



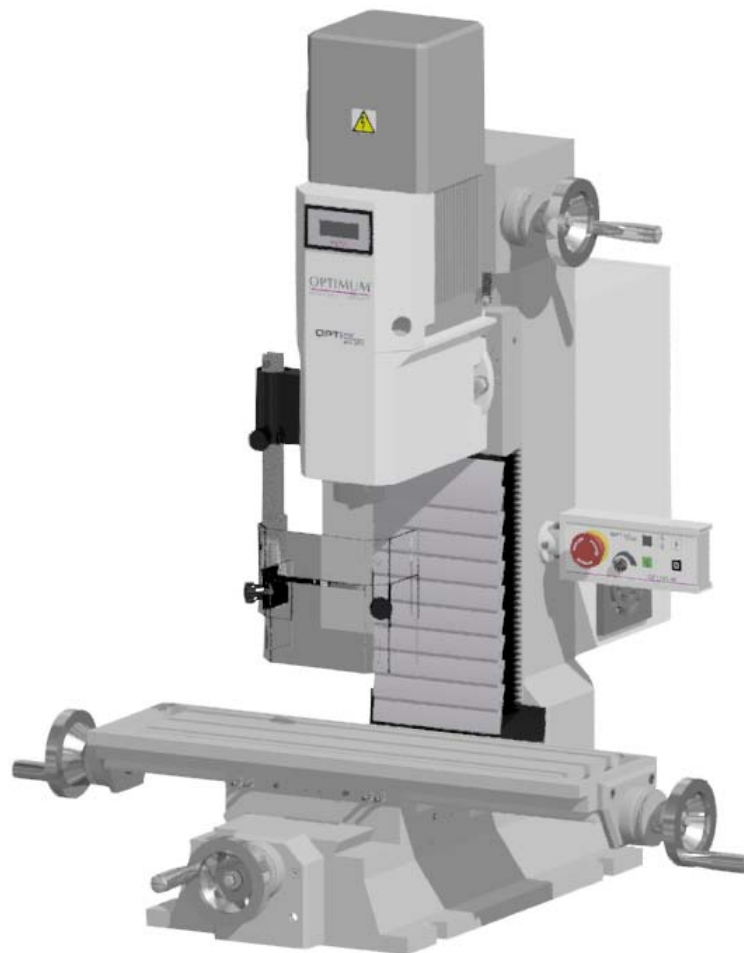
# Operating Instructions

Version 1.0.2

## Milling machine

**OPTImill**<sup>®</sup>  
**MH 25V**

Part no. 333 8155





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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

Mail: info@optimum-maschinen.de

Internet: www.optimum-maschinen.com



## 1 Safety

### Glossary of symbols

	provides further instructions
	calls on you to act
	Listings

This part of the operating instructions

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

In addition to these operation instructions, please observe

- the applicable laws and regulations,
- the statutory provisions for accident prevention,
- the prohibition, warning and mandatory signs as well as the warning notes on the milling machine.

When installing, operating, maintaining and repairing the milling machine, the relevant standards must be observed.

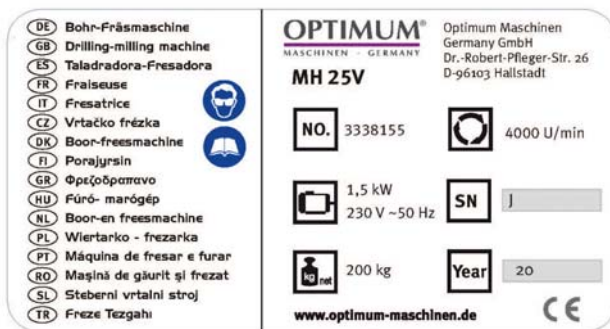
If European standards have not yet been incorporated in the national legislation of the country in question, the specific applicable regulations of each country must be observed.

If necessary, relevant measures must be taken to comply with national regulations before commissioning the milling machine.

Always keep this documentation close to the milling machine.

If you want to re-order the operating instructions for your machine, please quote the relevant serial number. The serial number can be found on the type plate.

### 1.1 Rating plate





## INFORMATION

If you are unable to rectify an issue using these operating instructions, please contact us for advice:



Optimum Maschinen Germany GmbH  
 Dr. Robert-Pfleger-Str. 26  
 D-96103 Hallstadt, Germany  
 Email: info@optimum-maschinen.de

## 1.2 Safety instructions (warning notes)

### 1.2.1 Classification of hazards

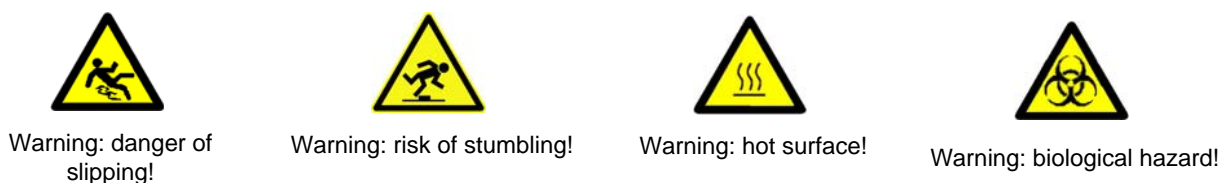
We classify safety instructions into different categories. The table below gives an overview of the classification of symbols (pictograms) and the signal words for each specific danger and its (possible) consequences.

Symbol	Signal word	Definition/consequence
	<b>DANGER!</b>	Imminent danger that will cause serious injury or death.
	<b>WARNING!</b>	A danger that can cause serious injury or death.
	<b>CAUTION!</b>	A danger or unsafe procedure that can cause personal injury or damage to property.
	<b>ATTENTION!</b>	Situation that could cause damage to the milling machine and product, as well as other types of damage. No risk of injury to persons.
	<b>INFORMATION</b>	Practical tips and other important or useful information and notes. No dangerous or harmful consequences for persons or property.

In case of specific dangers, we replace the pictogram with



### 1.2.2 Other pictograms





Warning: automatic start-up!



Warning: tilting danger!



Warning: suspended loads!



Caution, danger of explosive substances!



Switching on forbidden!



Read the operating instructions before commissioning!



Pull out the mains plug!



Wear protective glasses!



Wear protective gloves!



Wear safety shoes!



Wear a protective suit!



Use ear protection!



Only switch during standstill!



Protect the environment!



Contact address

### 1.3 Intended use

#### WARNING!

In the event of improper use, the milling machine

- may be a hazard to personnel,
- the machine and other property of the operating company and
- the functionality of the milling machine may be compromised.



The 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 when commercial milling and drilling tools are used.

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

If the milling machine is used in any way other than described above, or modified without the approval of Maschinen Germany GmbH, then the 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 explicitly point out that any construction, technical or process engineering changes that have not been approved by Optimum Maschinen Germany GmbH will render the warranty null and void. It is also part of the intended use that you

- observe the limits of the milling machine,
- observe the operating instructions,
- and comply with the inspection and maintenance instructions.

📖 Technical specification on page 17



## WARNING!

**Extremely severe injuries due to non-intended use.**

**It is forbidden to make any modifications or alternations to the operating parameters values of the milling machine. They could pose an accident hazard to persons and cause damage to the milling machine.**



### 1.4 Reasonably foreseeable misuse

Any use other than that specified under "Intended use" or any use beyond that described will be deemed non-intended use and is not permissible.

Any other use must be discussed with the manufacturer.

Only metallic, cold and non-flammable materials may be machined with the milling machine.

In order to avoid misuse, the operating instructions must be read and understood before first commissioning.

Operators must be duly qualified.

#### 1.4.1 Avoiding misuse

- Use of suitable cutting tools.
- Adapting the speed setting and feed to the material and workpiece.
- Clamp workpieces firmly and free of vibration.
- Risk of fire and explosion due to the use of flammable materials or cooling lubricants.  
Before processing inflammable materials (e.g. aluminium, magnesium) or using inflammable auxiliary materials (e.g. spirit), you need to take additional preventive measures in order to avoid health risks.
- When processing plastics, the machine operator must ensure that static electricity generated during the machining process can be discharged easily.
- When processing carbons, graphite and carbon-fibre-reinforced carbons, the machine is no longer being used as intended. This causes the warranty to be null and void. When processing carbons, graphite and carbon-fibre-reinforced carbons and similar materials, the machine can be damaged extremely quickly, even if the dusts generated are completely sucked out during the work process.

