove them completely. Always work carefully and observe the limit values of your chipping process.**



### 1.9.1 EMERGENCY STOP switch

The EMERGENCY STOP push button switches off the drilling-milling machine.

☞ "Switching on the drilling-milling machine" on page 28



Img.1-2: EMERGENCY STOP switch

## ATTENTION!

**The emergency stop push button stops the drilling-milling machine the moment it is activated.**





Activate the emergency stop impact switch only in case of danger! If this push button is actuated in order to switch off the drilling-milling machine in the standard operation the tool or workpiece might get damaged.

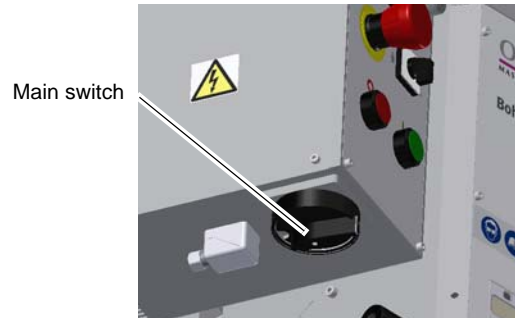
After having actuated the EMERGENCY STOP, turn the knob of the particular push button to the right in order to restart the machine.

## 1.9.2 Lockable main switch

In the position " 0 " the lockable main switch can be secured against accidental or non-authorized switching-on by means of a padlock.

When the main switch is switched-off, the current supply is interrupted.

Except for the areas marked by the pictogram in the margin.



Img. 1-3: Main switch

### WARNING!

Dangerous voltage even if the main switch is switched-off. In the areas marked by the ideogram in the margin, there might be voltage, even if the main switch is switched off.



## 1.9.3 Protective cover

The drilling / milling head is equipped with a protective cover.

### WARNING!

Only remove the protective cover when the mains plug of the drilling-milling machine is disconnected.



Img. 1-4: Protective cover





## 1.9.4 Separating protective equipment

Adjust the protective equipment to the correct height before you start working. To do so, detach the clamping screw, adjust the required height and re-tighten the clamping screw.

A switch is integrated in the fixture of the spindle protection which monitors that the cover is closed.

### INFORMATION

You cannot start the machine if the spindle protection is not closed.



Img. 1-5: Separating protective equipment

## 1.10 Safety check

Check the drilling-milling machine in regular intervals.

Check all safety devices

- before each operation,
- once a week (with the machine in operation),
- after every maintenance and repair work.

General check		
Equipment	Check	OK
Protective covers	Mounted, firmly bolted and not damaged	
Signs, Markings	Installed and legible	

Functional check		
Equipment	Check	OK
EMERGENCY STOP impact switch	When the EMERGENCY-STOP button is activated, the drilling-milling machine should switch off. Make sure that it is only possible to restart the machine if the EMERGENCY STOP push button is unlocked and the ON switch was activated.	
Separating safety device around the drilling and milling spindle	The drilling-milling machine may switch on only when the safety device is closed.	



### 1.11 Personnel protective equipment

For certain work personal protective equipment is required.

Protect your face and your eyes: Wear a safety helmet with facial protection when performing works where your face and eyes are exposed to hazards.



Use protective gloves when handling pieces with sharp edges.



Use safety shoes when you assemble, disassemble or transport heavy components.



Use ear protection if the noise level (emission) in the workplace exceeds 80 dB (A).

Before starting work make sure that the prescribed personnel protective equipment is available at the working place.



#### CAUTION!

**Dirty or contaminated personnel protective equipment can cause diseases. Clean it each time after use and once a week.**



### 1.12 For your own safety during operation

#### WARNING!

**Before activating the drilling-milling machine assure yourself that this will neither endanger other persons nor cause damage to equipment.**



Avoid any risky working practices:

- Make sure that nobody is endangered by your work.
- The instructions mentioned in these operating instructions have to be strictly observed during assembly, operation, maintenance and repair.
- Wear safety goggles.
- Switch off the drilling-milling machine before measuring the workpiece.
- Do not work on the drilling-milling machine, if your concentration is reduced, for example, because you are taking medication.
- Stay on the drilling-milling machine until the working spindle has come to a complete standstill.
- Use the prescribed personnel protective equipment. Make sure to wear a well-fitting work suit and, if necessary, a hairnet.
- Do not use protective gloves when drilling or milling.
- Disconnect the shock-proof plug from the outlet before replacing the tool.
- Use appropriate auxiliary materials to remove drilling and milling chips.
- Make sure that nobody is endangered by your work.
- Safely and firmly clamp the workpiece before switching on the drilling-milling machine.

We specially point out the specific dangers when working with and on the drilling-milling machine.



## 1.13 Switching-off and securing the drilling-milling machine

Switch off the drilling-milling machine with the main switch before starting any maintenance and repair works.



## 1.14 Using lifting equipment

### WARNING!

The use of unstable lifting and load suspension gear that might break under load can cause severe injuries or even death.

Check that the lifting equipment and load-suspension gears are of sufficient load capacity and are in perfect condition.

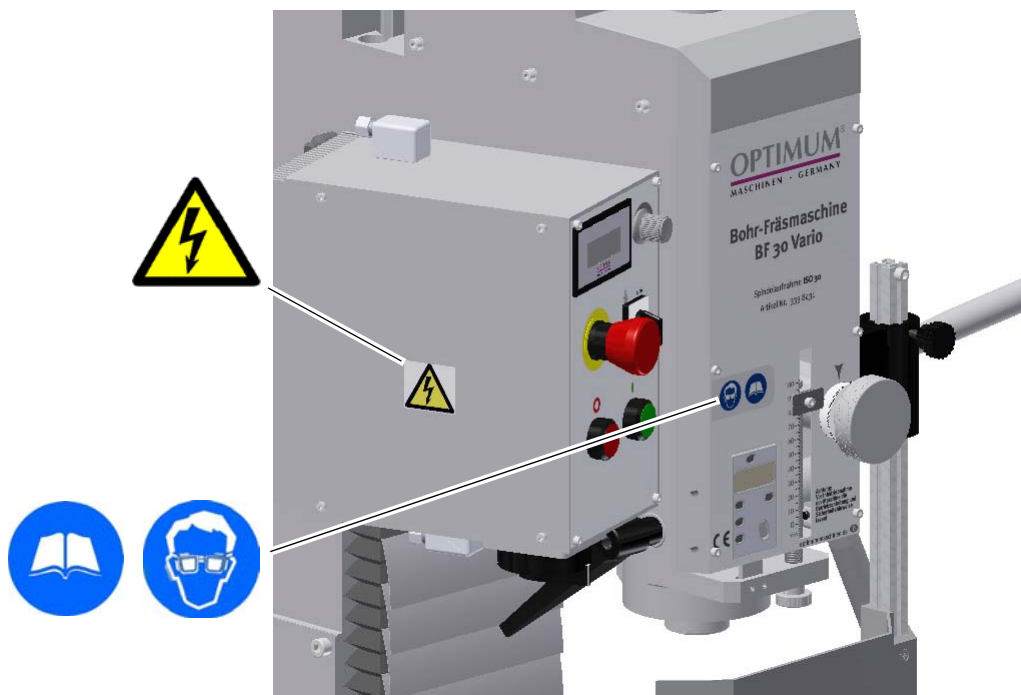
Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company.

Fasten the loads properly.

Never walk under suspended loads!



Positions of the signs on the drilling-milling machine



Img. 1-6: Drilling-milling machine





## 2 Technical data

The following information are the dimensions and indications of weight and the manufacturer's approved machine data..

<b>2.1 Electrical connection</b>		
Motor	230V / 50Hz / 2.2 kW	
<b>2.2 Drilling-milling capacity</b>		
Drilling capacity in steel [mm]	max. Ø 25	
Drilling capacity in cast [mm]	max. Ø 28	
Milling capacity end mill [mm]	max. Ø 30	
Milling capacity milling head [mm]	max. Ø 75	
Throat [mm]	220	
<b>2.3 Spindle seat</b>		
Spindle seat	MT3	ISO 30
Draw-in rod	M12	
Spindle sleeve stroke [mm]	90 mm	
<b>2.4 Drill-Mill head</b>		
Swivelling	+ / - 45°	
Reduction stages	3	
Travel of Z axis [mm]	470	
<b>2.5 Cross table</b>		
Table length [mm]	750	
Table width [mm]	210	
Travel of Y axis [mm]	200	
Travel of X axis [mm]	450	
T - slot size / number / distance [mm]	12 / 63	
max. load	150kg	
<b>2.6 Working area</b>		
Height [mm]	2100	
Depth [mm]	1900	
Width [mm]	2500	
<b>2.7 Speeds</b>		
Gear stage slow [min <sup>-1</sup> ]	80 - 963	
Gear stage average [min <sup>-1</sup> ]	135 - 1621	
Gear stage rapid [min <sup>-1</sup> ]	257 - 3100	



<b>2.8 Environmental conditions</b>	
Temperature	5-35 °C
Humidity	25 - 80%
<b>2.9 Operating material</b>	
Gear	filling quantity 1.2 litres Mobilgear 627, ISO VG 100 Viscosity 100 cSt at 40°C or a comparable oil
Bare steel parts	Mobilgrease OGL 007 or, Mobilux EP 004, acid-free oil, e.g. weapon oil, motor oil

## 2.10 Emissions

The emission of the drilling-milling machine is below 76 dB(A).

If the drilling-milling machine is installed in an area where various machines are in operation, the noise exposure (immission) on the operator of the drilling-milling machine at the working place may exceed 80dB(A).

### INFORMATION

This numerical value was measured on a new machine under proper operating conditions. Depending on the age respectively on the wear of the machine it is possible that the noise behaviour of the machine changes.

Furthermore, the factor of the noise emission is also depending on manufacturing influencing factors, e.g. speed, material and clamping conditions.



### INFORMATION

The mentioned numerical value is the emission level and not necessarily a safe working level.

Though there is a dependency between the degree of the noise emission and the degree of the noise disturbance it is not possible to use it reliably to determine if further precaution measures are required or not.

The following factors influence the actual degree of the noise exposure of the operator:

- Characteristics of the working area, e.g. size or damping behaviour,
- Other noise sources, e.g. the number of machines,
- Other processes taking place in the proximity and the period of time during which the operator is exposed to the noise.

Furthermore, it is possible that the admissible exposure level might be different from country to country due to national regulations.

This information about the noise emission shall allow the operator of the machine to more easily evaluate the endangering and risks.



### CAUTION!

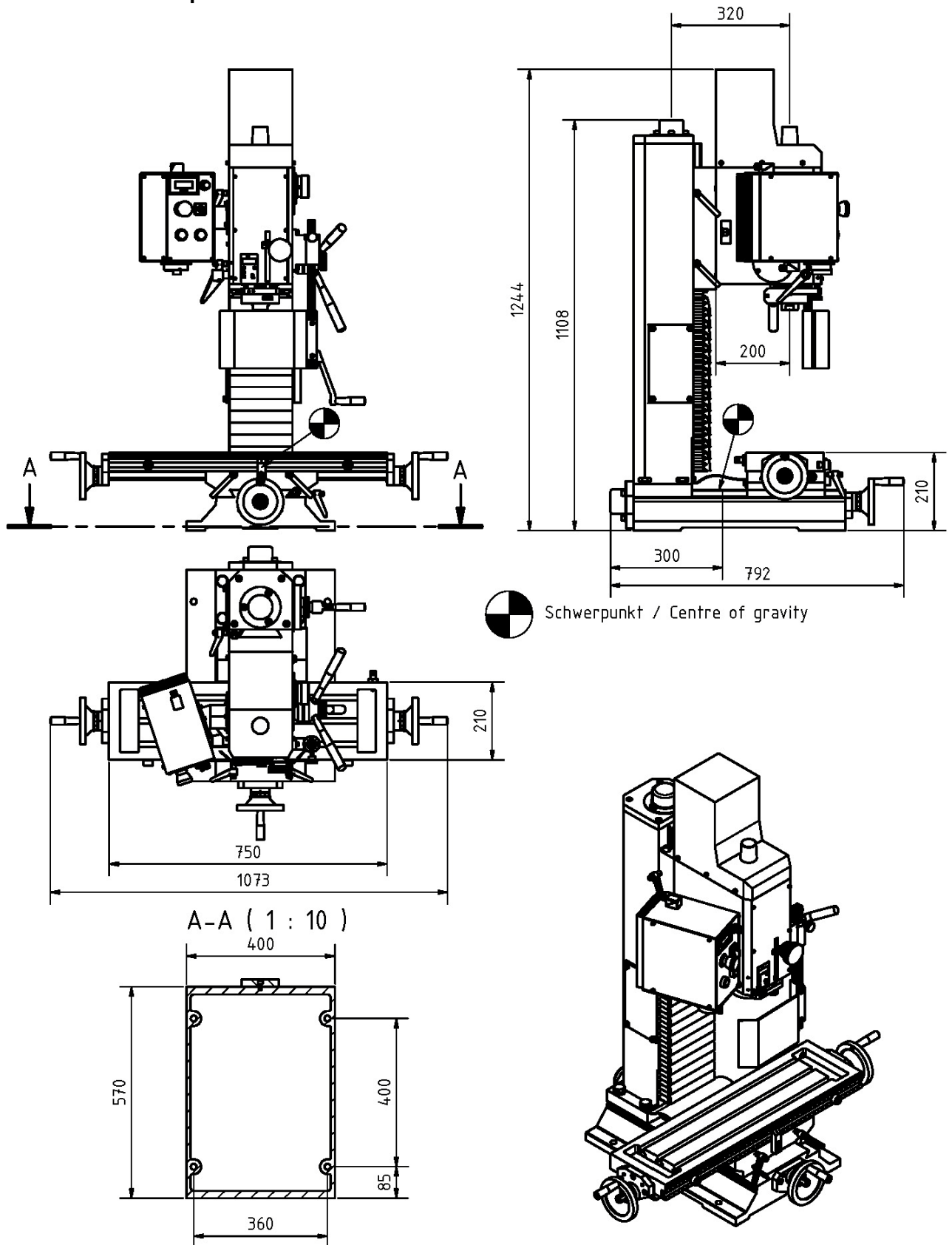
Depending on the overall noise exposure and the basic limit values the machine operators must wear an appropriate hearing protection.

We generally recommend to use a noise protection and a hearing protection.





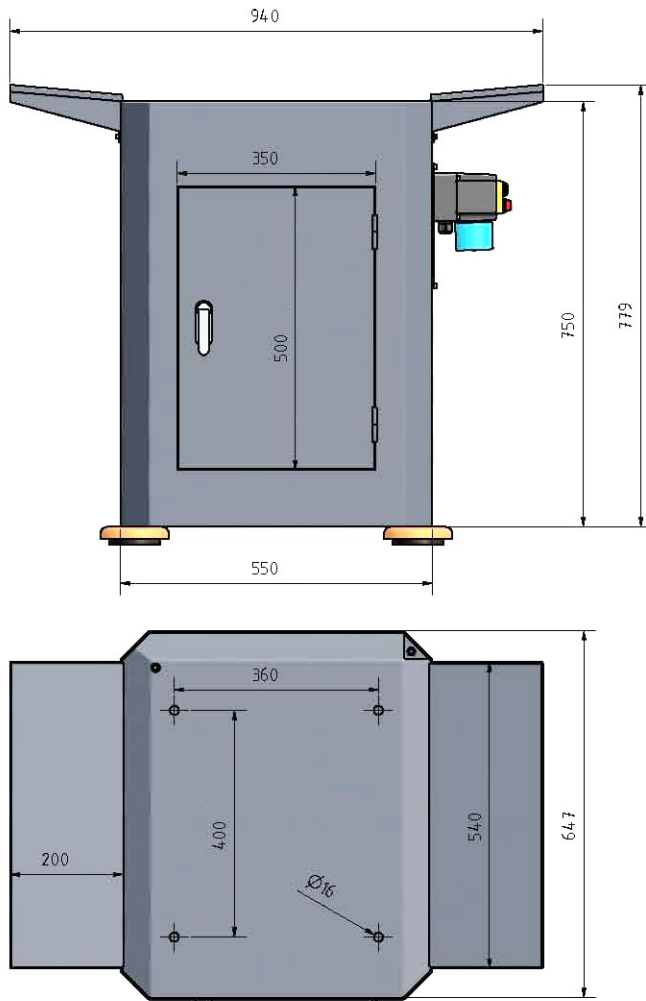
## 2.11 Installation plan BF30V



Img.2-1: Installation plan BF30V



## 2.12 Installation plan of optional substructure



Img.2-2: Installation plan of optional substructure



### 3 Unpacking and connecting

#### INFORMATION

The drilling-milling machine is pre assembled.



#### 3.1 Scope of delivery

Check immediately upon delivery of the drilling-milling machine if there are any transport damages or loosened fastening screws.

Compare the scope of delivery with the packing list.

#### 3.2 Transport

- Centres of gravity
- Load suspension points  
(Marking of the positions for the load suspension gear)
- Prescribed transportation position  
(Marking of the top surface)
- Means of transport to be used
- Weights



#### WARNING!

Severe or fatal injuries may occur if parts of the machine tumble or fall down from the forklift truck or from the transport vehicle. Follow the instructions and information on the transport case.



#### WARNING!

The use of unstable lifting and load suspension gear that might break under load can cause severe injuries or even death. Check that the lifting and load suspension gear has sufficient load capacity and that it is in perfect condition.



Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other competent supervisory authority, responsible for your company.

Fasten the loads properly.

Never walk under suspended loads!



## 3.3 Storage

### ATTENTION!

In case of wrong and improper storage electrical and mechanical machine components might get damaged and destroyed.

Store packed and unpacked parts only under the intended environmental conditions.

Follow the instructions and information on the transport case.



- Fragile goods  
(Goods require careful handling)



- Protect against moisture and humid environment  
☞ "Environmental conditions" on page 18.



- Prescribed position of the packing case  
(Marking of the top surface - arrows pointing to the top)



- Maximum stacking height

Example: not stackable - do not stack a second packing case on top of the first one.



Consult ☞ "Information" on page 5 if the drilling milling machine and accessories are stored for more than three months or are stored under different environmental conditions than those given here.

## 3.4 Installation and assembly

### 3.4.1 Requirements regarding the installation site

Organize the working area around the drilling-milling machine according to the local safety regulations.

### INFORMATION

In order to attain good functionality and a high processing accuracy as well as a long durability of the machine the installation site should fulfil certain criteria.



**Please observe the following points:**

- The device must only be installed and operated in a dry and well-ventilated place.
- Avoid places nearby machines generating chips or dust.
- The installation site must be free from vibrations also at a distance of presses, planing machines, etc.
- The substructure must be suitable for the drilling-milling machine. Also make sure that the floor has sufficient load bearing capacity and is level.
- The substructure must be prepared in a way that possibly used coolant cannot penetrate into the floor.



- Any parts sticking out such as stops, handles, etc. have to be secured by measures taken by the customer if necessary in order to avoid endangerment of persons.
- Provide sufficient space for the staff preparing and operating the machine and transporting the material.
- Also consider that the machine is accessible for setting and maintenance works.
- Provide for sufficient illumination (Minimum value: 500 lux, measured at the tool tip). At little intensity of illumination an additional illumination has to be ensured e.g. by means of a separate workplace lamp.

## INFORMATION

The mains plug of the drilling-milling machine must be freely accessible.



### 3.4.2 Load suspension point

#### WARNING!

Danger of crushing and overturning. Proceed carefully when lifting, installing and assembling the machine.



- Secure the load-suspension device around the drill-mill head. Use a lifting sling for this purpose.  
lifting sling.
- Firmly clamp all clamping levers on the drilling-milling machine before lifting the drilling-milling machine.
- Make sure that the load attachment does not cause damage to components or paint.

### 3.4.3 Assembly

- Check if the underground of the drilling-milling machine is level using a spirit level.
- Check if the underground is sufficiently stable and rigid. The total weight amounts to 265 kg.

#### ATTENTION!

**Insufficient rigidity of the foundation leads to the superposition of vibrations between the drilling-milling machine and the foundation (natural frequency of components). Critical speeds and moves in the axis with displeasing vibrations are rapidly achieved in case of insufficient rigidity of the whole system and will lead to bad milling results.**



- Place the drilling-milling machine on the provided underground.
- Fix the drilling-milling machine in the provided through-holes on the machine foot.

#### WARNING!

**The condition of the underground and the fixing type of the machine foot to the underground must be in a way that it can bear the loads of the drilling-milling machine. The substructure needs to be even. Check if the underground of the drilling-milling machine is level using a spirit level.**



Fix the drilling-milling machine to the substructure at the provided recesses at the stand. We recommend you to use shear connector cartridges resp. heavy-duty anchors.

- 🔗 "Installation plan BF30V" on page 19,
- 🔗 "Installation plan of optional substructure" on page 20

## 3.5 First commissioning

#### ATTENTION!

**Before commissioning the machine check all screws, fixtures resp. safety devices and tighten up the screws if necessary!**





## WARNING!

**Risk by using improper tool holders or operating them at inadmissible speeds.**

**Only use the tool holders (e.g. drill chuck) which were delivered with the machine or which are offered as optional equipment by OPTIMUM.**

**Only use tool holders in the intended admissible speed range.**

**It is only allowed to modify tool holding fixtures in compliance with the recommendations of**

**OPTIMUM or the manufacturer of the clamping device.**



## WARNING!

**When first commissioning the drilling-milling machine by inexperienced staff you endanger people and the machine.**

**We do not take any liability for damages caused by incorrectly performed commissioning.**

☞ "Qualification of personnel" on page 10



### 3.5.1 Power supply

#### CAUTION!

**Lay the connection cable of the machine so that a stumble of persons is prevented.**

→ Connect the electrical supply cable.

→ Check the fusing (fuse) of your electrical supply according to the technical instructions regarding the total connected power of the drilling-milling machine.



### 3.5.2 Cleaning and lubricating

→ Remove the anti-corrosive agents on the drilling-milling machine which had been applied for transportation and storage. Therefore, we recommend you to use paraffin.

→ Do not use any solvents, cellulose thinner or any other cleaning agents which might affect the coating of the drilling-milling machine when cleaning the machine. Observe the indications and notes of the manufacturer for cleaning agents.

→ Oil all blank machine parts using an acid-free lubricating oil.

→ Lubricate the drilling-milling machine according to the lubricating plan.

☞ "Inspection and maintenance" on page 38

→ Check if all spindles are running smoothly. The spindle nuts are re-adjustable.

→ Disassemble the V-ledges of the cross table and clean the ledges from the anti-corrosive agent. ☞ "V-ledges" on page 42

### 3.5.3 Filling in gear oil

The drilling-milling machine is delivered without oil filling. Fill in gear oil.

☞ "Oil change" on page 39





### 3.5.4 Warming up the machine



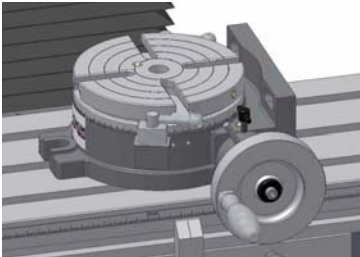
#### ATTENTION!

If the drilling-milling machine and in particular the milling spindle is immediately operated at maximum load when it is cold it may result in damages.

If the machine is cold such as e.g. directly after having transported the machine it should be warmed up at a spindle speed of only 500 1/min for the first 30 minutes.



### 3.6 Optionally available accessories

Designation	Item number
machine base Dimensions of packaging (L x W x H) 650 x 550 x 750	3338430404
	
Vice FMS 125	3355127
Hydraulic vice HMS 125	335 2044
Kit of parallel spacers 18 pcs	3354000
Universal coolant equipment 230 V	3352002
Universal coolant equipment 400 V	3352001
Levelling- damping element SE1	3381012
Levelling- damping element SE2	3381016
	
Milling cutter kit HSS 20 pcs	3386200
Collet chucks kit direct clamping MT 3	3352014
Draw-in collet chucks kit MT 3	3352050
Cutter head for copy and surface milling MT 3	3350213
Height-adjustable tailstock RST 1	3356155
Horizontal-vertical circular dividing table RT 150	3356150
	



## 4 Operation

### 4.1 Safety

Commission the drilling-milling machine only under the following conditions:

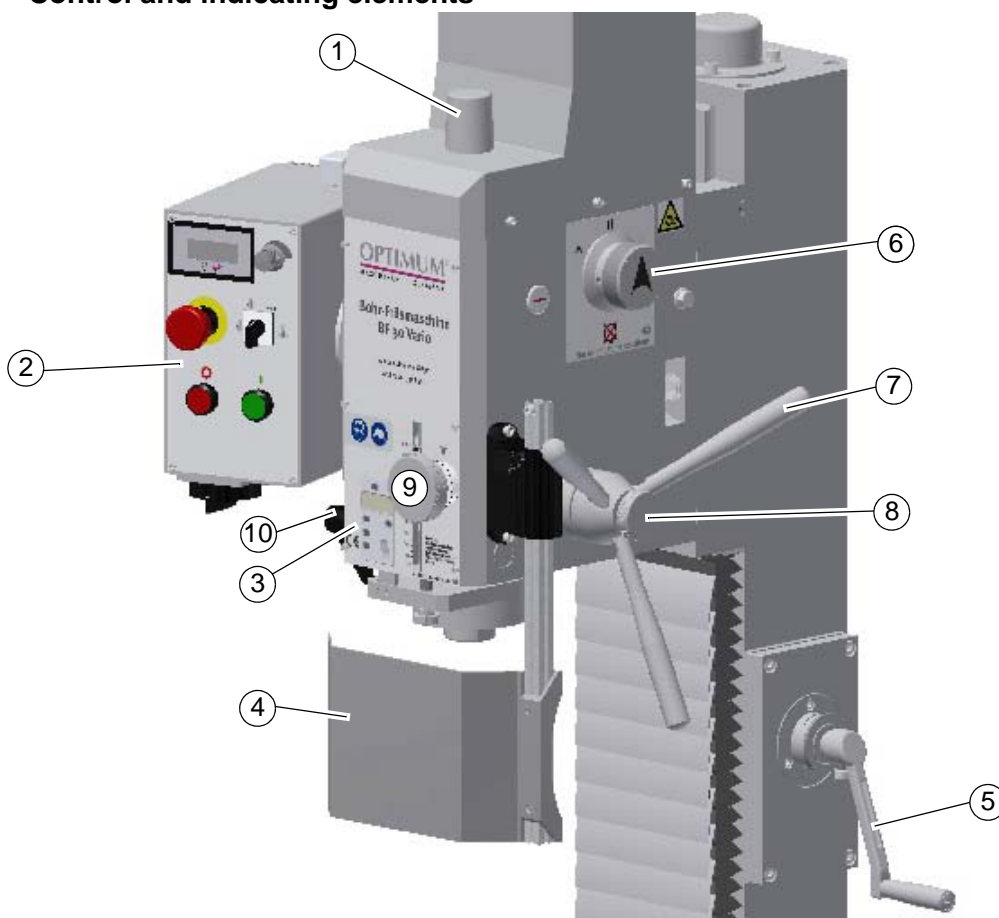
- The drilling-milling machine is in proper working order.
- The drilling-milling machine is used as intended.
- The operating manual is followed.
- All safety devices are installed and activated.

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



☞ "For your own safety during operation" on page 15

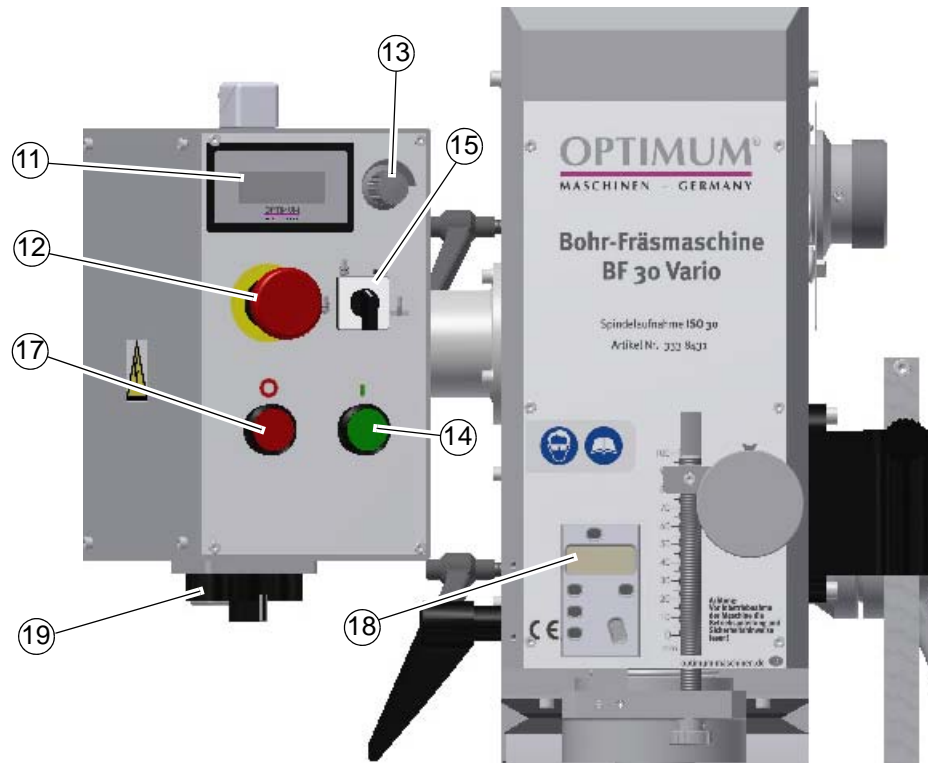
### 4.2 Control and indicating elements



Pos.	Designation	Pos.	Designation
1	Cover of draw-in rod	2	Control panel
3	Digital display fine crossfeed of spindle sleeve	4	Spindle protection
5	Crank for height adjustment of the drill-mill head	6	Selector switch for reduction stage
7	Star grip for spindle sleeve feed	8	Activation of the fine adjustment
9	Fine adjustment of spindle sleeve	10	Clamping lever for spindle sleeve



## 4.2.1 Control panel



Img.4-1: Control panel

Pos.	Designation	Pos.	Designation
10	Clamping screw of spindle sleeve	11	Digital display speed
12	EMERGENCY-STOP	13	Speed control
14	Push button spindle rotation "ON"	15	Selection switch operating mode <input type="radio"/> Automatic <input type="radio"/> Threading <input type="radio"/> turning direction
17	Push button spindle rotation "OFF"	18	Digital display fine crossfeed of spindle sleeve
19	Main switch		

### Selection switch for operating mode

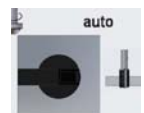
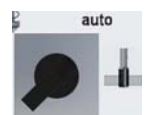
With the selector switch the operating mode „automatic, threading or right-hand respectively left-hand run“ is being selected.

### Operation mode automatic

In the automatic mode the engine starts up according to a predefined path over the drilling depth limit of the spindle sleeve and stop at the end position. This way for, the push button Start and Stop does not have to be actuated for repetitive drilling tasks.

### Operation mode thread cutting

In the thread cutting mode the engine automatically starts up according to a predefined path over the drilling depth stop and automatically changes the turning direction as soon as the predefined depth had been achieved. The screw-tap is drawn out of the workpiece.





## Rotation direction switch

Standard operation, selection left-handed or right-handed rotation.

## Potentiometer

Speed setting "VARIO"

## Push button ON

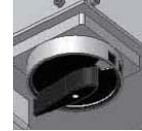
The push button "ON" switches on the rotation of the spindle.

## Push button OFF

The push button "OFF" switches off the rotation of the spindle.

## Main switch

Interrupts or connects the power supply.



## 4.3 Switching on the drilling-milling machine

- Switch on the main switch.
- Close the protective equipment.
- Select the operating mode.
- Select the gear level.
- Set the potentiometer to the lowest speed.
- Actuate the hand-actuated auxiliary switch Start.
- Set the required speed on the potentiometer.

### ATTENTION!

Wait until the drilling-milling machine has come to a complete halt before inverting the turning direction using the change-over switch.



### INFORMATION

At a cold drilling-milling machine it is possible that with switching on the machine an overload of the drive occur.

Therefore, allow the drilling-milling machine at low speeds depending on environmental conditions to warm up for 10 to 20 minutes before you go to maximum speed.

Also with a quick on and off, this overload occur. Therefore wait for about 3 seconds before you switch on the drilling-milling machine again, the capacitors in the controller must first discharged.



## 4.4 Switching off the drilling-milling machine

- Press the hand-actuated auxiliary switch Stop. For long-term standstill switch the milling machine off with the main switch.



## 4.5 Inserting a tool

### 4.5.1 Installation

#### CAUTION!

When milling operations are performed the cone seat must always be fixed to the draw-in rod. All cone connections with the taper bore of the work spindle without using the draw-in rod is not allowed for milling operations. The cone connection should be released by the lateral pressure. Injuries may be caused by parts flying off.



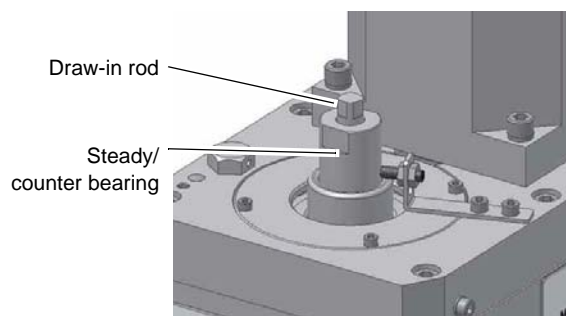
The milling head is equipped with a draw-in rod M12.

- Remove the cap.
- Clean the seat in the spindle / quill.
- Clean the taper of your tool.
- Insert the tool in the spindle / quill.



Img.4-2: Drilling and milling head

- Screw the draw-in bar in the tool.
- Tighten the tool with the draw-in rod and hold the spindle on the counter bearing by means of a wrench.



Img.4-3: Drilling-milling head without cap

### 4.5.2 Unfitting

- Hold the spindle counter bearing with a wrench and loosen the draw-in rod. Continue turning the draw -in rod, so that the tool is squeezed out from the conical collet.

#### ATTENTION!

When using an MT spindle.

When installing a cold morse taper into a heated-up machine those MT seats tend to shrink on the morse taper contrary to the quick-releaser tapers.



### 4.5.3 Use of collet chucks

When using collet chucks for the reception of milling tools, a higher operation tolerance can be achieved. The exchange of the collet chucks for a smaller or larger end mill cutter is performed simply and rapidly and it is not necessary to disassemble the complete tool. The collet chuck is pressed into the ring of the swivel nut and must rest there by itself. The milling cutter is clamped by fastening the swivel nut on the tool.

Make sure that the correct collet chuck is used for each milling cutter diameter, so that the milling cutter may be fastened securely and firmly.

☞ "Optionally available accessories" on page 25



## 4.6 Clamping the workpieces

### CAUTION!

Injury by flying off parts.

The workpiece is always to be fixed by a machine vice, jaw chuck or by another appropriate clamping tool such as for the clamping claws.



## 4.7 Changing the speed range

### ATTENTION!

Wait until the drilling-milling machine has come to a complete halt, before performing any changes on the gear switch.

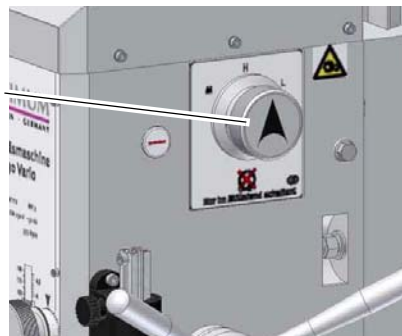


→ Select gear level

- H = rapid
- M = middle
- L = low

→ Adjust the speed with the potentiometer. The speed and thus the cutting speed depends on the material of the workpiece, the milling cutter diameter and the cutter type.