## ATTENTION!

**The workpiece must always be fixed in a machine vice, chuck or by another appropriate clamping tool such as clamping claws.**



## WARNING!

**Risk of injury caused by flying workpieces.**

- Clamp the workpiece in the machine vice. Make sure that the workpiece is firmly clamped in the machine vice and that the machine vice is firmly clamped onto 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.
- Set the bearing clearance and guides correctly.



Recommendations:

- Insert the drill in a way that it is positioned exactly between the three clamping jaws of the drill chuck.
- Clamp end mills (or shank cutters) in a collet chuck using the corresponding collets.
- Clamp end face mills using 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,
- if there is too much pressure, the drill will wear quickly and may even break or jam in the borehole. If the drill jams, immediately stop the main motor by pressing the emergency stop button,
- use commercial cooling/lubricating agents for hard materials, e.g. steel and
- generally always back the spindle out of the workpiece while it is still turning.

## ATTENTION!

Do not use the drill chuck as a milling tool. Never clamp a milling cutter into a drill chuck. Use a collet chuck and appropriate collets for end mills.



When milling, ensure that

- the right cutting speed is selected;
- for workpieces with normal strength values, e.g. steel, 18-22 m/min,
- for workpieces with higher strength values 10-14 m/min,
- the pressure is selected so that the cutting speed remains constant,
- normal trade coolants/lubricants are used for hard materials.

## INFORMATION

The MH25V milling machine is built to comply with EMC Class C2 to EN 61800-3.



## WARNING!

**Class C (machine tools) is not intended for use in residential buildings, in which the power supply is provided 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.**



## 1.5 Possible dangers posed by the milling machine

The milling machine was built using state-of-the-art technology.

Nevertheless, there is a residual risk, as the milling machine operates with

- high speeds,
- circulating parts and tools and
- electrical voltage and currents.

We have used design and safety engineering to minimize the health risk to personnel resulting from these hazards.

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

## INFORMATION

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

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



Always disconnect the milling machine from the electrical power supply before performing cleaning or maintenance tasks.



## WARNING!

The milling machine may only be used with fully functional safety devices.

Disconnect the 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 must be equipped with the stipulated safety devices. This is your responsibility as the operator!

 Safety devices on page 12



## 1.6 Personnel qualification

### 1.6.1 Target group

This manual is addressed to

- operators,
- users and
- maintenance personnel.

Consequently, the warning notes refer both to the use of the milling machine and to its maintenance.

## WARNING!

Always isolate the milling machine from the electrical power supply. This will prevent it from being used by unauthorized persons. The qualifications of the personnel for the different tasks are mentioned below:

### User

The user must have been instructed by the operator about the assigned tasks and possible risks in case of improper behaviour. The user may only carry out tasks that exceed normal operation if this is stated in these instructions and the operator has explicitly entrusted him with the task.

### Qualified electrician

With professional training, knowledge and experience as well as knowledge of respective standards and regulations, qualified electricians are able to perform work on the electrical system and recognise and avoid any possible dangers. Qualified electricians have been specially trained for the working environment, in which they are working and know the relevant standards and regulations.

### Qualified personnel

Because of their specialist training, knowledge and experience as well as their understanding of the relevant regulations, qualified personnel is capable of carrying out tasks assigned to them and recognise and avoid potential hazards without supervision.

### Instructed person

An instructed persons has been instructed by the operator regarding the assigned tasks and the possible risks of improper behaviour.

## INFORMATION

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

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

In the event of improper use

- there may be a risk to personnel,





- the milling machine and other property and
- the functionality of the milling machine may be compromised.

## 1.6.2 Authorized personnel

### WARNING!

**Inappropriate operation and maintenance of the machine constitutes a danger for personnel, property and the environment.**



**Only authorized personnel may operate the machine!**

Authorized operating and maintenance personnel are specialists instructed and trained by the operator and the manufacturer.

## 1.6.3 Operator's obligations

The operator must instruct personnel at least once a year in

- all safety regulations relevant to the machine,
- its operation and
- generally accepted engineering standards.

The operator must also

- check the personnel's knowledge level,
- document the training/instruction,
- have attendance at the training/instruction confirmed by signature and
- check whether personnel is working in a manner that shows awareness of safety and risks.
- Define and document the machine inspection deadlines in accordance with section 3 of the Factory Safety Order and perform an operational risk analysis in accordance with section 6 of the Safety at Work Act.

## 1.6.4 User's obligations

The user must

- have read and understood the operating instructions,
- be familiar with all safety devices and regulations and
- be able to operate the machine.

## 1.6.5 Additional requirements regarding qualification

The following additional requirements apply for work on electrical components or equipment:

- They must only be performed by a qualified electrician or person working under the instructions and supervision of a qualified electrician.

Before starting work on electrical parts or operating agents, the following actions must be taken in the order given:

- disconnect all poles,
- secure against restarting,
- check that there is no voltage.

## 1.7 User positions

The user position is in front of the milling machine.



## 1.8 Safety measures during operation

### CAUTION!

**Danger due to inhaling dust and mist that are hazardous to health.**

Depending on the materials to be machined and the agents used, dusts and mists can arise that are detrimental to health.

Ensure that the harmful dust and mist generated are safely sucked off at the point of origin and routed away from the working area or filtered. To do so, use a suitable extraction unit.



### CAUTION!

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

Extra precautionary measures must be taken before machining flammable materials (e.g. aluminium, magnesium) or using combustible agents (e.g. spirit) to avert a health hazard.



## 1.9 Safety devices

The milling machine must only be operated with fully functional safety devices.

Stop the milling machine immediately if there is a failure on the safety device or becomes ineffective.

This is your responsibility!

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

- have eliminated the cause of the fault and
- have verified that there is no danger to personnel or objects.

### WARNING!

**If you bypass, remove or override a safety device in any other way, you are endangering yourself and other persons working with the milling machine. The possible consequences include:**

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



### WARNING!

Although the isolating safety devices provided and delivered with the machine are designed to reduce the risks of workpieces being ejected or parts of tools or workpieces breaking off, they cannot eliminate these risks completely. Always work carefully and observe the limits of the machining process.





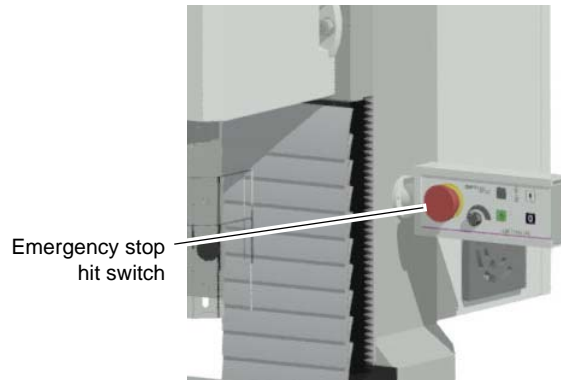
## 1.9.1 Emergency stop button

### CAUTION!

The spindle continues to rotate for a while, depending on the moment of inertia of the spindle and the tool in use.

The emergency stop button brings the machine to a standstill.

Turn the knob to the right to unlock and release the emergency stop button.



Emergency stop hit switch

Img. 1-1: Emergency stop button



### CAUTION!

Only press the emergency stop button in a genuine emergency. Do not use the emergency stop button to stop the machine during normal operation.



## 1.9.2 Lockable master switch

The lockable master switch can be secured in the "0" position by means of a padlock to guard against the milling machine being switched on accidentally or by an unauthorised person.

The power supply is cut off when the master switch is in the off position.

This excludes the points marked in the pictogram.

### WARNING!

Dangerous voltage even if the main switch is switched off. The areas marked by the pictogram might contain live parts, even if the main switch is switched off.



## 1.9.3 Stored charge

### WARNING!

The frequency converter contains capacitors that remain charged with a potentially lethal voltage after the machine has been isolated from the mains. If the frequency controller was under power, it must be disconnected from the power supply for at least 10 minutes. Before continuing to work, ensure there is no voltage. Normally, the capacitors are discharged by an internal resistor. In certain unusual error conditions, it is possible that the capacitors are not discharged or that a discharge is prevented by voltage on the adjacent motor connection terminals. If the frequency converter has a technical defect, so that nothing is shown on the display, the capacitors may not be discharged.