Selector switch  
Gear stage



Img.4-4: Drill-Mill head

## 4.8 Selecting the speed

The correct speed is an important factor for milling. The speed determines the cutting speed by which the cutting edges cut the material. By selecting the correct cutting speed, the service life of the tool is increased and the working result is optimized.

The optimum cutting speed mainly depends on the material and on the material of the tool. With tools (milling cutters) made of hard metal or ceramic insert it is possible to work with higher speeds than with tools made of high-alloy high speed steel (HSS). You will achieve the correct cutting speed by selecting the correct speed.

In order to determine the correct cutting speed for your tool and for the material to be cut you may refer to the following standard values or a table reference book (e.g. Tabellenbuch Metall, Europa Lehrmittel, ISBN 3808517220).

The required speed is calculated as follows:

$$n = \frac{V}{\pi \times d}$$

n = speed in  $\text{min}^{-1}$  (revolutions per minute)

V = cutting speed in m/min (meter per minute)

d = tool diameter in m (Meter)



## 4.8.1 Standard values for cutting speeds

[ m/min ] with high-speed steel and hard metal in upcut milling

Tool	Steel	Grey cast iron	Al alloy age-hardened
Plain mill and side milling cutters [ m/min ]	10 - 25	10 - 22	150 - 350
Relieved form cutters [ m/min ]	15 - 24	10 - 20	150 - 250
Inserted -tooth cutter with SS [ m/min ]	15 - 30	12 - 25	200 - 300
Inserted-tooth cutter with HM [ m/min ]	100 - 200	30 - 100	300 - 400

The results are the following standard values for speeds in dependence of the milling cutter diameter, cutter type and material.

Tool diameter [ mm ] Peripheral and side milling cutters	Steel 10 - 25 m/min	Grey cast iron 10 - 22 m/min	Al alloy cured 150 - 350 m/min
	Speed [ min <sup>-1</sup> ]		
35	91 - 227	91 - 200	1365 - 3185
40	80 - 199	80 - 175	1195 - 2790
45	71 - 177	71 - 156	1062 - 2470
50	64 - 159	64 - 140	955 - 2230
55	58 - 145	58 - 127	870 - 2027
60	53 - 133	53 - 117	795 - 1860
65	49 - 122	49 - 108	735 - 1715

Tool diameter [ mm ] form cutters	Steel 15 - 24 m/min	Grey cast iron 10 - 20 m/min	Al alloy cured 150 - 250 m/min
	Speed [ min <sup>-1</sup> ]		
4	1194 - 1911	796 - 1592	11900 - 19000
5	955 - 1529	637 - 1274	9550 - 15900
6	796 - 1274	531 - 1062	7900 - 13200
8	597 - 955	398 - 796	5900 - 9900
10	478 - 764	318 - 637	4700 - 7900
12	398 - 637	265 - 531	3900 - 6600
14	341 - 546	227 - 455	3400 - 5600
16	299 - 478	199 - 398	2900 - 4900



## 4.8.2 Standard values for speeds with HSS – Eco – twist drilling

Material	Drill diameter										Cooling 3)
		2	3	4	5	6	7	8	9	10	
Steel, unalloyed, up to 600 N/mm <sup>2</sup>	n <sup>1)</sup>	5600	3550	2800	2240	2000	1600	1400	1250	1120	E
	f <sup>2)</sup>	0.04	0.063	0.08	0.10	0.125	0.125	0.16	0.16	0.20	
Structural steel, alloyed, quenched and subsequently drawn, up to 900N/mm <sup>2</sup>	n	3150	2000	1600	1250	1000	900	800	710	630	E/oil
	f	0.032	0.05	0.063	0.08	0.10	0.10	0.125	0.125	0.16	
Structural steel, alloyed, quenched and subsequently drawn, up to 1200 N/mm <sup>2</sup>	n	2500	1600	1250	1000	800	710	630	560	500	Oil
	f"	0.032	0.04	0.05	0.063	0.08	0.10	0.10	0.125	0.125	
Stainless steels up to 900 N/ mm <sup>2</sup> e.g. X5CrNi18 10	n	2000	1250	1000	800	630	500	500	400	400	Oil
	f	0.032	0.05	0.063	0.08	0.10	0.10	0.125	0.125	0.16	

1): Speed [ n ] in r/min  
2): Feed [ f ] in mm/r  
3): Cooling: E = Emulsion; oil = cutting oil

- The above mentioned indications are standard values. In some cases it may be advantageous to increase or decrease these values.
- When drilling a cooling or lubricating agent should be used.
- For stainless materials (e.g. VA – or NIRO steel sheets) do not center as the material would compact and the drill bit will become rapidly blunt.
- The workpieces need to be tensed in flexibly and stably (vice, screw clamp).

### INFORMATION

High temperatures are generated at the tip of the tool by the occurring friction heat. The tool should be cooled during the milling process. Cooling the tool with a suitable cooling lubricant ensures better working results and a longer edge life of the cutting tool.



### INFORMATION

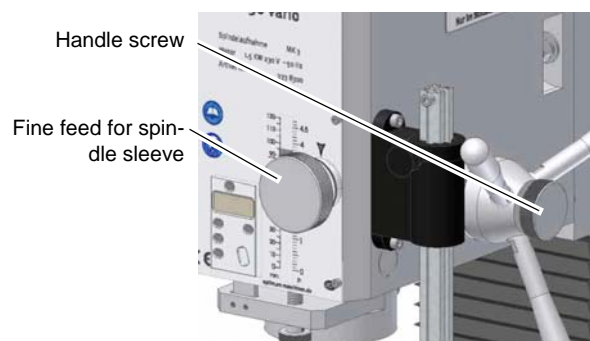
Use a water-soluble and non-pollutant emulsion as a cooling agent. This can be acquired from authorised distributors.

Make sure that the cooling agent is properly retrieved. Respect the environment when disposing of any lubricants and coolants. Follow the manufacturer's disposal instructions.



## 4.9 Manual spindle sleeve feed with the fine feed

- ➔ Turn the handle screw.  
The spindle sleeve lever moves in direction of the drilling-milling head and activates the coupling of the fine feed.
- ➔ Turn the spindle sleeve fine feed in order to move the spindle sleeve.



Img.4-5: Handle screw





## 4.10 Manual spindle sleeve feed with the spindle sleeve lever

### ATTENTION!

The clutch of the fine feed has to be disengaged before the spindle sleeve lever can be used. Activating the spindle sleeve lever when the fine feed is engaged may damage the clutch.

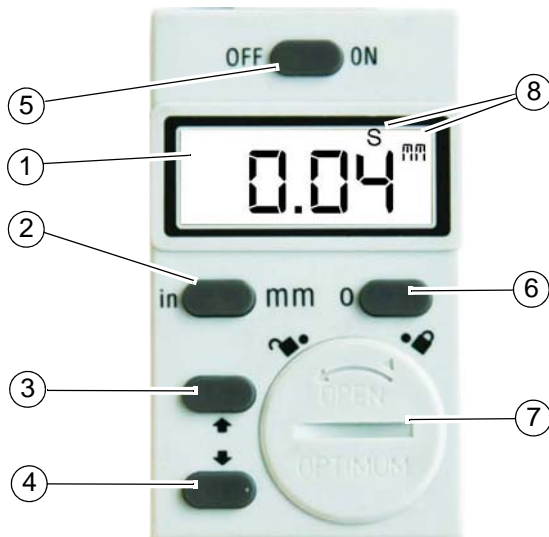


Loosen the handle screw (img.4-5: "Handle screw" on page 32.

The sleeve lever moves away from the drilling head and deactivates the coupler of the fine feed.

## 4.11 Digital display for spindle sleeve travel

Measuring range	0 - 999.99mm 0 - 39.371"inch
Reading precision	0.01mm 0.0004"inch
Power supply	round cell CR2032 , 3 V 20 x 3,2mm



Pos.	Designation
1	LCD display
2	Shifting mm/inch
3	Performs a value increase in operating mode "S" (Setting)
4	Performs a value decrease in operating mode "S" (Setting)
5	ON/OFF switch
6	Zero position and activation of operation mode "S"
7	Battery bay
8	Display of operation mode "S" and selected unit "mm / inch"

### Operation mode "S"

The operation mode "S" is used to enter and to compensate the mechanical play (backlash) of quill mechanism.

- (1) Display which shows the operating modes "S", "inch" or "mm"



- (2) converts the measuring unit from *millimetres* to *inches* and vice versa.
- (3) ↑ , Value increase in operation mode "S"
- (4) ↓ , Value decrease in operation mode "S"
- (5) Switches the display ON or OFF.
- Resets the display to the set compensation value "S".

### Enter the offset value of the quill mechanism

- ➔ Press the button (6) for about 2-3 seconds. The operation mode (8) "S" is activated and displayed.
- ➔ Enter the offset value of a quill mechanism, based on your experience with the keys (3) or (4).
- ➔ Stop the operation mode "S" by pressing the button (6) again.

### INFORMATION



Before inserting the new battery, wait about 30 seconds. Please make sure, that the contacts are metallicly bright and free from coverings which result from bleeding or gassing batteries. Grip the new batteries only with plastic forceps, if possible not with the hand due to the formation of oxide and never with metal forceps in order to avoid a short circuit. In most cases the round cell will be inserted into the digital display with the marking upside. After inserting the round cell, the battery compartment has to be closed again.

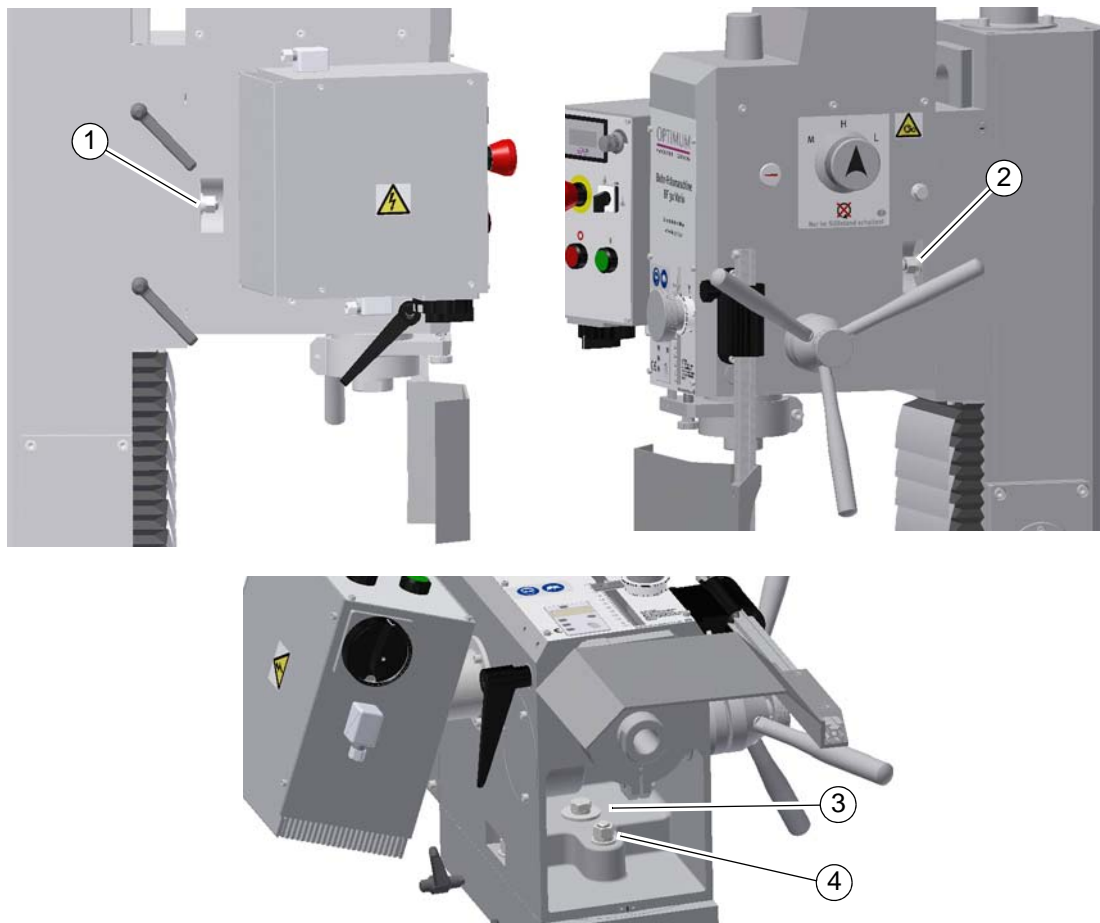
### 4.11.1 Malfunctions

Malfunction	Cause / possible effects	Solution
Flashing of the display	<ul style="list-style-type: none"><li>• Voltage too low</li></ul>	<ul style="list-style-type: none"><li>• Change battery</li></ul>
Screen doesn't refresh	<ul style="list-style-type: none"><li>• Operation mode "S" is active</li><li>• Disturbance in the circuit</li></ul>	<ul style="list-style-type: none"><li>• Disable the operation mode "S".</li><li>• Remove the battery, wait 30 seconds and reinsert the battery.</li></ul>
No data visible	<ul style="list-style-type: none"><li>• No power supply</li><li>• Battery voltage less than 3V</li></ul>	<ul style="list-style-type: none"><li>• Clean battery contacts</li><li>• Replace battery</li></ul>



## 4.12 Swivelling the drill-mill head

The drill-mill head may be swivelled 45° to the right and to the left. Four screwings need to be loosened.



Img.4-6: Clamping screws

### ATTENTION!

The drill-mill head can be rotated much further. When slewing it further on gear oil might escape.



### CAUTION!

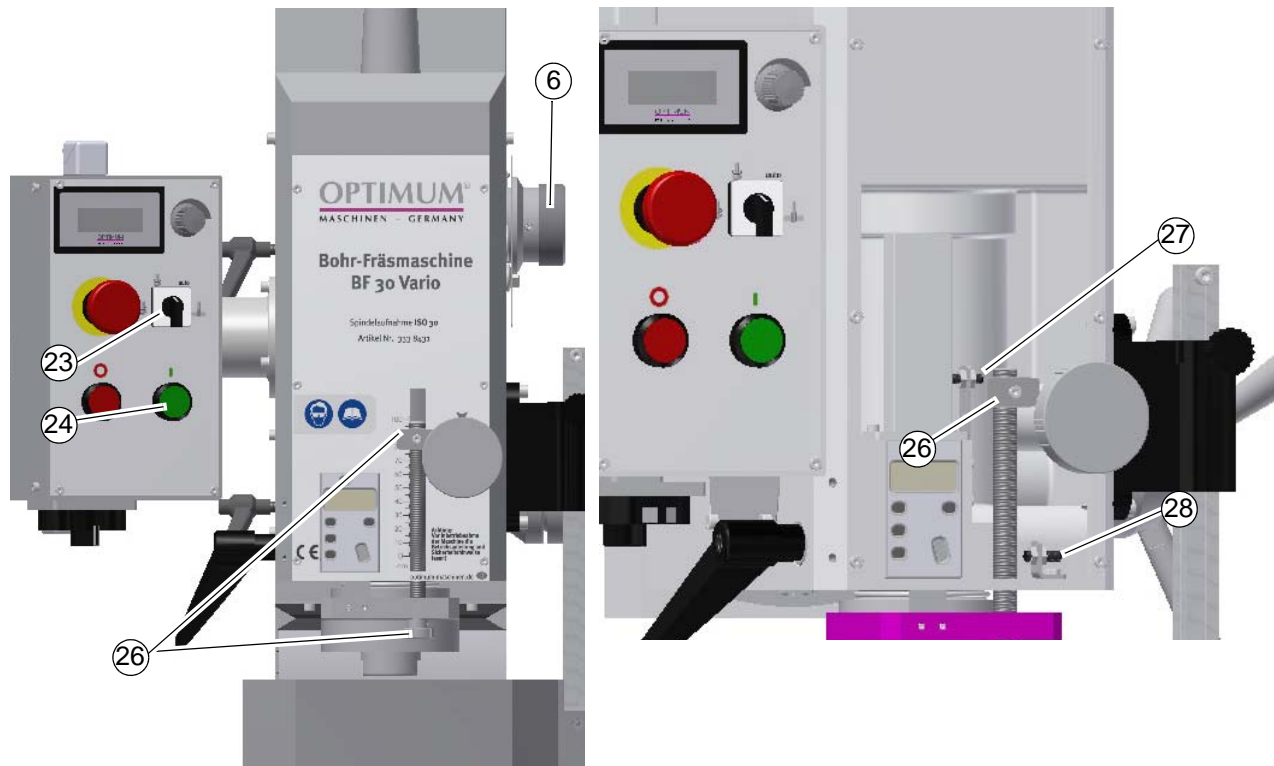
If the screws are completely unfastened, the drilling-milling head might fall down.

When slewing the working head, only unfasten the screws as far as necessary to be able to perform the settings. After having set the slewing angle, retighten the fixing screws.





## 4.13 Threading



Img.4-7: Operation mode thread cutting

Pos.	Designation	Pos.	Designation
6	Selector switch for reduction stage	20	Speed control
23	Selection switch operating mode ○ automatic ○ threading ○ turning direction	24	Push button spindle rotation "ON"
26	Depth stop	27	Adjustable stop cycle end
28	End position switch turning direction reversal		

- ➔ Set the selection switch mode (23) to "threading" or "automatic".
- ➔ Set the depth stop (26) to the desired depth.
- ➔ Select the smallest speed.
- ➔ Close spindle protection system.
- ➔ Start the rotation of spindle (24).
- ➔ Move the sleeve downward with the sleeve lever until the machine tap cams in the work-piece.

The machine tap turns into the workpiece. As soon as the preset depth is attained, the spindle reverses the direction of rotation at the switch point (28). The machine tap turns out of the work-piece. When the spindle sleeve is completely entered up to the switch point (27) in operation mode "automatic" the rotation of the spindle is stopped. Then it is possible to proceed another threading operation.

### ATTENTION!

The spindle sleeve must be completely retracted in order to trigger the switch point (27).





## 5 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repair

of the drilling-milling machine.

### ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

- operational safety,
- failure-free operation,
- long service life of the drilling-milling machine and
- the quality of the products which you manufacture.

Installations and equipment from other manufacturers must also be in good order and condition.



### 5.1 Safety

#### WARNING!

The consequences of incorrect maintenance and repair work may include:

- very serious injury to personnel working on the drilling-milling machine,
- damage to the drilling-milling machine.

Only qualified staff should carry out maintenance and repair work on the drilling-milling machine.



#### 5.1.1 Preparation

##### WARNING!

Only carry out work on the drilling-milling machine if it has been disconnected from the mains power supply.

☞ "Switching-off and securing the drilling-milling machine" on page 16

Attach a warning sign.



#### 5.1.2 Restarting

Before restarting run a safety check.

☞ "Safety check" on page 14

##### WARNING!


Before starting the drilling-milling machine, you must check that there is no danger for persons and that the drilling-milling machine is not damaged.



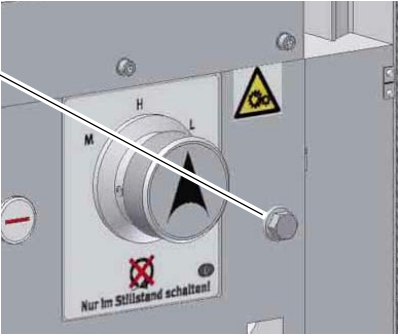
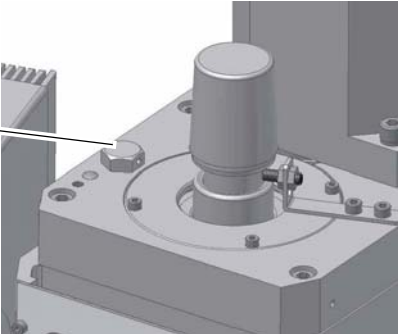


## 5.2 Inspection and maintenance


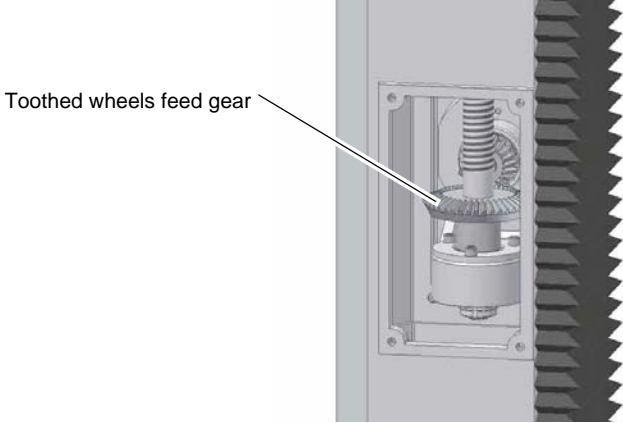
The type and level of wear depends to a large extent on the individual usage and operating conditions. For this reason, all the intervals are only valid for the authorised conditions.

Interval	Where?	What?	How?
Start of work, after every maintenance or repair work	Drilling-milling machine		→ ☞ "Safety check" on page 14
Start of work, after every maintenance or repair work	Dovetail guides	Oiling	→ Lubricate all slideways.
Every week	Cross table	Oiling	→ Oil all bare steel surfaces. Use an acid-free oil, e.g. weapon oil or motor oil.
Every week	Gear milling head	Oil level	<p>→ Check the oil level of the gear. The oil level must be in the middle of the view glass.</p>  <p>Img.5-1: Oil sight glass speed gear</p>



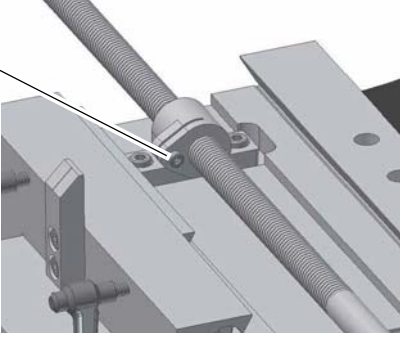
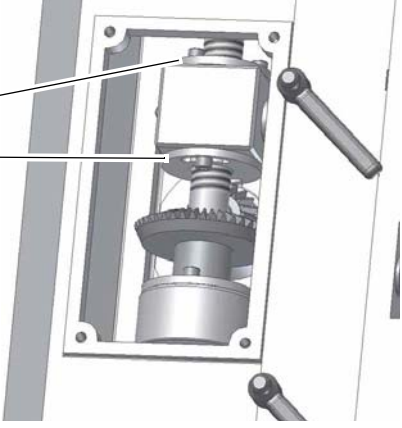
Interval	Where?	What?	How?
<p>First after 200 operating hours, then every 2000 operating hours</p>	<p>Gear milling head</p>	<p>Oil change</p>	<ul style="list-style-type: none"> <li>➔ For oil change use an appropriate collecting tray of sufficient capacity.</li> <li>➔ Have the drilling-milling machine run for a few minutes, the oil will heat up and will slightly penetrate from the opening.</li> <li>➔ Remove the ventilation screw from the gear.</li> <li>➔ Remove the oil drain plug.</li> <li>➔ Refill the oil over the removed ventilation screw.</li> </ul> <p>Quantity and type of oil → "Operating material" on page 18</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Oil drain plug</p> </div> <div style="text-align: center;">  <p>Ventilation screw of the gear</p> </div> </div> <p>Img.5-2: Milling head</p>



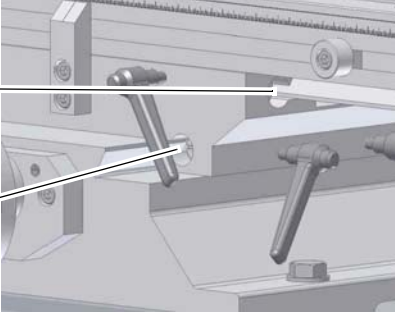


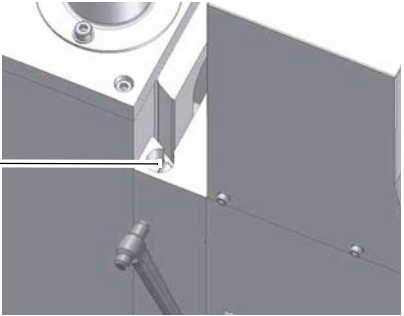
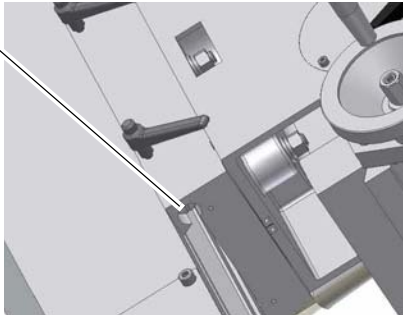
Interval	Where?	What?	How?
<p>Every week</p>	<p>Drilling-milling machine</p>	<p>Oiling</p>	<p>→ Lubricate all slideways.</p>  <p>Slideways X axis</p> <p>Slideways Y axis</p> <p>Slideways Z axis</p> <p>Img.5-3: Slideways</p>
<p>Every six months</p>	<p>Adjustment Z axis</p>	<p>Lubricating</p>	<p>→ Clamp the milling head.                      → Remove the service cover from the column.                      → Lubricate the gearwheels.</p>  <p>Toothed wheels feed gear</p> <p>Img.5-4: Adjustment Z axis</p>





Interval	Where?	What?	How?
As required	<b>Spindle nut cross table</b>	Readjusting	<p>An extended clearance in the spindles of the cross table can be reduced by readjusting the spindle nuts.</p>  <p style="text-align: center;">Spindle nut adjusting screw</p> <p style="text-align: center;">Img. 5-5: Spindle nut X - axis (milling table faded out)</p> <p>The spindle nuts are readjusted by reducing the thread flanks of the spindle nut by means of a regulating screw. Due to the readjustment it is necessary to check if a smooth movement over the whole travel is still given, otherwise the wear is considerably increased due to the friction between the spindle nut and the spindle.</p> <p>The regulating screw of the spindle nut of the Y axis is accessible from the rear side, the regulating screw of the spindle nut of the x axis is accessible from the right or left side of the milling table.</p>
As required	<b>Spindle nut Z-axis</b>	Readjusting	<p>An enlarged clearance in the spindle of the Z-axis can be performed by reciprocal turning of the spindle nut.</p>  <p style="text-align: center;">Spindle nut firm at the top Spindle nut turnable at the bottom</p> <p style="text-align: center;">Img. 5-6: Spindle nuts Z-axis</p> <p>Due to the readjustment it is necessary to check if a smooth movement over the whole travel is still given, otherwise the wear is considerably increased due to the friction between the spindle nut and the spindle.</p> <ul style="list-style-type: none"> <li>➔ Turn the crank of the drilling-milling head as low as possible.</li> <li>➔ Firmly clamp the clamping lever left and right.</li> <li>➔ Remove the service cover from the column.</li> </ul>



Interval	Where?	What?	How?
As required	<b>V-ledges</b>	Readjusting X and Y axis	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="margin-right: 10px;">Cross table</div>  </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="margin-right: 10px;">Regulating screw V-ledge X axis right side</div>  </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Regulating screw V-ledge Y axis front</div>  </div> </div> <p style="text-align: center; margin-bottom: 10px;">Img.5-7: Cross table</p> <ul style="list-style-type: none"> <li>➔ Turn the adjusting screw of the respective taper gib front and rear, or left and right in the clockwise direction. The taper gib is continued to push in and reduced by it the gap in the guide way.</li> <li>➔ Check the settings. The respective guide way must be still easily mobile from the adjustment, result in however a stable guidance.</li> </ul>
As required	<b>V-ledges</b>	Readjusting Z axis:	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="margin-right: 10px;">Regulating screw V-ledge Z-axis top</div>  </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Regulating screw V-ledge Z-axis bottom</div>  </div> </div> <p style="text-align: center; margin-bottom: 10px;">Img.5-8: Column and mill head</p> <ul style="list-style-type: none"> <li>➔ Proceed as described under "Readjusting X and Y axis".</li> </ul>

## INFORMATION

The spindle bearing is lifetime-lubricated. It is not necessary to lubricate it again.





## 5.3 Repair

### 5.3.1 Customer service technician

Request the assistance of an authorised customer service technician for any repair work. Contact your specialist dealer if you do not have the contact details for the customer service team or contact Stürmer Maschinen GmbH in Germany who can provide you with the contact information for a specialist dealer. Optionally, the

Stürmer Maschinen GmbH

Dr.-Robert-Pfleger-Str. 26

D- 96103 Hallstadt

can provide a customer service technician, however, the request for a customer service technician can only be made via your specialist dealer.

If the repairs are carried out by qualified technical personnel, they must follow the indications given in these operating instructions.

Optimum Maschinen Germany GmbH accepts no liability nor does it guarantee against damage and operating malfunctions resulting from failure to observe these operating instructions.

For repairs only use

- faultless and suitable tools,
- original parts or series components expressly authorized by Optimum Maschinen Germany GmbH.