## 1.9.4 Separation guard

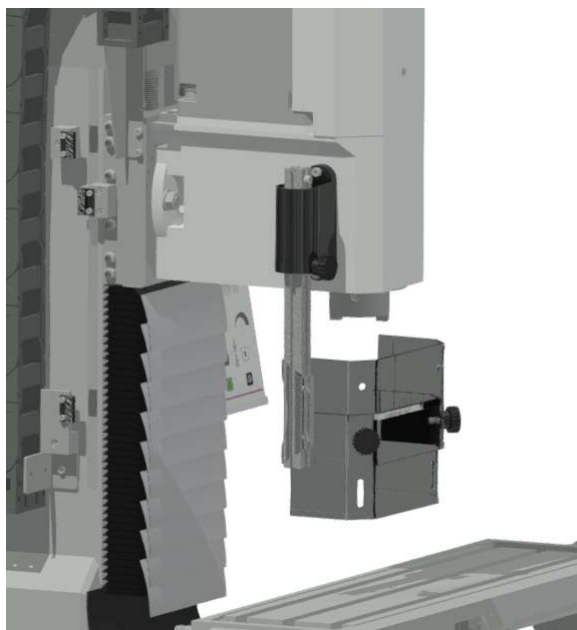
Adjust the guard to the correct height before you start working.

To do so, slacken the clamping screw, set the required height and re-tighten the clamping screw.

There is a switch integrated in the spindle protection mounting which monitors the closed position.

### INFORMATION

The machine cannot be started, if the spindle protection is not closed.



Img.1-2: Separation guard

## 1.10 Safety check

Check the milling machine regularly.

Check all safety devices

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

General check		
Equipment	Check	OK
Guards	Mounted, firmly bolted and not damaged	
Signs, Markers	Installed and legible	

Functional check		
Equipment	Check	OK
Emergency stop button	After the emergency stop button is pressed, the milling machine must switch off. It must only be possible to restart the machine, if the emergency stop button is unlocked and the ON switch has been pressed.	
Separation guard around the drill and milling spindle	The milling machine may switch on only when the guard is closed.	



## 1.11 Personal 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 work where your face and eyes are exposed to hazards.

Wear protective gloves when handling pieces with sharp edges.

Wear 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 required personal protective equipment is available at the workplace.

### CAUTION!

**Dirty or contaminated personal protective equipment can cause illness. It must be cleaned after each use and at least once a week.**

## 1.12 For your own safety during operation

### WARNING!

**Before switching the milling machine on, make sure that there is no risk of personal injury or damage to property.**

Avoid any unsafe work methods:

Make sure that your operation does not create a safety hazard.

- The rules specified in these operating instructions must be observed during assembly, operation, maintenance and repair.
- Use protective glasses!
- Switch off the milling machine before measuring the workpiece.
- Do not work on the milling machine, if your concentration is reduced, for example, because you are taking medication.
- Stay at the milling machine until the movements have stopped completely.
- Use the specified personal protective equipment. Ensure you wear close-fitting clothing 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 agents to remove drilling and milling chips.
- Ensure that your work does not create a safety risk.
- Clamp the workpiece securely and firmly before switching on the milling machine.

We specifically point out the dangers in the description of work with and on the drilling machine.

## 1.13 Switching-off and securing the milling machine

Disconnect the mains plug before starting maintenance and repairs.





## 1.14 Using lifting equipment

### WARNING!

The use of unstable lifting and load suspension equipment that might break under load can cause severe or fatal injuries.

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

Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other supervisory authorities applicable to your company.

Fasten loads properly.

Never walk under suspended loads!



## 1.15 Symbols on the milling machine

Make sure that the mandatory and warning symbols are legible.

## 1.16 Electrical system

Have the electrical equipment on the machine checked regularly. Rectify all defects such as loose connections, defective wires, etc. immediately.

A second person must be present during work on live components to disconnect the power in the event of an emergency. If there is a fault in the power supply, switch off the milling machine immediately!

Comply with the required inspection intervals in accordance with the factory safety directive, operating equipment inspection.

The machine operator must ensure that the electrical systems and operating materials are checked for serviceability

- by a qualified electrician or under the supervision and direction of a qualified electrician, prior to initial commissioning and after modifications or repairs, prior to recommissioning
- and at set intervals.

The intervals must be set so that foreseeable defects can be detected in a timely manner, when they occur.

The relevant electro-technical rules must be followed during the inspection.

No check is required before first commissioning, if the manufacturer or installer has confirmed to the operator that the electrical system and operating materials have been procured in accordance with the stipulations of the accident prevention regulations.

Permanently installed electrical systems and operating materials are considered constantly monitored if they are continually serviced by qualified electricians and inspected by means of measurements during operation (e.g. monitoring the insulation resistance).

## 1.17 Inspection deadlines

Define and document the inspection intervals for the machine in accordance with section 3 of the Factory Safety Order and perform an operational risk analysis in accordance with section 6 of the Safety at Work Act. The inspection intervals in the maintenance section should be used as reference values.





## 2 Technical specification

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

<b>2.1 Electrical connection</b>	<b>MH25V</b>
Total connected load	230V/50 Hz/2 kW
Milling spindle motor power	1.5 kW; 10 Nm
<b>2.2 Milling capacity</b>	
Max. end mill cutter size [ mm]	max. Ø 25
Max. milling head size [ mm]	max. Ø 50
<b>2.3 Spindle seat</b>	
Spindle seat	Taper JIS (MAS 403 BT30)
Pull stud	BT30x45°
Maximum distance between spindle nose - milling table [mm]	300



<b>2.4 Drill-mill head</b>	
Z axis travel [mm]	270
Throat [mm]	185
Z axis handwheel scale	4mm/rev - graduation 0.02mm
<b>2.5 Milling table</b>	
Table length [mm]	620
Table width [mm]	180
Max. bearing load	30 kg
T-slot size/distance/number	12mm / 50mm / 3
X axis travel [mm]	400
X axis handwheel scale	4mm/rev - graduation 0.02mm
Y axis travel [mm]	210
Y axis handwheel scale	4mm/rev - graduation 0.02mm
Distance spindle - table max. [mm]	300
<b>2.6 Dimensions</b>	
	Dimensions on page 22
Total weight [kg]	192
<b>2.7 Work area</b>	
	Keep a work area of at least one metre around the machine free for operation and maintenance.
<b>2.8 Speeds</b>	
Electronically variable speed [ rpm]	200 - 4000
<b>2.9 Environmental conditions</b>	
Temperature	5-35°C
Humidity	25-80%
<b>2.10 Operating material</b>	
Bare steel parts	Mobilgrease OGL 007 or, Mobilux EP 004, acid-free oil, e.g. weapon oil, motor oil
<b>2.11 Emissions</b>	
Maximum sound pressure level at 1 m distance from the machine and 1.60 m above the ground.	79 dB(A) on no load running



## CAUTION!

The machine operator should use hearing protection.

## INFORMATION

This numerical value was measured on a new machine under the operating conditions specified by the manufacturer. The noise behaviour of the machine might change depending on its age and wear. Furthermore, the noise emission also depends on production engineering factors, e.g. speed, material and clamping conditions.





## 3 Delivery, interdepartmental transport, assembly and commissioning

### 3.1 Notes on transport, installation, commissioning

Improper transport, installation and commissioning is liable to accidents and can cause damage or malfunctions to the machine for which we do not assume any liability or guarantee.

Transport the scope of delivery secured against shifting or tilting with a sufficiently dimensioned industrial truck or a crane to the installation site.

#### 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 box.**



**Note the total weight of the machine. The weight of the machine is indicated in the "Technical data" of the machine. When the machine is unpacked, the weight of the machine can also be read on the rating plate.**

**Only use transport devices and load suspension gear that can hold the total weight of the machine.**

#### WARNING!

**The use of unstable lifting and load suspension equipment that might break under load can cause severe injuries or even death. Check that the lifting and load suspension gear has sufficient load-bearing 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.**

#### 3.1.1 General risks during internal transport

##### WARNING: TILTING DANGER!

**The machine may be lifted unsecured by a maximum of 2 cm.**

**Employees must be outside the danger zone, i.e. the reach of the load.**

**Warn employees and advise them of the hazard.**

Machines may only be transported by authorized and qualified persons. Act responsibly during transport and always consider the consequences. Refrain from daring and risky actions.