## 6 Ersatzteile - Spare parts

### 6.1 Säule - Column

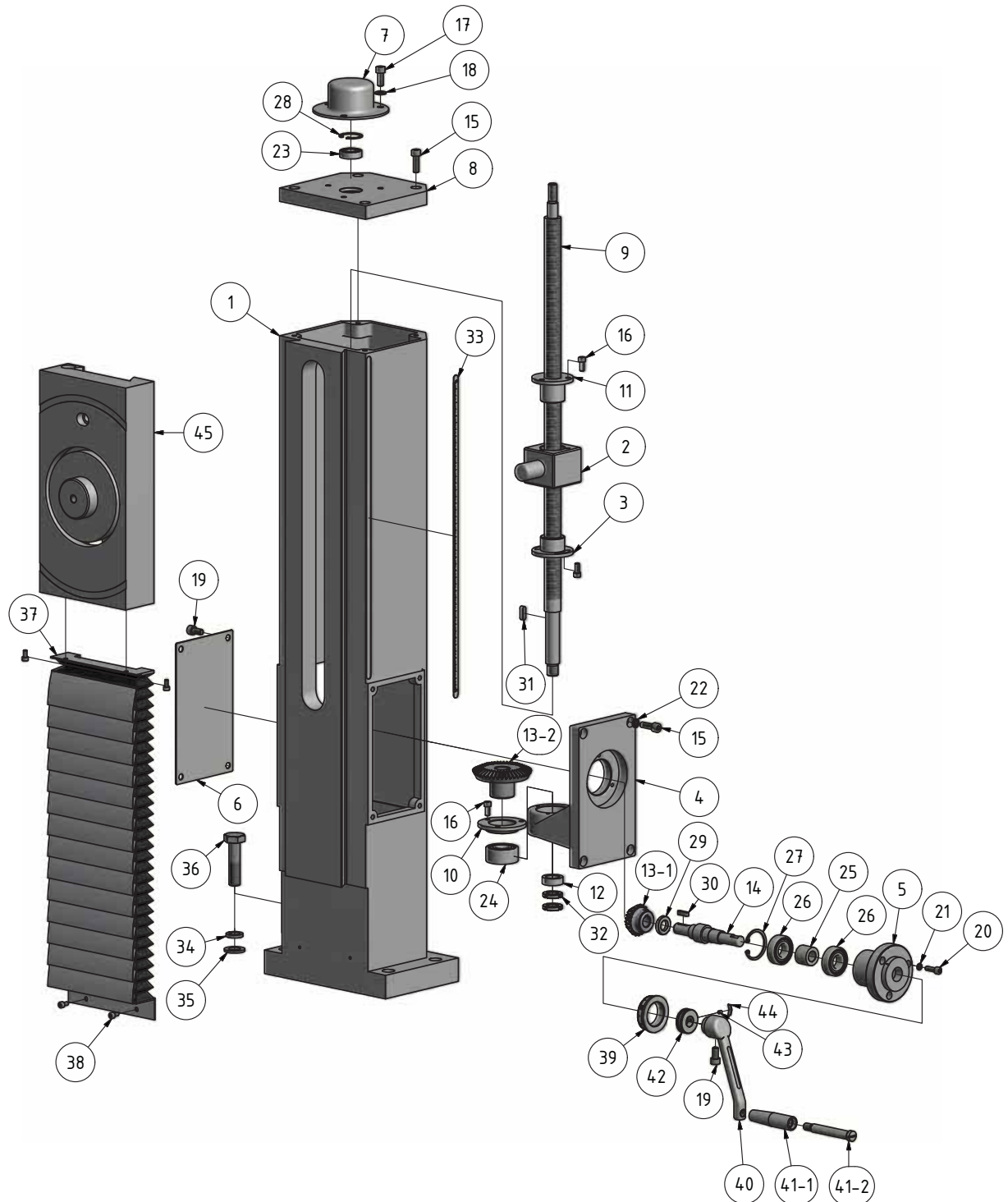


Abb.6-1: Säule-Column

## 6.2 Kreuztisch - Cross table 1 - 2

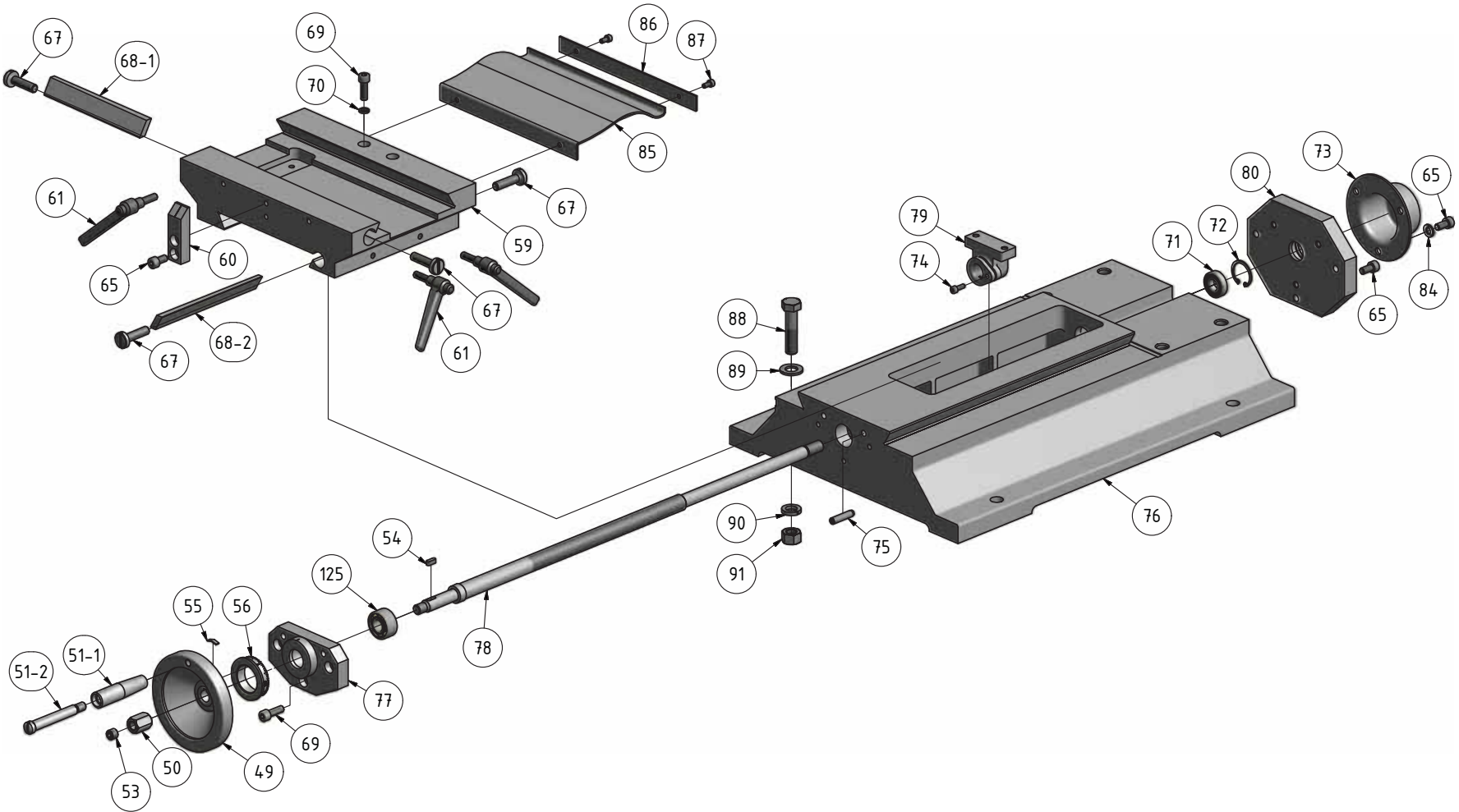


Abb.6-2: Kreuztisch- Cross table 1-2





### 6.3 Kreuztisch - Cross table 2 - 2

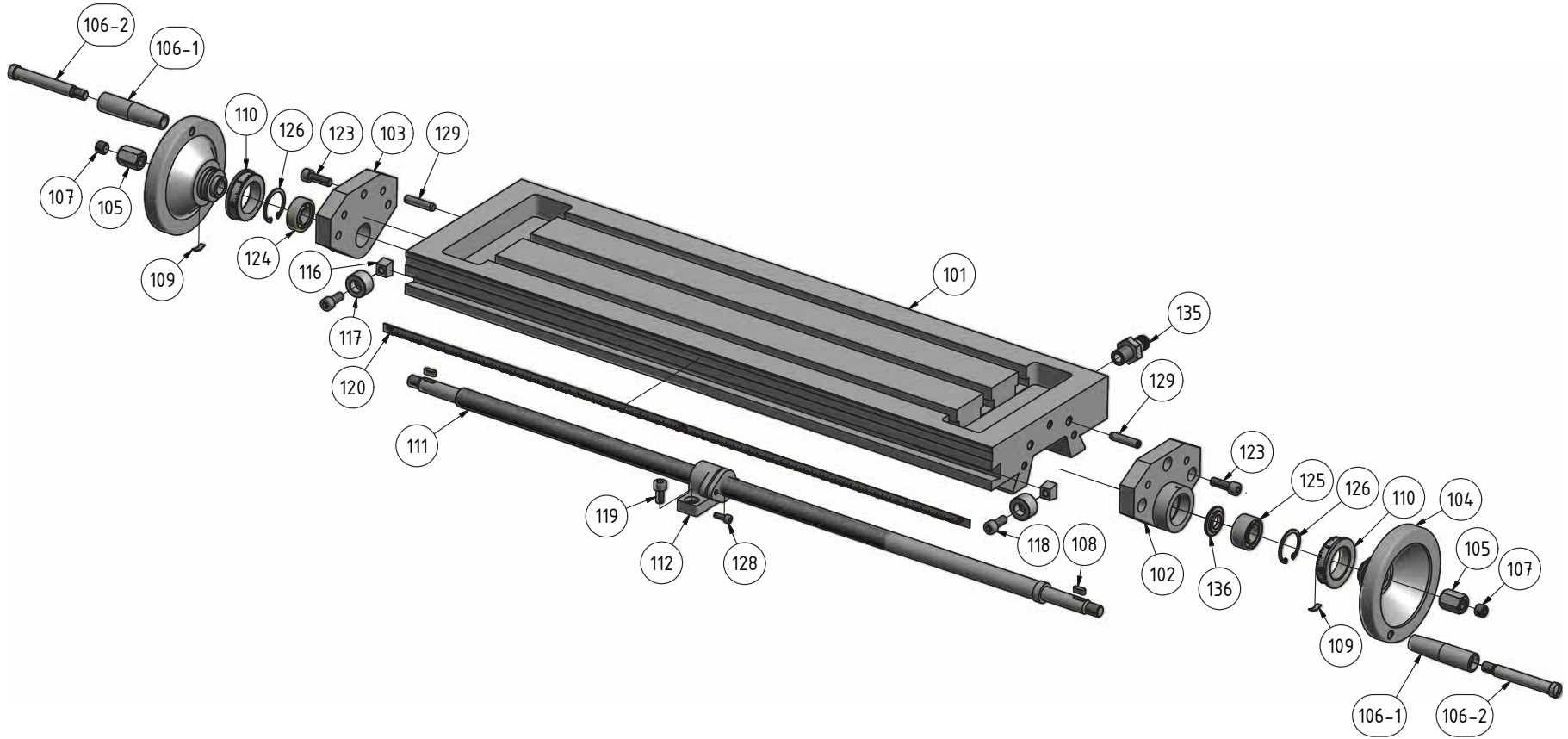


Abb.6-3: kreuztisch- Cross table 2- 2

## 6.4 Schutzeinrichtung - Protection device

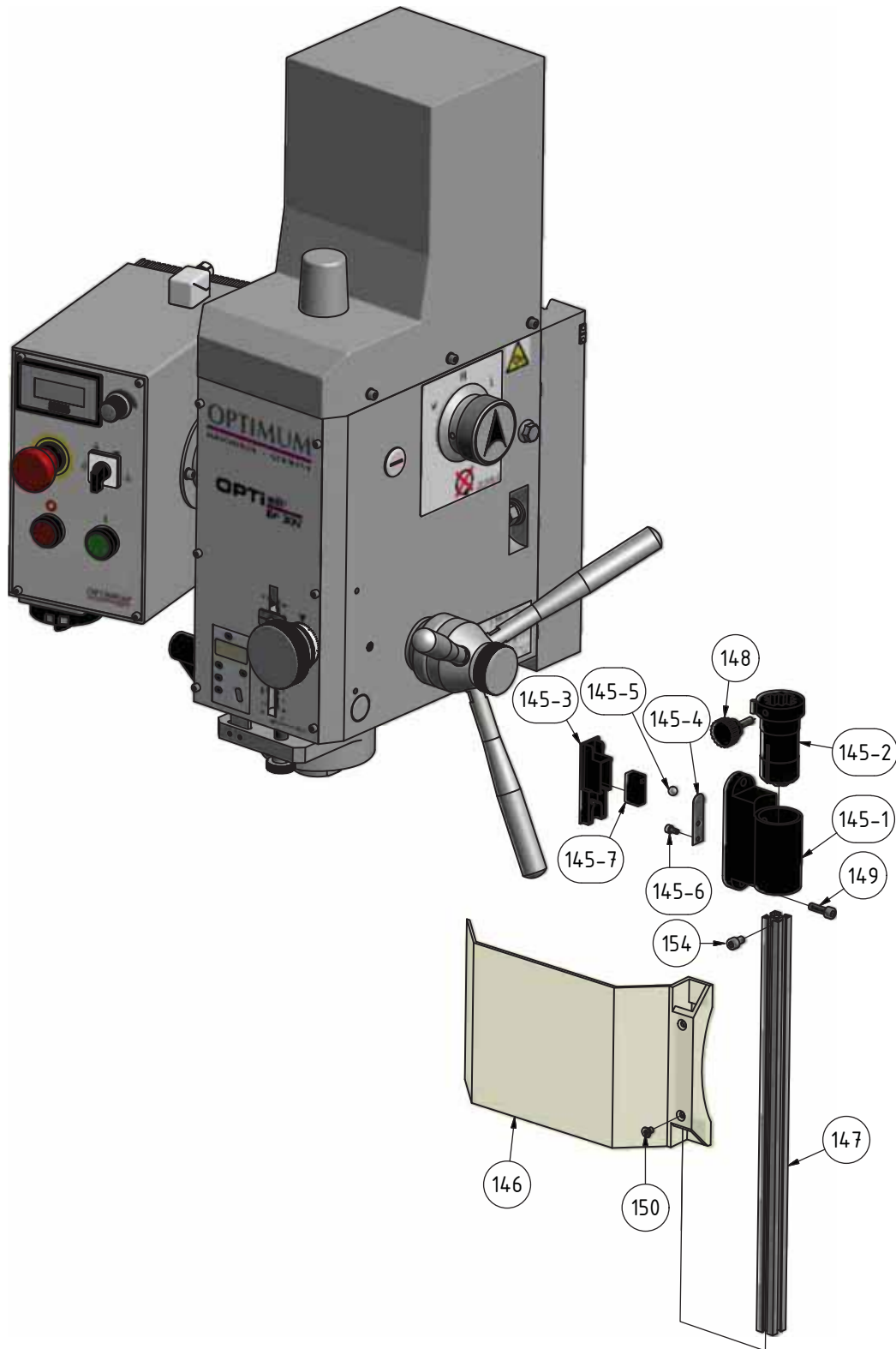


Abb.6-4: Schutzeinrichtung- Protection device





### 6.5 Fräskopf - Milling head 1 - 3

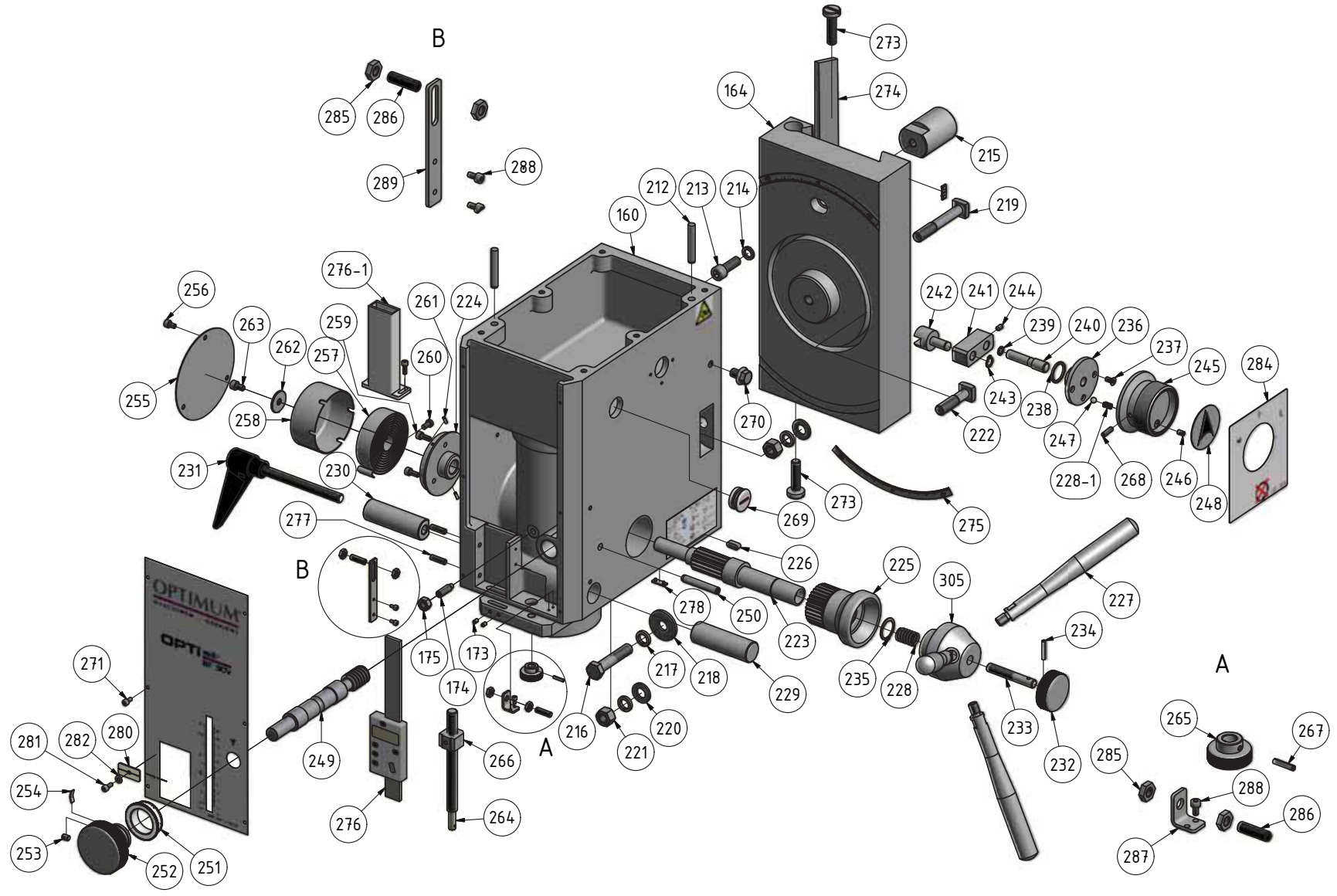


Abb.6-5: Fräskopf- Milling head 1- 3

## 6.6 Fräskopf - Milling head 2 - 3

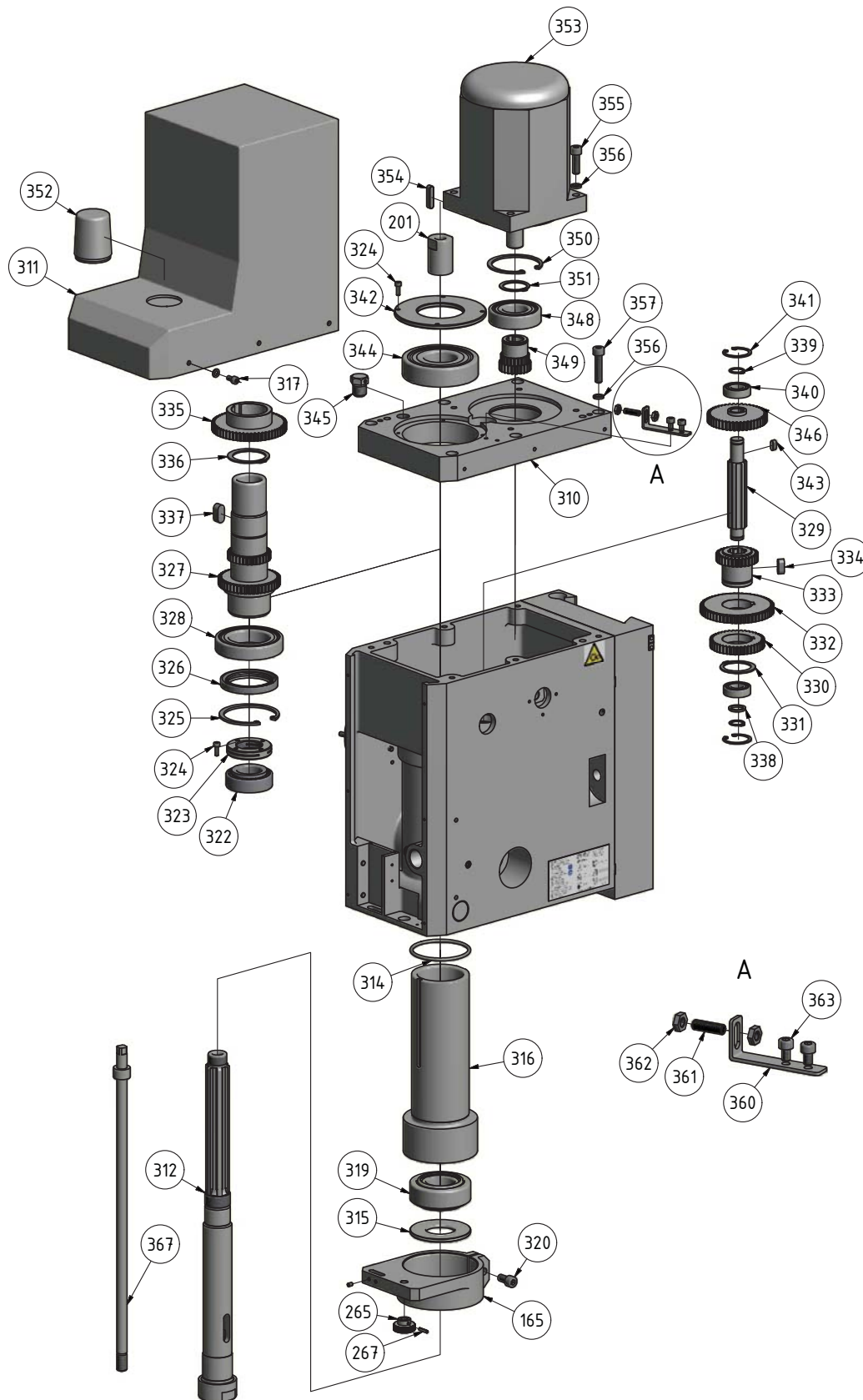


Abb.6-6: Fräskopf- Milling head 2- 3



## 6.7 Fräskopf - Milling head 3 - 3

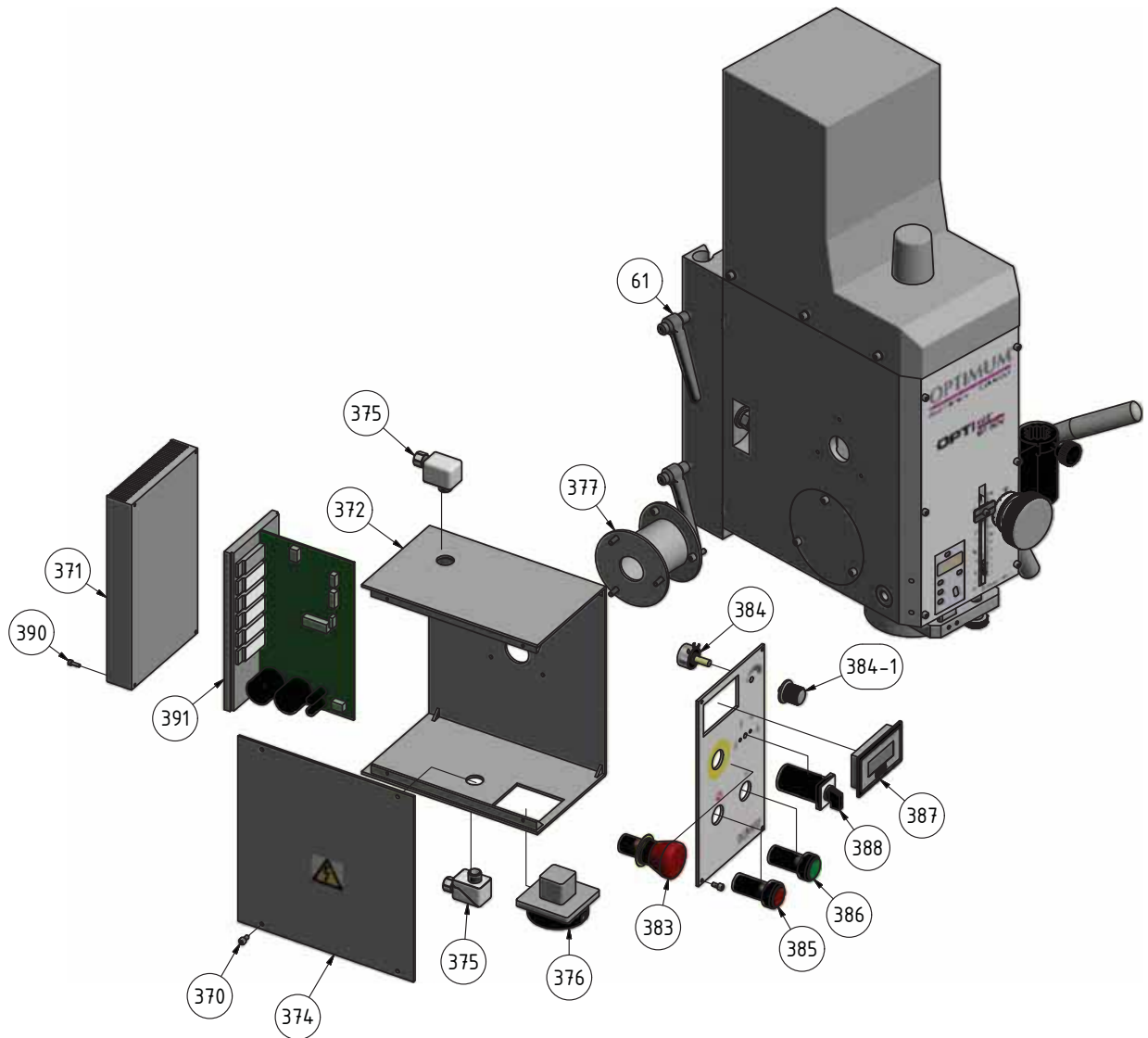


Abb.6-7: Fräskopf- Milling head 3- 3

## 6.8 Maschinenunterbau (Optional) - Machine stand (option)

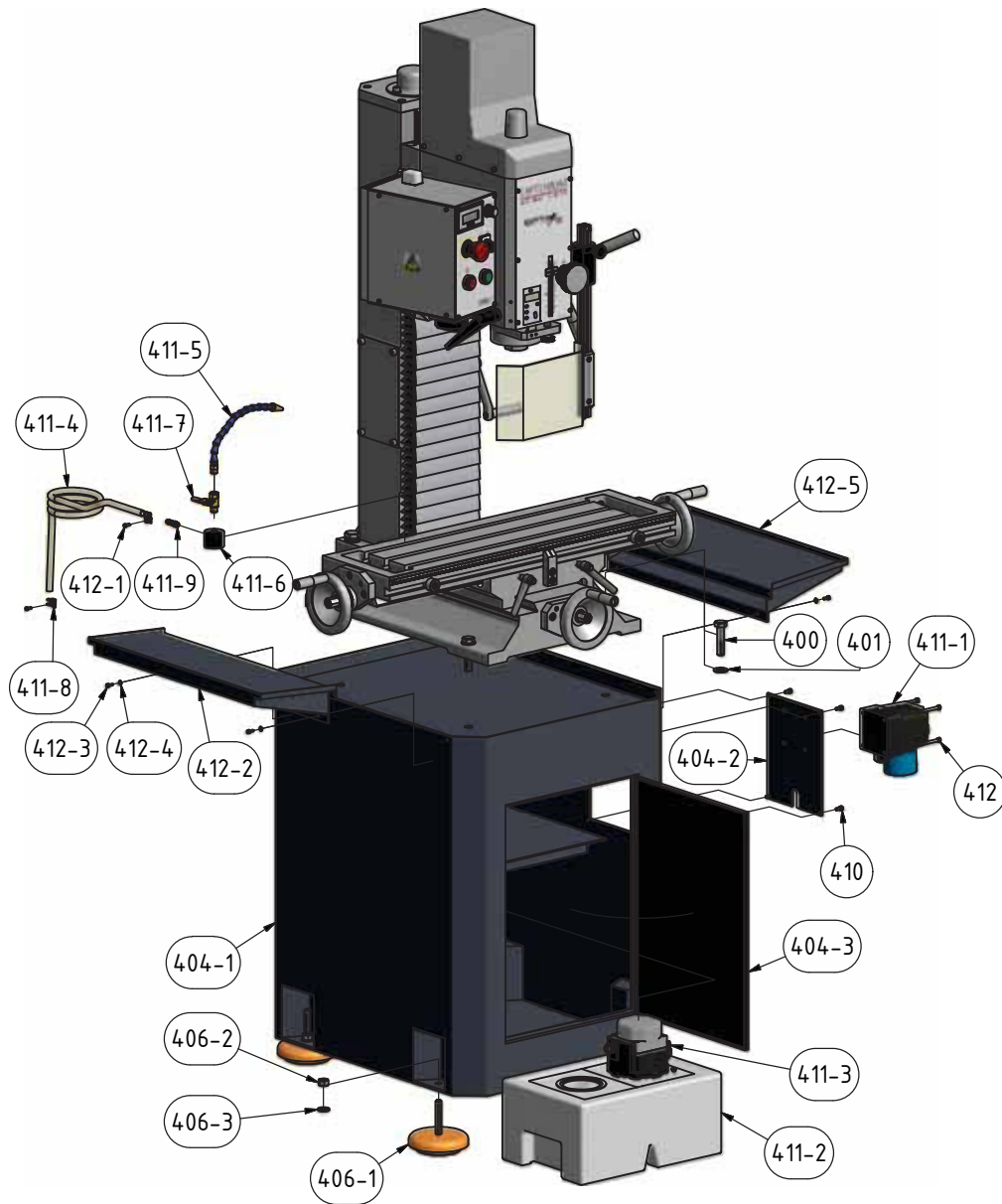


Abb.6-8: Maschinenunterbau (optional)- Machine stand (option)



## 6.9 Maschinenschilder - Machine labels

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Abb.6-9: Maschinenschilder - Machine labels



## 6.9.1 Maschinenschilder - Machine labels

Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Quantity	Size	Article no.
1	Frontschild	Front label	1	BF30 Vario/ MK3	03338430L01
				BF30 Vario/ ISO 30	03338431L01
2	Schild Schaltkasten	Switch box label	1		03338430L02
3	Getriebeschild	Gear box label	1		03338430L03
4	Sicherheitsschild	Safety label	1		03338430L04
5	Sicherheitsschild	Safety label	1		03338430L05
6	Maschinenlabel	Machine label	1		03338430L06
7	Label Hauptschalter	Label Main switch	1		03338430L07



## 6.10 Teileliste - Parts list

Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Säule	Column	1		033384301
2	Träger Spindelmutter Z-Achse	Support spindle nut z axis	1		033384302
3	Spindelmutter zweiteilig, Z-Achse Unterteil	Spindle nut two-piece, z axis lower part	1		033384303
4	Lagerbock Höhenverstellung Z-Achse	Clevis mounting vertical adjustment z axis	1		033384304
5	Flansch, Welle Höhenverstellung Z-Achse	Flange, shaft vertical adjustment z axis	1		033384305
6	Abdeckblech Säule	Cover plate column	1		033384306
7	Spindelabdeckung Y und Z Achse	Spindle cover Y and Z axis	1		033384307
8	Lagerbock, Deckel Säule	Clevis mounting, cover column	1		033384308
9	Spindel Z-Achse	Spindle z - axis	1		033384309
10	Lagerdeckel	Bearing cover	1		0333843010
11	Spindelmutter zweiteilig, Z-Achse Oberteil	Spindle nut two-piece, z axis upper section	1		0333843011
12	Scheibe	Disk	1		0333843012
13-1	Kegelzahnrad 21 Zähne	Taper gear wheel 21 teeth	1	21/42,2	03338430131
13-2	Kegelzahnrad 42 Zähne	Taper gear wheel 42 teeth	1	21/42,2	03338430132
14	Welle	Shaft	1		0333843014
15	Innensechskantschraube	Socket head screw	8	GB 70-85/M8 x 25	0333843015
16	Innensechskantschraube	Socket head screw	8	GB 70-85/M6 x 14	0333843016
17	Innensechskantschraube	Socket head screw	3	GB 70-85/M8 x 20	0333843017
18	Scheibe	Disk	3	8	0333843018
19	Innensechskantschraube	Socket head screw	5	GB 97.1-85/M8 x 16	0333843019
20	Innensechskantschraube	Socket head screw	3	GB 70-85/M6 x 20	0333843020
21	Federring	Lock washer	3	GB 93-87/M6	0333843021
22	Federring	Lock washer	4	GB 93-87/M8	0333843022
23	Rillenkugellager	Grooved ball bearing	1	6002-2Z	0406002.2R
24	Schräggkugellager, zweireihig	Skew-angle roller bearing, double-row	1	3204	0403204
25	Distanzring	Spacer	1		0333843025
26	Rillenkugellager	Grooved ball bearing	2	6004-2Z	0406004.2R
27	Sicherungsring	Snap ring	1	GB 893.1/42	0333843027
28	Sicherungsring	Snap ring	1	GB 893.1/32	0333843028
29	Distanzhülse Kegelzahnrad	Spacer taper gear wheel	1		0333843029
30	Paßfeder	Key	1	DIN 6885/A 5 x 5 x 20	0333843030
31	Paßfeder	Key	1	DIN 6885/A 6 x 6 x 20	0333843031
32	Nutmutter	Groove nut	2	DIN1804/M16x1,5	0333843032
33	Skala Z-Achse	Scale z axis	1		0333843033
34	Federring	Lock washer	4	GB 93-87/M16	0333843034
35	Distanzhülse	Spacer	4	GB 95-85/16	0333843035
36	Sechskantschraube	Hexagon screw	4	GB/T 1228-91/M16x65	0333843036
37	Faltenbalg	Bellows	1		0333843037
38	Innensechskantschraube	Socket head screw	4	GB 70-85/M5 x 10	0333843038
39	Skala	Scale	1		0333843039
40	Handkurbel	Crank	1		0333843040
41	Griff komplett	Handle complete	1	JB-T7270.4-1994	0333843041
41-1	Hülse	Case	1	JB-T7270.4-1994-1	03338430411
41-2	Schraube	Screw	1	JB-T7270.4-1994-2	03338430412
42	Lauftring Skala	Center ring scale	1		0333843042
43	Innensechskant - Stiftschraube	Threaded pin	1	GB 77-85/M4 x 6	0333843043
44	Federblech	Spring plate	1		0333843044
45	Drehlagerbock Fräskopf	Turning clevis mounting milling head	1		0333843045
49	Handrad	Handwheel	1		0333843049
50	Klemmutter Handrad	Clamping nut handwheel	1		0333843050
51	Griff komplett	Handle complete	1	JB-T7270.4-1994	0333843051
51-1	Hülse	Case	1	JB-T7270.4-1994-1	03338430511
51-2	Schraube	Screw	1	JB-T7270.4-1994-2	03338430512
53	Gewindestift	Set screw	1	GB 77-85/M12 x 10	0333843053