Gradients and descents (e.g. driveways, ramps and the like) are particularly dangerous. If such passages are unavoidable, special caution is required.

Before starting the transport check the transport route for possible danger points, unevenness and faults.

Danger points, unevenness and disturbance points must be inspected before transport. The removal of danger spots, disturbances and unevenness at the time of transport by other employees leads to considerable dangers.

Careful planning of interdepartmental transport is therefore essential.





## 3.2 Scope of delivery

### INFORMATION

The milling machine is delivered pre-assembled.

Check the milling machine immediately after delivery for transport damage, missing parts and loose locking bolts.

Compare the scope of delivery with the attached packing list.



## 3.3 Set-up and assembly

### 3.3.1 Installation site requirements

The workplace for operating, maintenance and repair must not be restricted.

The master switch must be freely accessible.

The illumination of the workplace must be designed in such a manner that an illumination of 500 Lux is attained at the tool tip.

If this is not guaranteed with the normal installation site lighting, workplace lights (available as an option) must be used.

### 3.3.2 Load suspension point

#### WARNING!

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

- Fix the load lifting gear around the drilling-milling head. Use a lifting sling for this purpose.
- Lock all clamping levers on the drilling-milling machine before you lift it.
- Make sure that the attached load does not cause damage to components or paint.



### 3.3.3 Assembly

- Check that the milling machine foundation is horizontal with a spirit level.
- Check that the foundation has sufficient load-bearing capacity and rigidity.

#### ATTENTION!

**Inadequate rigidity of the foundation will cause interaction of vibrations between the milling machine and the foundation (resonant frequency of the components). If the rigidity of the overall system is insufficient, critical speeds with annoying vibrations will be reached very quickly and lead to bad milling results.**

- Place the milling machine on the provided foundation.
- Fix the machine base to the substructure through the holes pre-drilled for this purpose.



#### WARNING!

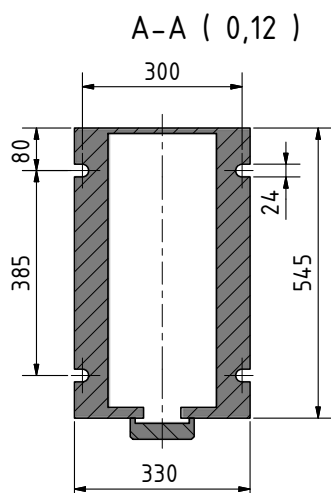
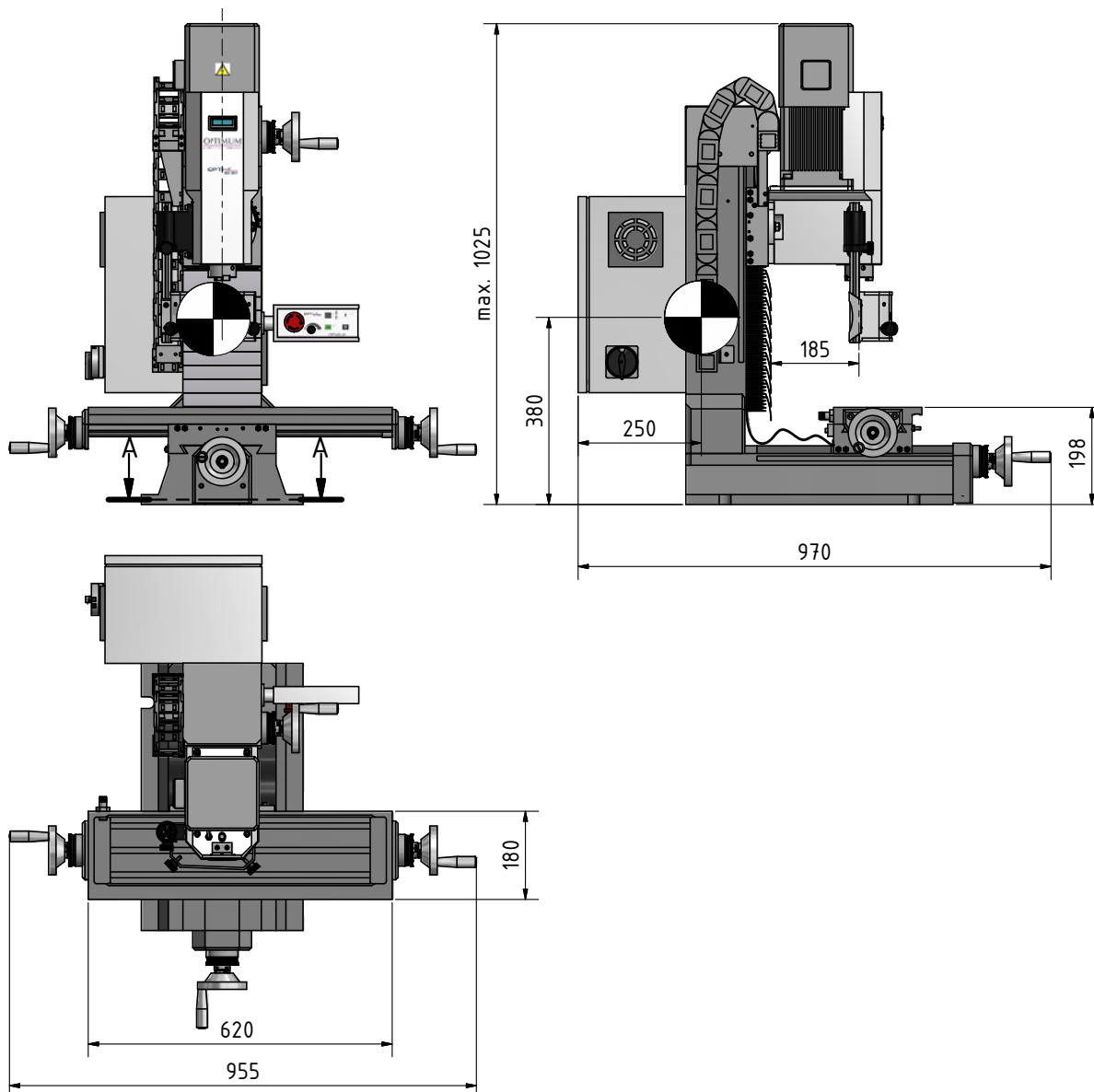
**The nature of the foundation and type of fixings used to secure the machine base to the foundation must be capable of absorbing the loads caused by the milling machine. The foundation must be level. Check that the milling machine foundation is horizontal by using a spirit level.**

Fix the milling machine to its foundation at the recesses provided on the machine base for this purpose. We recommend that you use shear connector cartridges or heavy-duty anchors.





## 3.4 Dimensions



Schwerpunkt / Centre of gravity



### 3.5 First commissioning

**WARNING!**

First commissioning may only take place after proper installation.

First commissioned of the milling machine by inexperienced personnel constitute a risk to personnel and equipment. We do not accept any liability for damages caused by incorrectly performed commissioning.



**ATTENTION!**

Before commissioning the machine, all bolts, fastenings and protections must be checked and retightened as necessary!



**WARNING!**

The use of improper tool holders or their operation at inadmissible speeds constitutes a hazard.

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.

Tool holders may only be modified in compliance with the recommendation of OPTIMUM or the clamping device manufacturer.



Personnel qualification on page 10

### 3.6 Electrical connection

**CAUTION!**

Position the power lead for the machine in such a manner that people cannot trip over it.

Please check whether the type of current, voltage and protection fuse correspond to the values specified. A protective earth conductor connection must be available. Mains fuse 16A. With an internal EMC filter, whether the leakage current is greater than 3.5 mA. We ask for due attention to industrial safety guidelines while carrying out machine tests.



#### 3.6.1 Current in the protective earth conductor

The magnitude of the leakage current in the protective earth conductor depends on whether the internal EMC filter in the Emerson M200 frequency converter is used to control the speed of the milling spindle or not. The standard frequency converter is fitted with an internal EMC filter. Instructions on how to remove the internal filter can be found in the converter manual.

- With the EMC filter, the leakage current is 15.4 mA AC at 230V 50Hz (single phase supply, phase-neutral power supply, neutral point earthed).
- Without an EMC filter, the leakage current is < 1.9 mA (phase-neutral power supply, neutral point earthed).

Therefore, a fixed earth connection is required and the minimum cross section of the protective earth conductor must comply with local safety regulations for devices with high leakage current. This is achieved by providing a permanent fixed earthing connection with two independent conductors, each having a cross section the same as or greater than that of the mains lead. To simplify this, the converter is provided with two earth terminals. Both earthing connections are required to comply with the EN 61800-5-1 standard.

Since the frequency converter can cause a direct current in the protective earthing conductor, the following guidelines must be followed, if an upstream residual current detector (ELCB/RCD) is required in the network:

There are three common FI types (ELCB/RCD):

- AC - to detect AC fault currents



- A - to detect AC fault currents and pulsating DC fault currents (provided the DC current reaches zero at least once every half cycle).
- B - to detect AC fault currents, pulsating DC fault currents and smooth DC fault currents.

The AC type should never be used with converters.

Type A can only be used with single-phase converters.

Type B must be used with 3-phase converters.

When using an external EMC filter, a time delay of at least 50 ms is required to avoid false error shutdowns. The leakage current can exceed the threshold trigger value for an error shutdown, if the phases are not switched on at the same time.

### 3.7 Cleaning and lubrication

- ➔ Remove the anti-corrosive agents which has been applied to the milling machine for transport and storage. We recommend you use paraffin for this purpose.
- ➔ To clean the milling machine, do not use any solvents, nitro-cellulose thinner or other cleaning agents that could damage the paintwork. Observe the cleaning agent manufacturer's information and notes.
- ➔ Grease all exposed machine parts using an acid-free lubricating oil.
- ➔ Lubricate the milling machine in accordance with the lubrication schedule.
  - 🔧 Inspection and maintenance on page 33
- ➔ Check that all spindles are running smoothly. All spindle nuts are re-adjustable.

#### INFORMATION

The milling machine has been painted with **varnish**. This fact must be taken into account when selecting your cooling lubricant.

Optimum Maschinen Germany GmbH does not accept any liability for subsequent damages due to unsuitable cooling lubricants.

The flashpoint of the emulsion must be higher than 140°C.

When using non-water-miscible cooling lubricants (oil content > 15%) with a flashpoint, the occurrence of ignitable aerosol-air mixtures cannot be excluded. This leads to a risk of explosion.







## 4 Operation

### 4.1 Safety

The milling machine must only be operated under the following conditions:

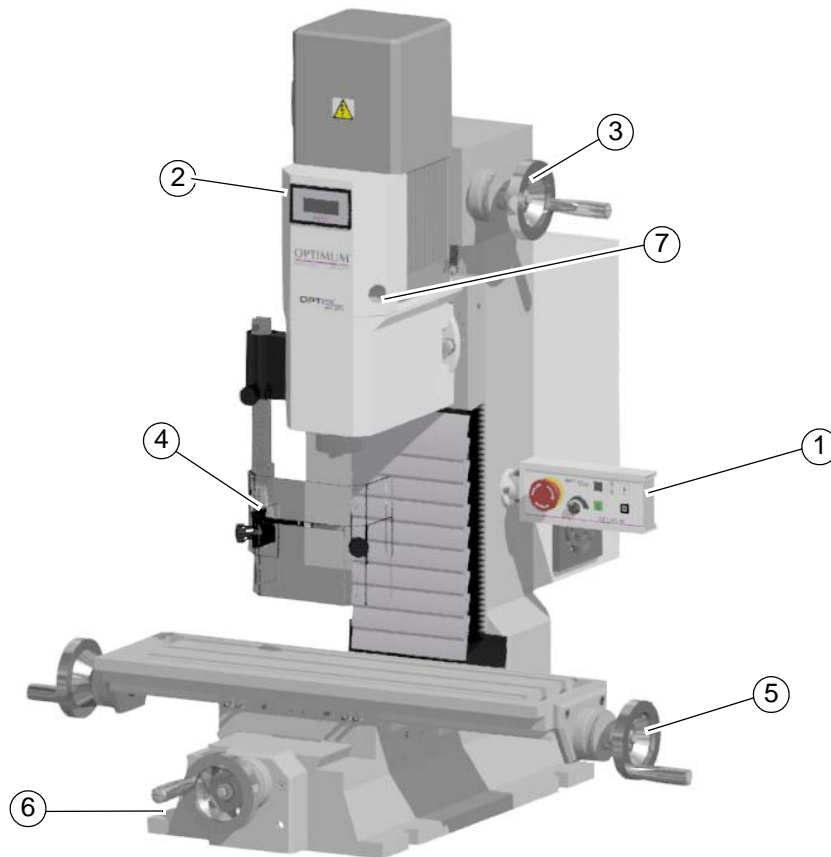
- The milling machine is in proper working order.
- The milling machine is used as intended.
- The operating instructions are followed.
- All safety devices are installed and activated.

Eliminate or have all malfunctions rectified promptly. Stop the 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



Item	Designation	Item	Designation
1	Control panel ☞ Control panel on page 26	2	Rev counter
3	Milling head height adjustment hand crank	4	Spindle protection
5 - 6	Hand crank for milling table	7	Opening Tool quick clamping system

MH25V\_GB\_4\_fm



## 4.2.1 Control panel



Item	Designation	Item	Designation
13	Emergency stop button	15	Spindle rotation ON
16	Spindle rotation OFF	17	Spindle speed setting
18	Spindle direction selection	19	Control ON

## 4.3 Switching the milling machine on

- Switch on the master switch.
- Unlock the emergency stop button.
- Close the spindle protection system.
- Switch the control on.

## 4.4 Switching the milling machine off

- Switch off the master switch.
- Switching-off and securing the milling machine on page 15

### CAUTION!

Only press the **EMERGENCY STOP** button in a genuine emergency. You should not use the **EMERGENCY STOP** button to stop the machine during normal operation.



## 4.5 Resetting an emergency stop situation

- Unlock the emergency stop button again.
- Switch the control on again.
- Switch on the spindle rotation again.

## 4.6 Power failure, Restoring readiness for operation

- Switch the control on again.
- Switch on the spindle rotation again.

## 4.7 Speed setting

The speed may be continuously adjusted in the range from 200 - 4000 rpm using the rotary knob on the control panel.

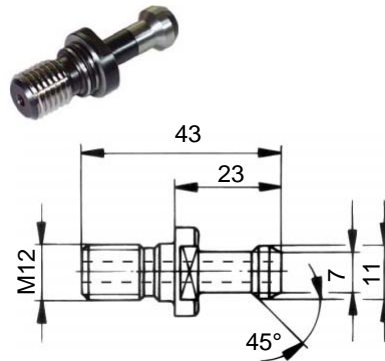


## 4.8 Inserting the tool

### 4.8.1 Quick-change clamping system

The milling head is equipped with a collet chuck for tightening with pull stud BT30x45 °.

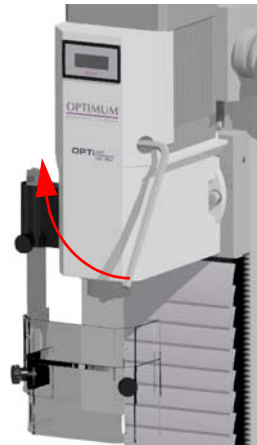
- Tightening pull stud into the taper.
- Clean the seat in the milling spindle.
- Clean the cone of your tool.
- Place the tool into the milling spindle. Put a 10mm Allen key in the mounting hole and turn it clockwise to open the collet chuck.



Img.4-1: pull stud

### 4.8.2 Removal

- Hold the tool.
- Put a 10mm Allen key in the mounting hole and turn it clockwise to open the collet chuck.