54	Paßfeder	Key	1		0333843054
55	Federblech	Spring plate	1		0333843055
56	Skalenring Kreuztisch	Skale ring cross table	1		0333843056
59	Kreuztischführung	Cross table guidance	1		0333843059
60	Marke Längenmessung Kreuztisch	Zero point - linear measurement cross table	1		0333843060
61	Klemmhebel	Locking lever	6	JB-T7270.12-1994	0333843061
65	Innensechskantschraube	Socket head screw	10	GB 70-85/M8 x 16	0333843065
67	Stellschraube Keilleiste	Adjusting screw taper gib	4		0333843067
68-1	Keilleiste Kreuztisch X-Achse links	Taper gib cross table x axis left side	1		03338430681
68-2	Keilleiste Kreuztisch Y-Achse hinten	Taper gib cross table y axis back	1		03338430682



Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
69	Innensechskantschraube	Socket head screw	11	GB 70-85 /M8 x 25	0333843069
70	Federring	Lock washer	2	GB 93-87/M8	0333843070
71	Rillenkugellager	Grooved ball bearing	2	6002-2Z	0406002.2R
72	Sicherungsring	Snap ring	3	GB 893.1/32	0333843072
73	Spindelabdeckung Y und Z Achse	Spindle cover Y and Z axis	1		0333843073
74	Innensechskantschraube	Socket head screw	2	GB 70-85/M5 x 14	0333843074
75	Zylinderstift	Cylindrical pin	6	GB 120-86/8 x 35	0333843075
76	Maschinenfuss	Machine food	1		0333843076
77	Lagerbock Spindel Kreuztisch Y-Achse vorne	Clevis mounting spindle cross table y axis in front	1		0333843077
78	Spindel Y-Achse Kreuztisch	Spindle cross table y axis	1		0333843078
79	Spindelmutter Kreuztisch Y-Achse	Spindle nut cross table y axis	1		0333843079
80	Lagerbock Spindel Kreuztisch Y-Achse hinten	Clevis mounting spindle cross table y axis in the back	1		0333843080
83	Distanzring Lagerbock Kreuztisch X-Achse rechts	Spacer ring clevis mounting cross table x axis right side	2		0333843083
84	Scheibe	Washer	3	GB 97.1-85/8	0333843084
85	Gummiabdeckung	Rubber cover	1		0333843085
86	Klemmleiste	Strip	1		0333843086
87	Innensechskantschraube	Socket head screw	2	GB 70-85/M5 x 10	0333843087
88	Sechskantschraube	Hexagon screw	4	GB 5780-86/M14 x 60	0333843088
89	Scheibe	Washer	4	GB 95-85/14	0333843089
90	Federring	Lock washer	4	GB 7244-87/14	0333843090
91	Sechskantmutter	Hexagon nut	4	GB 6170-86/M14	0333843091
92	Axial-Schrägkugellager	Grooved ball bearing	2	7202AC/15x32x11	0407202
101	Frästisch	Milling table	1		03338430101
102	Lagerbock Spindel Kreuztisch X-Achse rechts	Clevis mounting spindle cross table x axis right side	1		03338430102
103	Lagerbock Spindel Kreuztisch X-Achse links	Clevis mounting spindle cross table x axis left side	1		03338430103
104	Handrad	Handwheel	2		03338430104
105	Klemmmutter Handrad	Clamping nut handwheel	2		03338430105
106	Griff komplett	Handle complete	2	JB-T7270.4-1994	03338430106
106-1	Hülse	Case	2	JB-T7270.4-1994-1	033384301061
106-2	Schraube	Screw	2	JB-T7270.4-1994-2	033384301062
107	Innensechskant - Stiftschraube	Threaded pin	3	GB 77-85/M12 x 10	03338430107
108	Paßfeder	Key	3	DIN 6885/A 5 x 5 x 14	03338430108
109	Federblech	Spring plate	2		03338430109
110	Skalenring Kreuztisch	Skale ring cross table	2		03338430110
111	Spindel X-Achse Kreuztisch	Spindle x axis cross table	1		03338430111
112	Spindelmutter Kreuztisch Y - Achse	Spindle nut cross table y axis	1		03338430112
116	Rechteckmutter, Nutenstein Endanschlag Kreuztisch X-Achse	Rectangle nut, slots stone end stop, cross table x axis	2		03338430116
117	Hülse Endanschlag Kreuztisch X-Achse	Collar end stop, cross table x axis	2		03338430117
118	Innensechskantschraube	Socket head screw	2	GB 70-85/M8 x 20	03338430118
119	Innensechskantschraube	Socket head screw	10	GB 70-85/M8 x 16	03338430119
120	Skala X-Achse	Skale X- axis	1		03338430120
123	Innensechskantschraube	Socket head screw	11	GB 70-85/M8 x 25	03338430123
124	Kugellager	Ball bearing	1	7202-15x35x11	0407202
125	Kugellager	Ball bearing	2	3202-15x35x15,9	0403202
126	Sicherungsring	Snap ring	3	GB 893.1/32	03338430126
128	Innensechskantschraube	Socket head screw	2	GB 70-85/M5 x 14	03338430128
129	Zylinderstift	Cylindrical pin	6	GB 120-86/8 x 35	03338430129
135	Einschraubanschluss Kühlmittelabfluss	Screwing in connection coolant drainage	1		03338430135
136	Scheibe	Washer	1		03338430136
145	Halter Schutz Einrichtung komplett	Support protection device complete	1		03338430145
145-1	Gehäuse	Housing	1		033384301451
145-2	Aluminium Profilaufnahme	Aluminium profile admission	1		033384301452
145-3	Deckel	Cover	1		033384301453
145-4	Federblech	Spring plate	1		033384301454
145-5	Stahlkugel	Steel ball	1		033384301455
145-6	Schraube	Screw	2		033384301456
145-7	Mikroschalter	Micro switch	1		033384301457
146	Schutz	Protection	1		03338430146
147	Aluminiumprofil	Aluminium profile	1		03338430147
148	Klemmschraube	Clamping scw	1		03338430148
149	Innensechskantschraube	Socket head screw	2	GB 70-85/M6 x 20	03338430149
150	Senkschraube mit Kreuzschlitz	Recessed countersunk flat head screw	2	GB 819-85/M5 x 12	03338430150
154	Innensechskantschraube	Socket head screw	2	GB 70-85/M6 x 10	03338430154





Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
160	Gehäuse Fräskopf	Housing milling head	1		03338430160
164	Drehlagerbock Fräskopf	Turning clevis mounting milling head	1		03338430164
165	Halter	Support	1		03338430165
173	Innensechskant - Stiftschraube	Threaded pin	2	GB 77-85/M4 x 6	03338430173
174	Gewindestift geschlitzt mit langem Zapfen	Hexagon socket set screws with half-dog point	1	GB 79-85/M8 x 2	03338430174
175	Sechskantmutter	Hexagon nut	1	GB 6170-86/M8	03338430175
198	Rillenkugellager	Grooved ball bearing	1	6308-2RZ	0406308.2R
201	Gegenhalter	Holder	1		03338430201
212	Zylinderstift	Cylindrical pin	2	GB 119-86/A 8 x 50	03338430212
213	Innensechskantschraube	Socket head screw	1	GB 70-85/M10 x 30	03338430213
214	Federring	Lock washer	1	GB 93-87/M10	03338430214
215	Führungsstück	Guiding piece	1		03338430215
216	Sechskantschraube	Hexagon screw	1	GB 5782-86/M12x60	03338430216
217	Federring	Lock washer	4	GB 93-87/ M12	03338430217
218	Scheibe	Washer	1	GB 96-85/12	03338430218
219	Vierkantschraube	Square head bolt	1	GB 35-88/M12x80	03338430219
220	Scheibe	Washer	3	GB 97.1-85/12	03338430220
221	Sechskantmutter	Hexagon nut	3	GB 6170-86 /M12	03338430221
222	Vierkantschraube	Square head bolt	2	GB 35-880/M12x50	03338430222
223	Verzahnte Welle	Toothed shaft	1		03338430223
224	Mitnehmerscheibe Spiralfeder	Driving disk spiral spring	1		03338430224
225	Schneckenrad	Taper gear wheel	1		03338430225
226	Paßfeder	Key	1	DIN 6885 /A 6 x 6 x 16	03338430226
227	Griffhebel	Lever	3		03338430227
228	Druckfeder Feinvorschub	Compression spring micro feed	1		03338430228
228-1	Druckfeder Feinvorschub	Compression spring micro feed	1		033384302281
229	Klemmbolzen Pinole rechts	Clamping pin spindle sleeve right side	1		03338430229
230	Klemmbolzen Pinole links	Clamping pin spindle sleeve left side	1		03338430230
231	Klemmhebel Pinole	Release handle sleeve	1		03338430231
232	Rändelscheibe Kupplung Feinvorschub	Knurling tool disk clutch micro feed	1		03338430232
233	Gewindestange Feinvorschub	Threaded rod micro feed	1		03338430233
234	Spannstift, Rändelscheibe Kupplung-Gewindestange	Spring pin, threaded rod - knurling disk clutch	1	GB 879-86/ 4 x 24	03338430234
235	Sicherungsring	Snap ring	1	GB 894.1 - 22/22	03338430235
236	Aufnahmescheibe Schaltgabel	Support shift fork	1		03338430236
237	Senkschraube mit Kreuzschlitz	Recessed countersunk flat head screw	3	GB 819-85/M5x10	03338430237
238	O-Ring	O-ring	1	GB 3452-1/ 20 x 2.65 G	03338430238
239	O-Ring	O-ring	1	GB 3452-1/6.9 x 1.8 G	03338430239
240	Welle Schaltgabel	Shaft shift fork	1		03338430240
241	Arm Schaltgabel	Arm shift fork	1		03338430241
242	Schaltgabel	Shift fork	1		03338430242
243	Sicherungsring	Snap ring	1	GB 894.1/10	03338430243
244	Innensechskant - Stiftschraube	Threaded pin	1	GB 80-85/ M5 x 8	03338430244
245	Wahldrehschalter Getriebe	Choice rotary switch transmission	1		03338430245
246	Innensechskant - Stiftschraube	Threaded pin	1	GB 77-85/ M8 x 8	03338430246
247	Stahlkugel	Steel ball	1		03338430247
248	Positionsdeckel Wahldrehschalter	Position cover choice rotary switch	1		03338430248
249	Schneckenwelle	Worm shaft	1		03338430249
250	Zylinderstift	Cylindrical pin	1	GB 120-86/8 x 50	03338430250
251	Skalenring Feinvorschub Pinole	Scale ring micro feed spindle sleeve	1		03338430251
252	Rändelscheibe Feinvorschub Pinole	Knurling tool disk micro feed spindle sleeve	1		03338430252
253	Innensechskant - Stiftschraube	Threaded pin	1	GB 77-85 - M6 x 8/M6 x 8	03338430253
254	Federblech	Spring plate	1		03338430254
255	Abdeckung Federhaeuse	Barrier barrel	1		03338430255
256	Innensechskantschraube	Socket head screw	3	GB 70-85/ M5 x 8	03338430256
257	Spiralfeder - Rückholfeder Pinole	Spiral spring - return spring spindle sleeve	1		03338430257
258	Abeckung Spiralfeder	Cover spiral spring	1		03338430258
259	Innensechskantschraube	Socket head screw	3	GB 70-85/M5 x 12	03338430259
260	Zylinderschraube mit Kreuzschlitz	Recessed head raised fillister head screw	1	GB 822-88/M5 x 10	03338430260
261	Innensechskant - Stiftschraube	Threaded pin	2	GB879-86/M3x10	03338430261
262	Scheibe	Washer	1		03338430262
263	Innensechskantschraube	Socket head screw	2	GB 70-85/M6 x 10	03338430263
264	Gewindestange Bohrtiefenanschlag	Threaded rod drilling depth stop	1		03338430264
265	Rändelscheibe Bohrtiefenanschlag	Knurling tool disk drilling depth stop	1		03338430265
266	Bohrtiefenanschlag	Drilling depth stop	1		03338430266
267	Spannstift	Spring pin	1	GB 879-86 /3 x 14	03338430267



Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
268	Innensechskant - Stiftschraube	Threaded pin	1	GB 78-85/M5 x 16	03338430268
269	Ölschauglas	Oil sight glas	1		03338430269
270	Sechskantschraube	Hexagon screw	1		03338430270
271	Innensechskantschraube	Socket head screw	14	GB 70-85/M4 x 8	03338430271
273	Stellschraube Keilleiste	Adjusting screw taper gib	2		03338430273
274	Keilleiste Fräskopf	Taper gib milling head	1		03338430274
275	Winkelskala	Angle scale	2		03338430275
276	Digitale Anzeige Feinvorschub (Bohrtiefe)	Digital indicator micro feed (drilling depth)	1		03338430276
276-1	Schutzabdeckung	Prodective cover	1		033384302761
276-2	Innensechskantschraube	Hexagon socket screw	2		033384302762
277	Innensechskant - Stiftschraube	Threaded pin	2	GB 77-85/M6 x 20	03338430277
278	Marke Winkelskala Säule	Zero point - scale column	2		03338430278
280	Anzeiger Bohrtiefenanschlag	indicator drilling depth stop	1		03338430280
281	Innensechskantschraube	Socket head screw		GB 70-85/ M4 x 10	03338430281
282	Scheibe	Washer	1	GB 955-87/4	03338430282
285	Sechskantmutter	Hexagon nut	4		03338430285
286	Sensor Endschalter	Sensor position switch	2		03338430286
287	Winkel Endschalter	Angle plate position switch	1		03338430287
288	Innensechskantschraube	Socket head screw	6	GB 70-85/M3 x 6	03338430288
289	Leiste Endschalter	Band position switch	1		03338430289
305	Nabe Sterngriff Pinolenvorschub	Hub star grip spindle sleeve feed	1		03338430305
310	Fräskopf Gehäusedekkel	Milling head housing cover	1		03338430310
311	Motorhaube	Motor cover	1		03338430311
312	Spindel MK3	Spindle MK3	1		03338430312
312	Spindel ISO 30	Spindle ISO 30	1		03338431312
314	O-Ring	O-ring	1	GB 3452-1/65 x 3.55 G	03338430314
315	Distanzring	Spacer	1		03338430315
316	Pinole MK3	Spindle sleeve MT3	1		03338430316
316-1	Pinole ISO 30	Spindle sleeve ISO 30	1		033384303161
317	Innensechskantschraube	Socket head screw	6	GB 70-85/M5 x 10	03338430317
318	Scheibe	Washer	6	GB 97.1-855	03338430318
319	Kegelrollenlager	Taper roller bearing	1	33207_Q	04033207
320	Innensechskantschraube	Socket head screw	1	GB 70-85 / M8 x 16	03338430320
322	Kegelrollenlager	Taper roller bearing	1	32006-X	04032006
323	Klemmmutter Spindellager	Clamping nut spindle bearings	1		03338430323
324	Innensechskantschraube	Socket head screw	6	GB 70-85/M4 x 12	03338430324
325	Sicherungsring	Snap ring	1	GB 893.1/68	03338430325
326	Radial-Wellendichtring	Radial rotary shaft seal	1	GB 13871/50 x 68 x 8	03338430326
327	Verzahnnte Antriebswelle	Toothed drive shaft	1		03338430327
328	Rillenkugellager	Grooved ball bearing	1	6010-2RZ	0406010.2R
329	Welle	Shaft	1		03338430329
330	Zahnrad 41 Zähne, Modul 1.5, geradverzahnt	Gear wheel of 41 teeth, module 1.5, straight teeth	1		03338430330
331	Sicherungsring	Snap ring	1	GB 894.1/35	03338430331
332	Zahnrad 56 Zähne, Modul 1.5, geradverzahnt	Gear wheel of 56 teeth, module 1.5, straight teeth	1		03338430332
333	Zahnrad 31 Zähne Modul 2, geradverzahnt	Gear wheel of 31 teeth, module 2, straight teeth	1		03338430333
334	Paßfeder	Key	1	DIN 6885/ A 8 x 7 x 18	03338430334
335	Zahnrad 57 Zähne Modul 2, geradverzahnt	Gear wheel of 57 teeth, module 2, straight teeth	1		03338430335
336	Sicherungsring	Snap ring	1	GB 894.1/42	03338430336
337	Paßfeder	Key	1	DIN 6885/A 10 x 8 x 22	03338430337
338	Distanzring	Spacer	1		03338430338
339	Sicherungsring	Snap ring	2	GB 894.1/15	03338430339
340	Rillenkugellager	Grooved ball bearing	2	6002-2Z	0406002.2R
341	Sicherungsring	Snap ring	2	GB 893.1/32	03338430341
342	Lagerdeckel	Bearing cover	1		03338430342
343	Paßfeder	Key	1	DIN 6885/A 5 x 5 x 12	03338430343
344	Rillenkugellager	Grooved ball bearing	1	6308-2RZ	0406308.2R
345	Belüftungsschraube Getriebe	Vent screw transmission	1		03338430345
346	Zahnrad 45 Zähne Modul 2, geradverzahnt	Gear wheel of 45 teeth, module 2, straight teeth	1		03338430346
348	Rillenkugellager	Grooved ball bearing	1		0406206.2R
349	Zahnrad -Motor 23 Zähne Modul 2, geradverzahnt	Gear wheel motor of 23 teeth, module 2, straight teeth	1		03338430349
350	Sicherungsring	Snap ring	1	GB 893.1/62	03338430350
351	Sicherungsring	Snap ring	1	GB 894.1/30	03338430351
352	Abdeckkappe Anzugsstange	Cover screw rod	1		03338430352
353	Motor	Motor	1		03338430353
354	Paßfeder	Key	1	CNS 169/6 x 6 x 28	03338430354



Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
355	Innensechskantschraube	Socket head screw	4	GB 70-85/ M8 x 25	03338430355
356	Federring	Lock washer	10	GB 93-87/ M8	03338430356
357	Innensechskantschraube	Socket head screw	6	GB 70-85/M8 x 35	03338430357
360	Winkel Drehzahlmesser	Angle rotational-speed	1		03338430360
361	Sensor Drehzahlmesser	Rotational-speed sensor	1		03338430361
362	Sechskantmutter	Hexagon nut	2		03338430362
363	Innensechskantschraube	Socket head screw	2	GB 70-85/M3 x 6	03338430363
367	Anzugsstange MK3 Spindel	Screw rod MK3 spindle	1		03338430367
367	Anzugsstange ISO 30 Spindel	Screw rod ISO 30 spindle	1		03338431367
370	Innensechskantschraube	Socket head screw	14	GB 70-85/M4 x 8	03338430370
371	Schaltkasten - Abdeckung mit Wärmeableitung	Electric box - cover with heat dissipation	1		03338430371
372	Schaltkasten - Gehäuse	Electric box - housing	1		03338430372
374	Schaltkasten - Deckel	Electric box - cover	1		03338430374
375	Zugentlastung Anschlusskabel Schaltkasten	Strain relief lead switchbox	2		03338430375
376	Hauptschalter	Main switch	1		03338430376
377	Halterung Bedienpanel	Holder control panel	1		03338430377
378	Innensechskantschraube	Socket head screw	3	GB 70-85/M5 x 20	03338430378
380	Federring	Lock washer	3	GB 93-87/M5	03338430380
383	Not Aus Schlagschalter	Emergency OFF push button	1		03338430383
384	Potentiometer	Potentiometer	1		03338430384
384-1	Knopf	Knob	1		033384303841
385	Drucktaster Aus	Push button off	1		03338430385
386	Drucktaster Ein	Push button on	1		03338430386
387	Elektronische Anzeige	Electronic display	1		03338430387
388	Schalter Drehrichtung	Change over switch	1		03338430388
390	Innensechskantschraube	Socket head screw	4	GB 70-85/ M3 x 10	03338430390
391	Steuerplatine	Control board	1		03338430391
400	Sechskantschraube	Hexagon screw	4	GB 5780-86 /M14x60	03338430400
401	Scheibe	Washer	4	GB 95-85/14	03338430401
402	Sechskantmutter	Hexagon nut	4	GB 6170-86/M16	03338430402
403	Scheibe	Washer	4	GB 95-85/16	03338430403
404	Maschinenunterbau komplett, optional	Machine stand complete, option	1		03338430404
404-1	Maschinenunterbau	Machine stand	1		033384304041
404-2	Befestigungsblech Kühlmittelpumpe	Fixing plate coolant pump	1		033384304042
404-3	Tür Maschinenunterbau	Door machine stand	1		033384304043
406	Nivellier- Schwingelement SE1 komplett, optional	Levelling- damping element SE1 complete, option	1		03381012
	Nivellier- Schwingelement SE2 komplett, optional	Levelling- damping element SE2 complete, option	1		03381016
406-1	Nivellier- Schwingelement SE1	Levelling- damping element SE1	1		033810121
	Nivellier- Schwingelement SE2	Levelling- damping element SE2	1		033810161
406-2	Sechskantmutter SE1	Hexagon nut SE1	1		033810122
	Sechskantmutter SE2	Hexagon nut SE2	1	GB 6170-86/M12	033810162
406-3	Scheibe SE1	Washer SE1	1		033810123
	Scheibe SE2	Washer SE2	1	GB 95-85/12	033810163
410	Innensechskantschraube	Socket head screw	4	GB 70-85/M5 x 10	03338430410
411	Universal-Kühlmittleinrichtung 230 V komplett, optional	Universal coolant adjustment 230 V complete, option	1		03352002
	Universal-Kühlmittleinrichtung 400 V komplett, optional	Universal coolant adjustment 400 V complete, option	1		03352001
411-1	Schalter-Stecker-Kombination 230 V	ON/OFF switch combination 230 V	1		033520021
	Schalter-Stecker-Kombination 400 V	ON/OFF switch combination 400 V	1		033520011
411-2	Kühlmittelbehälter 230 V	Coolant reservoir 230 V	1		033520022
	Kühlmittelbehälter 400 V	Coolant reservoir 400 V	1		033520012
411-3	Kühlmittelumpe 230 V	Coolant pump 230 V	1		033520023
	Kühlmittelumpe 400 V	Coolant pump 400 V	1		033520013
411-4	Kühlmittelschlauch 230 V	Coolant hose 230 V	1		033520024
	Kühlmittelschlauch 400 V	Coolant hose 400 V	1		033520014
411-5	Flexibler Kühlmittelschlauch 230 V	Flexible coolant hose 230 V	1		033520025
	Flexibler Kühlmittelschlauch 400 V	Flexible coolant hose 400 V	1		033520015
411-6	Befestigung Magnettuss 230 V	Attachment magnet foot 230 V	1		033520026
	Befestigung Magnettuss 400 V	Attachment magnet foot 400 V	1		033520016
411-7	Kugelhahn 230 V	Ball valve 230 V	1		033520027
	Kugelhahn 400 V	Ball valve 400 V	1		033520017

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Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
411-8	Schlauchbinder 230V	Hose binder 230 V	1		033520028
	Schlauchbinder 400V	Hose binder 400 V	1		033520018
411-9	Schlauchverbinder 230 V	Hose fitting 230 V	1		033520029
	Schlauchverbinder 400 V	Hose fitting 400 V	1		033520019
412	Innensechskantschraube	Socket head screw	4	GB 70-85/M5 x 50	03338430412
412-1	Innensechskantschraube	Socket head screw	2	GB 70-85/M4 x 10	033384304121
412-2	Auffangblech	Plate	1	4	033384304122
412-3	Innensechskantschraube	Socket head screw	4	GB 70-85/M4 x 10	033384304123
412-4	Scheibe	Washer	4	GB 97.1-85/4	033384304124
412-5	Auffangblech	Plate	1		033384304125