Img.4-2: MAS BT30



## 4.8.3 With draw bar - until version 1.0 ( Building year to 10/2015)

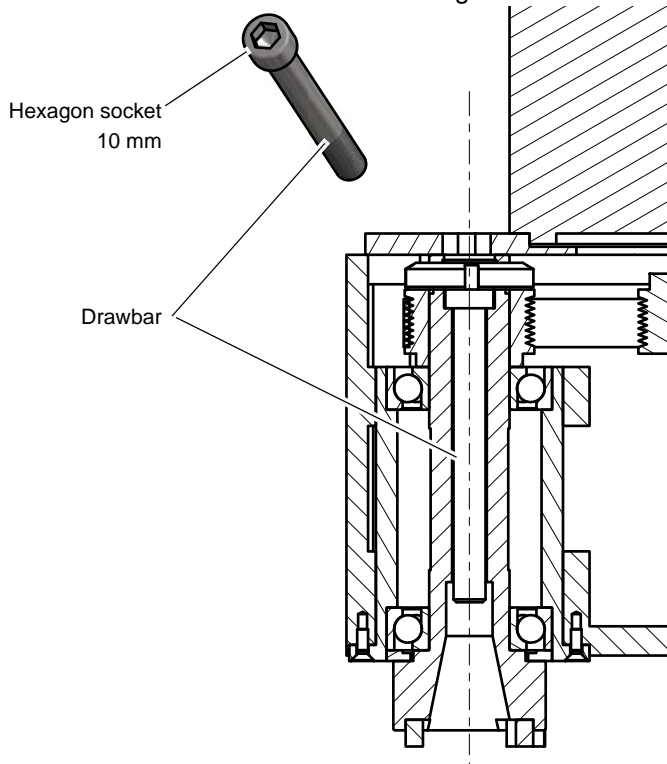
### CAUTION!

When milling, the seat cone must always be secured with the drawbar. A simple connection with the taper bore of the work spindle without using the drawbar is not permissible for milling. The cone connection is released by lateral pressure. Injuries may be caused by parts flying off.



The milling head is fitted with an M12 drawbar with a 10 mm hexagon socket.

- Clean the seat in the milling spindle.
- Clean the cone of your tool.
- Place the tool into the milling spindle.
- Screw the drawbar into the tool and tighten the drawbar securely.



Img.4-3: Drawbar

## 4.8.4 Removal

- Loosen the drawbar and turn it further to release the conical joint.



## 4.8.5 Use of collets

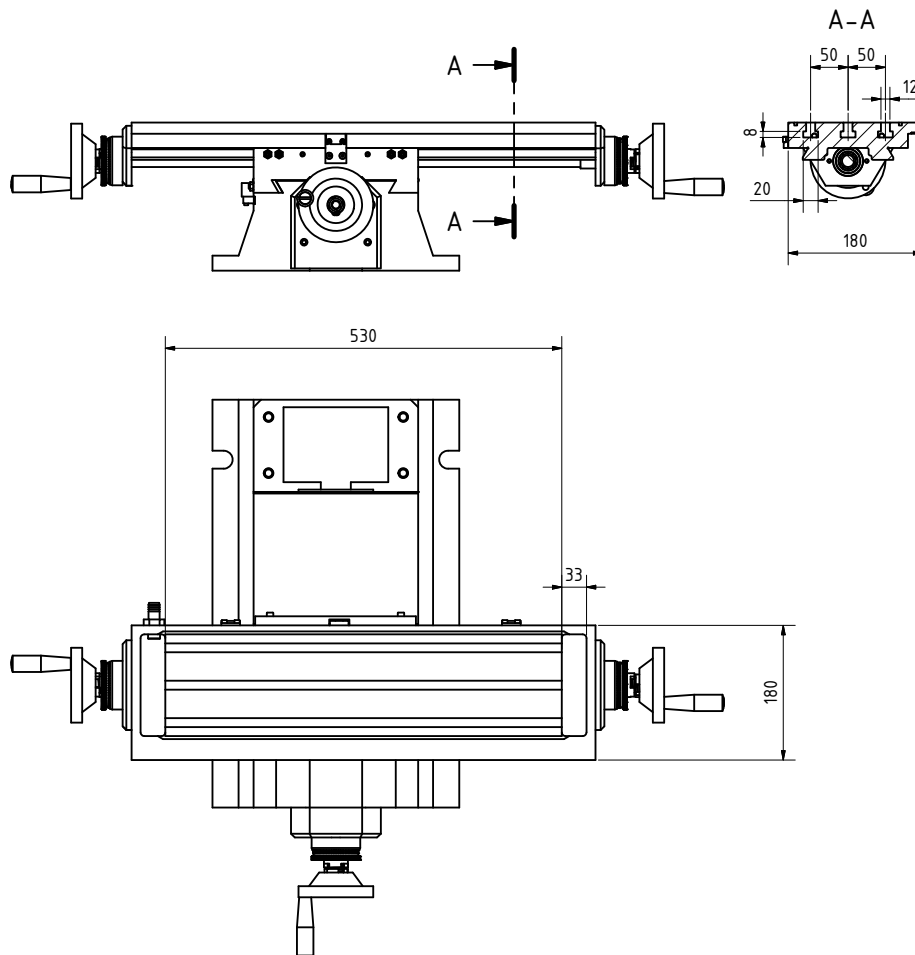
If collets are used to house milling tools, higher machining tolerance can be achieved. The collet may easily and quickly be changed for a smaller or larger end mill with no need to remove the complete tool. The collet is pressed into the ring of the swivel nut and must rest there by itself. The milling cutter is clamped by fastening the swivel nut on the tool. Make sure that the correct collet is used for each milling cutter diameter, so that the milling cutter may be fastened securely and firmly.

## 4.9 Clamping the workpieces

### CAUTION!

Injuries can be caused by parts flying off.

The workpiece must always be secured to the milling table in a machine vice, chuck or with another suitable clamping tool, such as clamping claws.



Img.4-4: Milling table

## 4.10 Swivelling the milling head

The milling head can be swivelled to the right and to the left.

- ➔ Loosen 2 fixing screws on the milling head.
- ➔ Turn the drill-mill head to the desired position.
- ➔ Retighten the fastening screws.



## 4.11 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. The service life of the tool can be increased and the working result optimized by selecting the correct cutting speed.

The ideal cutting speed basically depends on the workpiece and the tool material. Higher speeds are possible with tools (mills) made from hard metal or cutting ceramics than with tools made from high-alloy high speed steel (HSS). You will achieve the ideal cutting speed by selecting the correct rotation speed.

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

The required speed is calculated as follows:

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

n = speed in rpm (revolutions per minute)

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

d = tool diameter in m (metres)

### 4.11.1 Standard values for cutting speeds

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

Tool	Steel	Grey cast iron	Al alloy case-hardened
Plain milling cutters and shell end mills [m/min]	10 - 25	10 - 22	150 - 350
Relieved milling cutters [m/min]	15 - 24	10 - 20	150 - 250
Cutter head with SS [m/min]	15 - 30	12 - 25	200 - 300
Cutter head with HM [m/min]	100 - 200	30 - 100	300 - 400

This results in the following standard speeds, dependent on mill diameter, mill type and material.

Tool diameter [mm] plain milling cutters and shell end mills	Steel 10 - 25 m/min	Grey cast iron 10 - 22 m/min	Al alloy case-hardened 150 - 350 m/min
	Speed [rpm]		
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 mills	Steel 15 - 24 m/min	Grey cast iron 10 - 20 m/min	Al alloy case-hard- ened 150 - 250 m/min
	Speed [rpm]		
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

#### 4.11.2 Standard values for speeds with HSS – Eco – twist drills

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	
Mild steel, alloyed, tempered, 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	
Mild steel, alloyed, tempered, up to 1200 N/mm <sup>2</sup>	n	2500	1600	1250	1000	800	710	630	560	500	Oil
	f <sup>3)</sup>	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 rpm											
2): Feed [f] in mm/rev											
3): Cooling: E = Emulsion; oil = cutting oil											

- The above data are standard values. In some cases it may be advantageous to increase or decrease these values.
- A cooling or lubricating agent should be used when drilling.
- For stainless materials (e.g. VA – or NIRO steel sheets) do not centre, as this will result in the material compacting and the drill bit rapidly becoming blunt.
- The workpieces need to be tensed inflexibly and stably (vice, screw clamp).

#### INFORMATION

Friction during the cutting process causes high temperatures at the cutting edge of the tool. 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.





## 5 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- Repair

of the milling machine.

### ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

- operational safety,
- failure-free operation,
- a long working life of the 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 incorrectly executed maintenance and repair work can be:

- extremely serious injuries to those working on the milling machine and
- damage to the milling machine.

Maintenance and repair work on the milling machine must be carried out by qualified technical personnel only.



#### 5.1.1 Preparation

##### WARNING!

Only work on the milling machine if it has been disconnected from the power supply.

☞ Switching-off and securing the milling machine on page 15

Attach a warning sign.



#### 5.1.2 Restarting

Before restarting, run a safety check.

☞ Safety check on page 14

##### WARNING!

Before starting the milling machine, it is essential that you ensure that this does not constitute a risk to personal safety or damage to the milling machine.

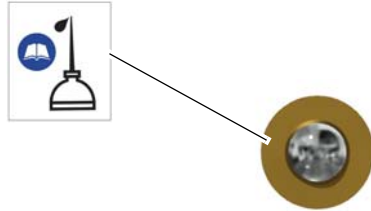




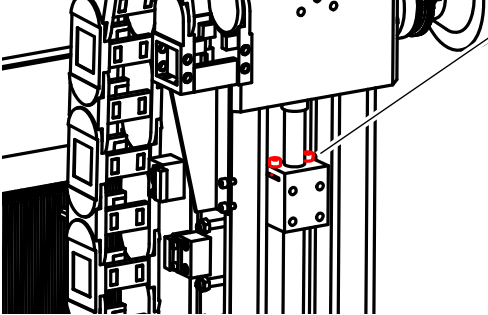
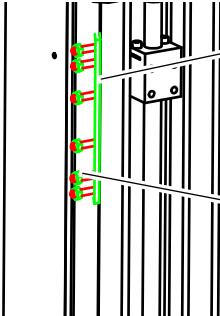


## 5.2 Inspection and maintenance

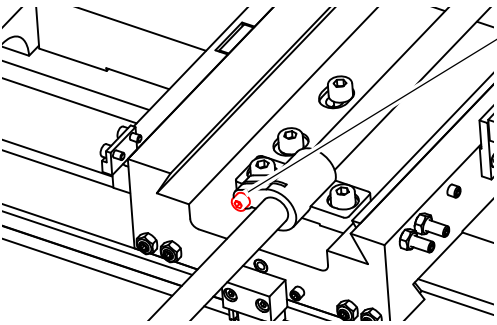
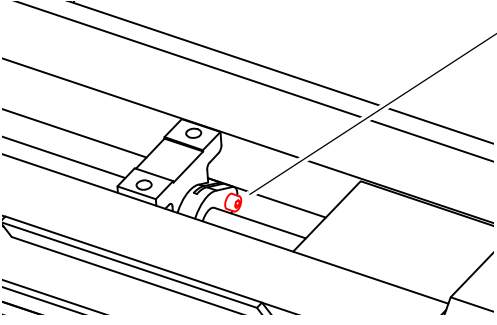
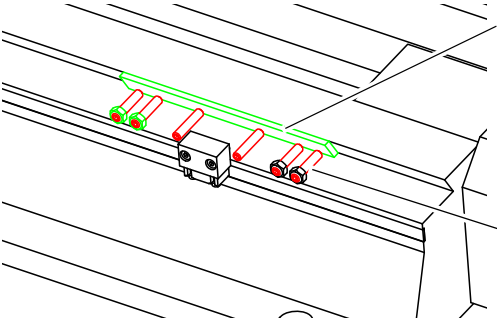
The type and level of wear depends to a large extent on the individual usage and operating conditions. Any indicated intervals therefore are only valid for the corresponding approved conditions.

Interval	Where?	What?	How?
Start of work, after every maintenance or repair work	Milling machine	→  Safety check on page 14	
Start of work, after every maintenance or repair work	Dovetail guides	Oiling	→ Oil all guide rails.
Every week	Milling table	Oiling	→ Oil all bare steel surfaces. Use acid-free oil.
Monthly	Clamping bolts Milling head	firmly tightened	→ Ensure that the clamping bolts for swivelling the drill head are firmly tightened.
Monthly	Oiler cup	Oiling	<p>→ Lubricate all oiler cups with machine oil, do not use grease guns or the like.</p> 

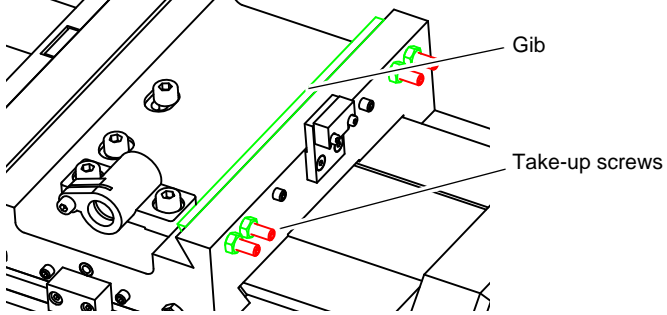


Interval	Where?	What?	How?
When necessary	Spindle nut Milling head	Reset Z axis	<p>Increased play in the milling head spindle can be reduced by adjusting the spindle nut. The spindle nuts are reset by reducing the thread flanks of the spindle nut with two take-up screws. After the reset, it is necessary to check if there is still smooth movement over the entire path, otherwise wear is considerably increased due to friction between the spindle nut and the spindle.</p>  <p>Take-up screws</p> <p>Img. 5-1: Milling head</p>
When necessary	Adjustment gib Milling head	Reset Z axis	<ul style="list-style-type: none"> <li>➔ Turn the take-up screws of the gib clockwise. The gib is pushed further inward thus reducing the play in the guide rail.</li> <li>➔ Check the settings. The corresponding guide rail must be more easily movable but ensure stable guidance.</li> </ul>  <p>Gib</p> <p>Take-up screws</p> <p>Img. 5-2: Take-up screws Z axis</p>



Interval	Where?	What?	How?
	<b>Spindle nut Milling table</b>	Reset X axis	<p>Increased play in the milling table spindles can be reduced by resetting the spindle nuts. The spindle nuts are reset by reducing the thread flanks of the spindle nut by means of a take-up screw. After the reset, it is necessary to check if there is still smooth movement over the entire path, otherwise wear is considerably increased due to friction between the spindle nut and the spindle.</p>  <p style="text-align: right;">Take-up screw</p> <p>Img.5-3: Milling table</p>
	<b>Spindle nut Milling table</b>	Reset Y axis	 <p style="text-align: right;">Take-up screw</p>
When necessary	<b>Adjustment gib Milling table</b>	Reset Y axis	<ul style="list-style-type: none"> <li>➔ Turn the take-up screws of the gib clockwise. The gib is pushed further inward thus reducing the play in the guide rail.</li> <li>➔ Check the settings. The corresponding guide rail must be more easily movable but ensure stable guidance.</li> </ul>  <p style="text-align: right;">Gib Take-up screws</p> <p>Img.5-4: Take-up screws Y axis</p>



Interval	Where?	What?	How?
When necessary	Adjustment gib Milling table	Reset X axis	<p>→ Turn the take-up screws of the gib clockwise. The gib is pushed further inward thus reducing the play in the guide rail.</p> <p>→ Check the settings. The corresponding guide rail must be more easily movable but ensure stable guidance.</p>  <p>Img. 5-5: Take-up screws X axis</p>
according to operator's empirical values in accordance with German DGUV (BGV A3)	Electrical system	Electrical inspection	<p>☞ Operator's obligations on page 11</p> <p>☞ Electrical system on page 16</p>

## 5.3 Repair

### 5.3.1 Customer service technician

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

Stürmer Maschinen GmbH

Dr.-Robert-Pfleger-Str. 26

D- 96103 Hallstadt, Germany

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

If 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

- serviceable and appropriate tools,
- original parts or production parts expressly authorised by Optimum Maschinen Germany GmbH.

## 6 Ersatzteile - Spare parts

### 6.1 Ersatzteilbestellung - Ordering spare parts

Bitte geben Sie folgendes an - Please indicate the following :

- Seriennummer - Serial No.
- Maschinenbezeichnung - Machines name
- Herstellungsdatum - Date of manufacture
- Artikelnummer - Article no.