## 6.11 Schaltplan - Wiring diagram

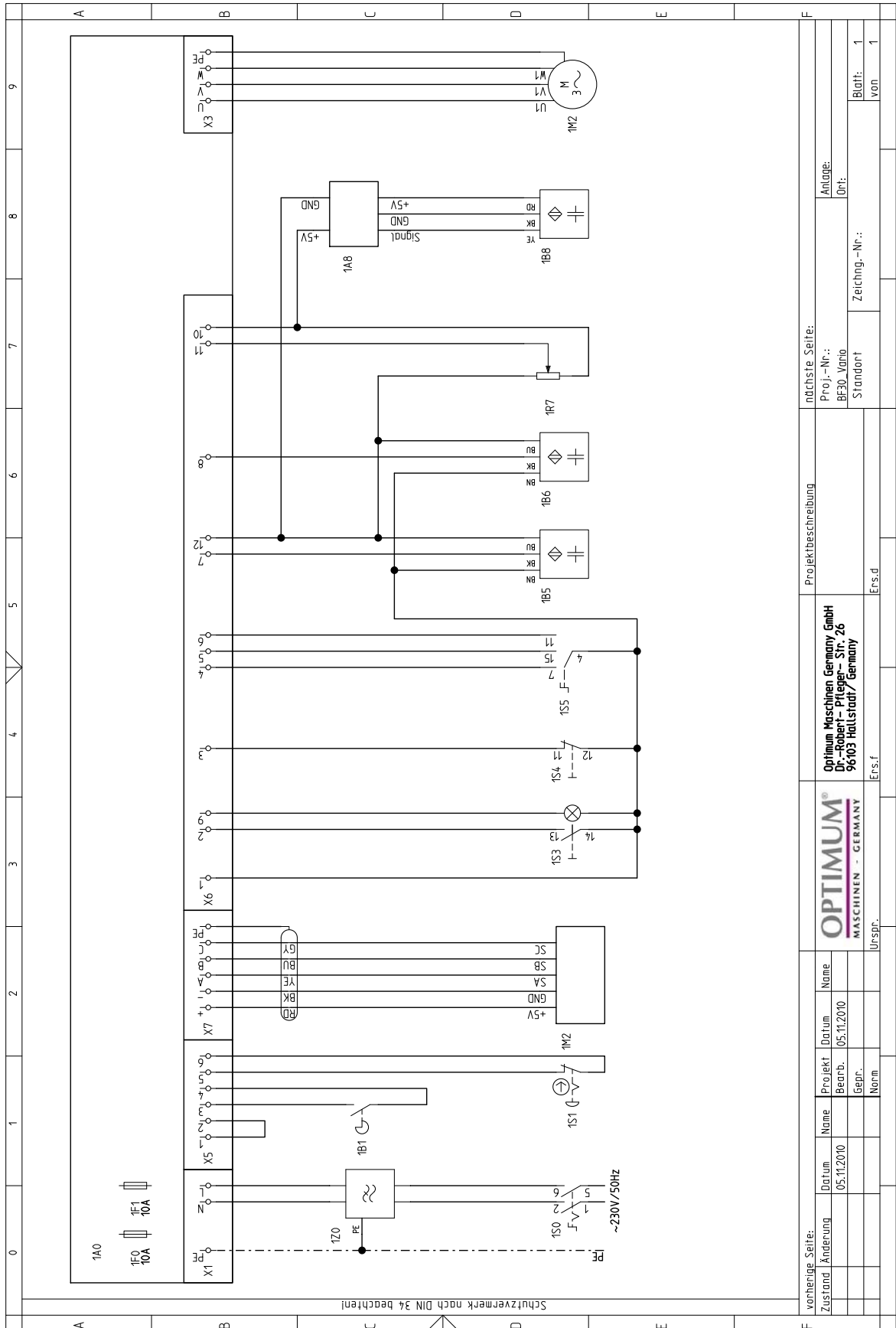


Abb. 6-10: Schaltplan - Wiring diagram

vorherige Seite:		nächste Seite:	
Zustand	Änderung	Projekt	Datum
		Name	Name
	05.11.2010	Bearb.	05.11.2010
		Gepr.	
		Norm	
Urspr.		Ers.f	
Ers.d		Ers.f	
Zeichung-Nr.:		Blatt: - 1	
Standort		von 1	
Proj.-Nr.:		Anlage:	
BF30_Vario		Ort:	
<p style="text-align: center;"><b>OPTIMUM</b> MASCHINEN - GERMANY</p> <p style="text-align: center;">Optimum Maschinen Germany GmbH Dr.-Robert-Pflegger-Str. 26 96103 Hallstadt / Germany</p>			



## 6.11.1 Teileliste Elektrik - Parts list electrical komponents

Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1S0	Hauptschalter	Main switch	1	LW8GS-20104-2/660V,20A	03338430376
1A0	Brushlesscontroller	Brushlesscontroller	1		03338430391
1F0/1F1	Sicherung	Fuse	1	10A	033384301F0
1Z0	Netzfilter	Line filter	1		033384301Z0
1B1	Sicherheitsschalter Fräsfutterschutz	Milling chuck safety switch	1		033384301457
1S1	Not-Aus-Schalter	Emergency-Stop button	1	LA103/10A, 660V	03338430383
1M2	Antriebsmotor	Drive motor	1		03338430353
1S3	Taster Ein	Button On	1	LA103XD-22/36V,10A	03338430386
1S4	Taster Aus	Button Off	1	LA103	03338430385
1S5	Funktionsschalter	Functional switch	1	Kraus&Naimer/ F89580/ 001	03338430388
1B5	Sensor obere Endstellung	Upper end position sensor	1		03338430286
1B6	Sensor untere Endstellung	Lower end position sensor	1		03338430286
1R7	Potentiometer	Potentiometer	1	WX14-12/4K7	03338430384
1B8	Drehzahlsensor	Speed sensor	1		03338430361
1A8	Drehzahlanzeige	Rotation speed indicator	1	SN100304	03338430387



## 7 Malfunctions

### 7.1 Malfunctions on the drilling-milling machine

Malfunction	Cause / possible effects	Solution
The drilling-milling machine does not start	<ul style="list-style-type: none"> <li>Power-on sequence ignored.</li> </ul>	<ul style="list-style-type: none"> <li> "Switching on the drilling-milling machine" on page 28</li> <li>Have it checked by authorised personnel.</li> </ul>
Tool "burnt".	<ul style="list-style-type: none"> <li>Incorrect speed.</li> <li>Chips do not come out of the bore hole</li> <li>Tool blunt.</li> <li>Operating without cooling agent.</li> </ul>	<ul style="list-style-type: none"> <li>Select another rate, feed too high.</li> <li>Pull out tool more often.</li> <li>Sharpen or replace tool.</li> <li>Use cooling agent</li> </ul>
Impossible to insert grip cone into the spindle sleeve.	<ul style="list-style-type: none"> <li>Remove any dirt, grease or oil from the internal conical surface of the spindle sleeve or the grip cone.</li> </ul>	<ul style="list-style-type: none"> <li>Clean surfaces well</li> <li>Keep surfaces free of grease.</li> </ul>
It is not possible to push-out the taper.	<ul style="list-style-type: none"> <li>Optional MT3 taper is shrunk on the Morse taper.</li> </ul>	<ul style="list-style-type: none"> <li>Let the machine run at highest speed for two minutes in order to warm it up and then retry to disassemble the taper.</li> </ul>
Motor does not start	<ul style="list-style-type: none"> <li>Defective fuse.</li> </ul>	<ul style="list-style-type: none"> <li>Have it checked by authorised personnel.</li> </ul>
Working spindle rattling on rough piece surfaces	<ul style="list-style-type: none"> <li>Climb milling machining not possible under the current operating conditions.</li> <li>Clamping lever of the movement axes not tightened.</li> <li>Loose collet chuck, loose drill chuck, loose draw-in rod.</li> <li>Tool is blunt.</li> <li>The workpiece is not fastened.</li> <li>Excessive slack in bearing.</li> <li>Working spindle goes up and down.</li> </ul>	<ul style="list-style-type: none"> <li>Perform conventional milling.</li> <li>Tighten clamping lever</li> <li>Check, re-tighten.</li> <li>Sharpen or replace tool</li> <li>Clamp the workpiece firmly.</li> <li>Readjust bearing slack or replace bearing</li> <li>Readjust bearing slack or replace bearing</li> </ul>
Fine feed of the spindle sleeve does not work	<ul style="list-style-type: none"> <li>Fine feed is not correctly activated.</li> <li>Coupling of the fine feed does not cam-in, is soiled, blurred, worn, defective</li> </ul>	<ul style="list-style-type: none"> <li> "Manual spindle sleeve feed with the fine feed" on page 32</li> <li>Clean, replace.</li> </ul>



## 8 Appendix

### 8.1 Copyright

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Subject to technical changes without notice.

### 8.2 Terminology/Glossary

Term	Explanation
Cross table	Bearing surface, clamping surface for the workpiece with X- and Y-axis travel
Taper mandrel	Cone of the drill or of the drill chuck
Workpiece	Piece to be milled, drilled or machined.
Draw-in rod	Threaded rod to fix the taper mandrel in the spindle sleeve.
Drill chuck	Drill bit chuck
Collet chuck	Holder for end mill
Drill-Mill head	Upper part of the drilling-milling machine
Spindle sleeve	Hollow shaft in which the milling spindle turns.
Milling spindle	Shaft activated by the motor
Drilling table	Supporting surface, clamping surface
Taper mandrel	Cone of the drill or of the drill chuck
Spindle sleeve lever	Manual operation for the drill feed
Quick action - drill chuck	Drill chuck can be fixed by hand.
Workpiece	Piece to be drilled or machined.
Tool	Milling cutter, drill bit, etc.

### 8.3 Change information manual

Chapter	Short note	new version number
4.3	Warming up of the drilling-milling machine Fast on and off.	1.1.1
1.3.1	Avoiding misuses	1.1.2
EC declaration	changed standard	1.1.3
4.11	New digital display for spindle sleeve travel	1.1.4
2	Speeds	1.1.5





### 8.3.1 Liability claims for defects / warranty

Beside the legal liability claims for defects of the customer towards the seller the manufacturer of the product, OPTIMUM GmbH, Robert-Pfleger-Straße 26, D-96103 Hallstadt, does not grant any further warranties unless they are listed below or had been promised in the frame of a single contractual agreement.

- The processing of the liability claims or of the warranty is performed as chosen by OPTIMUM GmbH either directly or through one of its dealers.  
Any defective products or components of such products will either be repaired or replaced by components which are free from defects. The property of replaced products or components passes on to OPTIMUM Maschinen Germany GmbH.
- The automatically generated original proof of purchase which shows the date of purchase, the type of machine and the serial number, if applicable, is the precondition in order to assert liability or warranty claims. If the original proof of purchase is not presented, we are not able to perform any services.
- Defects resulting of the following circumstances are excluded from liability and warranty claims:
  - Using the product beyond the technical options and proper use, in particular due to overstraining of the machine.
  - Any defects arising by one's own fault due to faulty operations or if the operating manual is disregarded.
  - Inattentive or incorrect handling and use of improper equipment.
  - Non-authorized modifications and repairs.
  - Insufficient installation and safeguarding of the machine
  - Disregarding the installation requirements and conditions of use.
  - Atmospheric discharges, overvoltage and lightning strokes as well as chemical influences.
- The following items are as well not subject to the liability or warranty claims:
  - Wearing parts and components which are subject to a standard wear as intended such as e.g. V-belts, ball bearings, illuminants, filters, sealings, etc.
  - Non reproducible software errors
- Any services which OPTIMUM GmbH or one of its agents performs in order to fulfill in the frame of an additional guarantee are neither an acceptance of the defects nor an acceptance of its obligation to compensate. Such services do neither delay nor interrupt the warranty period.
- Place of jurisdiction among traders is Bamberg.
- If one of the above mentioned agreements is totally or partially inefficient and/or null, it is considered as agreed what is closest to the will of the warrantor and which remains in the framework of the limits of liability and warranty which are predefined by this contract.

### 8.4 Note regarding disposal / options to reuse:

Please dispose of your device environmentally friendly by disposing of scrap in a professional way.

Please neither throw away the packaging nor the used machine later on, but dispose of them according to the guidelines established by your city council/municipality or by the corresponding waste management enterprise.

#### 8.4.1 Decommissioning

##### CAUTION!

**Immediately decommission used machines in order to avoid later misuse and endangering of the environment or of persons.**

- **Disconnect the plug from the power supply.**
- **Cut the connection cable.**
- **Remove all environmentally hazardous operating fluids from the used device.**





- If applicable remove batteries and accumulators.
- Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.
- Supply the machine components and operating fluids to the provided disposal routes.

## 8.4.2 Disposal of the packaging of new devices

All used packaging materials and packaging aids of the machine are recyclable and generally need to be supplied to the material reuse.

The packaging wood can be supplied to the disposal or the reuse.

Any packaging components made of cardboard box can be chopped up and supplied to the waste paper collection.

The films are made of polyethylene (PE) and the cushion parts are made of polystyrene (PS). These materials can be reused after reconditioning if they are forwarded to a collection station or to the appropriate waste management enterprise.

Only forward the packaging materials correctly sorted to allow a direct reuse.

## 8.4.3 Disposing of the old device

### INFORMATION

Please take care in your interest and in the interest of the environment that all component parts of the machine are only disposed of in the intended and admitted way.

Please note that the electrical devices include lots of reusable materials as well as environmentally hazardous components. Account for separate and professional disposal of the component parts. In case of doubt, please contact your municipal waste management. If appropriate, call on the help of a specialist waste disposal company for the treatment of the material.



## 8.4.4 Disposal of electrical and electronic components

Please make sure that the electrical components are disposed of professionally and according to the legal regulations.

The device includes electric and electronic components and must not be disposed of with the rubbish. According to the European directive 2002/96/EG regarding electrical and electronic used devices and the execution of national rights used electrical tools and electrical machines need to be collected separately and be supplied to an environmentally compatible reuse.

Being the machine operator you should obtain information regarding the authorized collection or disposal system which applies for your company.

Please make sure that the batteries and/or accumulators are disposed of in a professional way according to the legal regulations. Please only throw discharged batteries in the collection boxes in shops or at municipal waste management companies.



### 8.4.5 Disposal of lubricants and coolants

#### ATTENTION!

Please imperatively make sure to dispose of the used coolant and lubricants in an environmentally compatible way. Observe the disposal notes of your municipal waste management companies.



#### INFORMATION

Used coolant emulsions and oils should not be mixed up since it is only possible to reuse used oils which had not been mixed up without pre-treatment.

The disposal notes for the used lubricants are made available by the manufacturer of the lubricants. If necessary, request the product-specific data sheets.



### 8.5 Disposal via municipal collection

Disposal of used electrical and electronic components

(Applicable in the countries of the European Union and other European countries with a separate collecting system for those devices).

The sign on the product or on its packing indicates that the product must not be handled as common household waste, but that it needs to be delivered to a central collection point for recycling. Your contribution to the correct disposal of this product will protect the environment and the health of your fellow men. The environment and the health are endangered by incorrect disposal. Recycling of material will help to reduce the consumption of raw materials. Your District Office, the municipal waste collection station or the shop where you have bought the product will inform you about the recycling of this product.



### 8.6 RoHS , 2002/95/CE

The sign on the product or on its packing indicates that this product complies with the European guideline 2002/95/EC .



### 8.7 Product follow-up

We are required to perform a follow-up service for our products which extends beyond shipment.

We would be grateful if you could send us the following information:

- Modified settings
- Experiences with the drilling-milling machine, which could be important to other users
- Recurring failures

Optimum Maschinen Germany GmbH

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D-96103 Hallstadt

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## EC - Declaration of Conformity

Machinery Directive 2006/42/EC Annex II 1.A

**The manufacturer /  
retailer:** Optimum Maschinen Germany GmbH  
Dr.-Robert-Pfleger-Str. 26  
D- 96103 Hallstadt

**hereby declares that the following product,**

**Type of machine:** mill drill

**Type designation:** BF30Vario

**Serial number:** \_ \_ \_ \_ \_

**Year of manufacture:** 20\_\_

Manual geared drill with with frequency converter for speed control for private persons as well as for craft and industrial plants which meets all the relevant provisions of the above mentioned Directive 2006/42/EC as well as the other directives applied (below) including their amendments in force at the time of declaration. The following other EU Directives have been applied: EMC Directive 2014/30/EC, Low Voltage Directive 2014/35/EC

The safety objective meet the requirement of EC Directive 2006/42/EC

### The following harmonized standards were applied:

EN 1037:1995+A1:2008 Safety of machinery - Prevention of unexpected start-up

EN ISO 14119 Safety of machinery - Interlocking devices associated with guards - Principles for design and selection

EN 61800-5-1 Adjustable speed electrical power drive systems 2008-04 + correction 2

EN 61800-3:2012-09 Adjustable speed electrical power drive systems + correction 1

EN 13128:2001+A2:2009/AC:2010 Safety of machine tools - Milling machines (including boring machines)

EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

EN 60204-1:2006/AC: 2010 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

EN ISO 13849 - Safety of machinery - Safety-related parts of control systems

DIN EN 55011 class A: 2003-08 Industrial, scientific radio-frequency equipment

EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)

EN ISO 13857:2008 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs

Responsible for documentation: Kilian Stürmer, phone: +49 (0) 951 96555 - 800

Address: Dr.-Robert-Pfleger-Str.26D - 96103 Hallstadt

Kilian Stürmer Hallstadt, 2015-01-19  
(CEO, General manager)



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## Quellenverzeichnis von Ihrem Fachhändler Metallbau Mehner

Optimum Fräsmaschinen und CNC Fräsmaschinen:  
Optimum OPTImill BF 30V Übersicht

- OPTImill BF 30V
  - OPTImill BF 30V Ersatzteile
  - OPTImill BF 30V Zubehör
  
- CNC OPTImill BF 30V
  
  
- OPTImill Zubehör

### **Ihr Ersatzteil nicht in den Listen?**

Direkt zum >>**Formular Download**<<. Tragen sie Ihr Maschinenmodell, samt Bauteil und Artikelnr. ein und wir unterbreiten Ihnen ein Angebot.

### **Allgemeine Betriebsmittel**

- Öle und Schmiermittel
- Minimalmengenschmierung

### **Weitere interessante Verweise**

- Bohrmaschinen / CNC Steuerungen
- Drehmaschinen / CNC Drehmaschinen
- Drucklufttechnik / Kompressoren