Die Artikelnummer befindet sich in der Ersatzteilliste. *The article no. is located in the spare parts list.* Die Seriennummer befindet sich am Typschild. *The serial no. is on the rating plate.*

### 6.2 Hotline Ersatzteile - Spare parts Hotline



+49 (0) 951-96555 -118  
ersatzteile@stuermer-maschinen.de



### 6.3 Service Hotline



+49 (0) 951-96555 -100  
service@stuermer-maschinen.de



### 6.4 Elektrische Ersatzteile - Electrical spare parts

### 6.5 Schaltplan - Wiring diagram

Der aktuelle Schaltplan mit Ersatzteilliste befindet sich im Schaltschrank der Fräsmaschine.  
*The current circuit diagram and spare parts list is located in the control cabinet of the milling machine.*

## 6.6 Fräskopf - Milling head

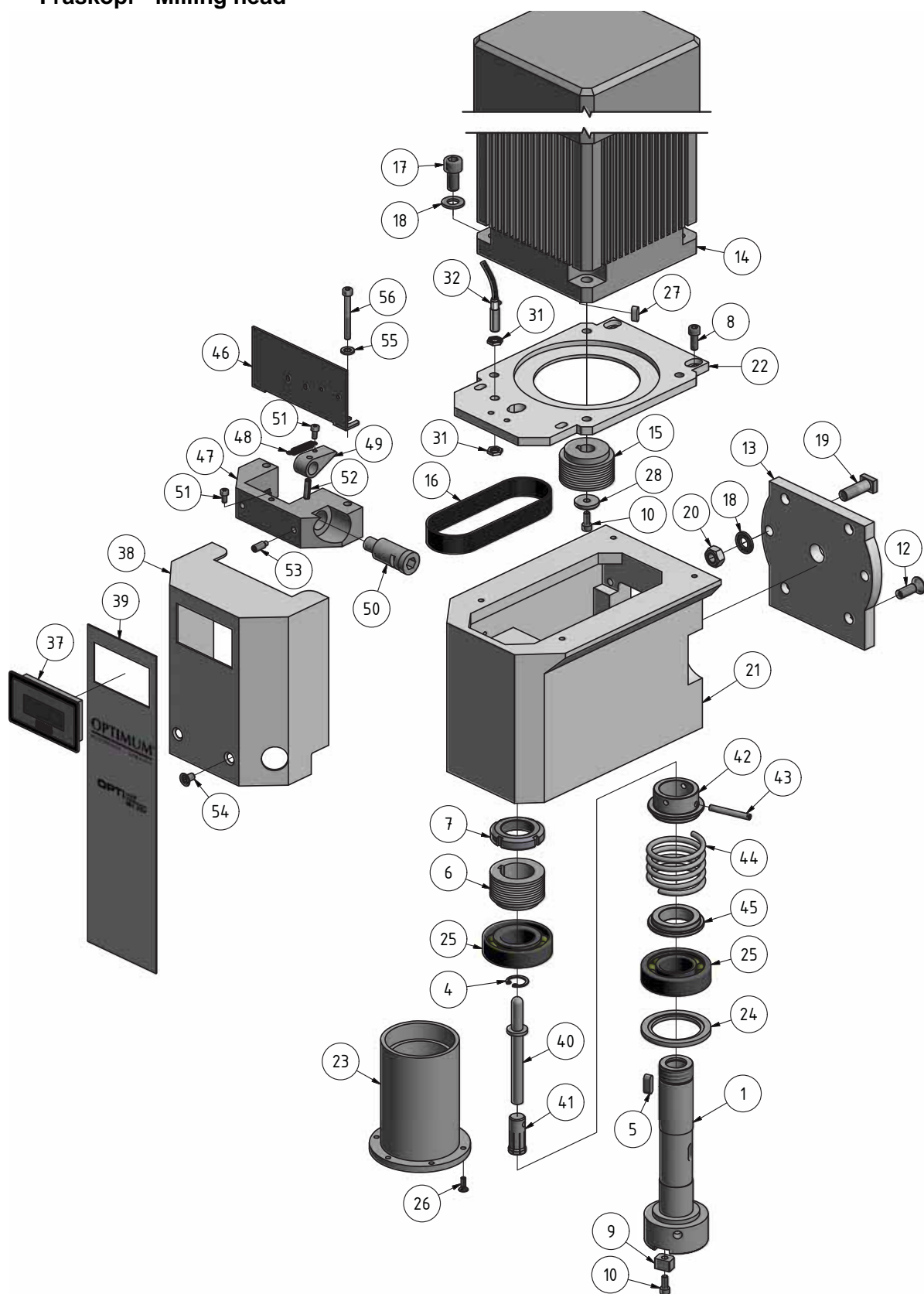


Abb.6-1: Fräskopf - Milling head

Teilleiste Fräskopf - Parts list milling head					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Bohrspindel	Drill spindle	1	10	03338160101
4	Sicherungsring	Retaining ring	1	19	042SR19W
5	Passfeder	Fitting key	1	DIN 6885 - A 6 x 6 x 18	042P6618
6	Riemenscheibe	Pulley	1		03338160106
7	Nutmutter	Groove nut	1	M30 x 1,5	03338160107
8	Innensechskantschraube	Socket head screw	4	ISO 4762 - M6 x 16	
9	Nutenstein	Slot nut	2		03338160109
10	Innensechskantschraube	Socket head screw	3	ISO 4762 - M5 x 12	
11	Scheibe	Washer	2	DIN 125 - A 6,4	
12	Schraube	Screw	4	M8 x 25	033381601
13	Platte	Plate	1		03338160113
14	Motor	Motor	1	SSM15 - A2 - 1.5-15/90 Senlima Electric Motor 1.5 KW ; 400/230V 3.5 / 6.1A ; 10.1 Nm S1 ; IP54 ; Ins. class F	03338160114
15	Riemenscheibe	Pulley	1		03338160115
16	Flachriemen	Flat belt	1		03338160116
17	Innensechskantschraube	Socket head screw	4	ISO 4762 - M10 x 20	
18	Scheibe	Washer	6	DIN 125 - A 10,5	
19	T-Schraube	T-Screw	2		03338160119
20	Sechskantmutter	Hexagon nut	2	ISO 4032 - M10	
21	Gehäuse	Housing	1		03338160121
21	Fräskopf komplett	Milling head complete	1		03338160121CPL
22	Motorplatte	Motor plate	1		03338160122
23	Pinole komplett	Sleeve complete	1		03338160123CPL
24	Ring	Ring	1		03338160124
25	Kugellager	Ball bearing	2	7206	0407206
26	Schraube	Screw	6	ISO 7046/M4 x 12	
27	Passfeder	Fitting key	1	DIN 6885 - A 5 x 5 x 14	042P5516
28	Scheibe	Washer	1		03338160128
31	Sechskantmutter	Hexagon nut	2		03338160131
32	Drehzahlsensor	Rotation speed sensor	1		03338160132
37	Drehzahlanzeige	Rotation speed indicator	1		03338155137
38	Abdeckung	Cover	1		03338160138
39	Frontabdeckung	Front cover	1		03338155139
40	Stößel	Plunger	1		03338160140
41	Schnapper	Catcher	1		03338160141
42	Buchse	Bushing	1		03338160142
43	Gewindestift	Grub screw	1		03338160143
44	Feder	Spring	1		03338160144
45	Ring	Ring	1		03338160145
46	Platte	Plate	1		03338155146

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47	Führung	Guide	1		03338160147
47	Führung komplett	Guide complete	1		03338160147CPL
48	Feder	Spring	1		03338160148
49	Exzenter	Eccentric	1		03338160149
50	Bolzen	Bolt	1		03338160150
51	Innensechskantschraube	Socket head screw	2	M4x8	
52	Spannstift	Spring pin	1		03338160152
53	Gewindestift	Grub screw	1	M6x14	
54	Senkschraube	Screw	2	M6x10	
55	Scheibe	Washer	2	5	
56	Innensechskantschraube	Socket head screw	2	M5x45	



**6.7 Säule - Column 1-2**

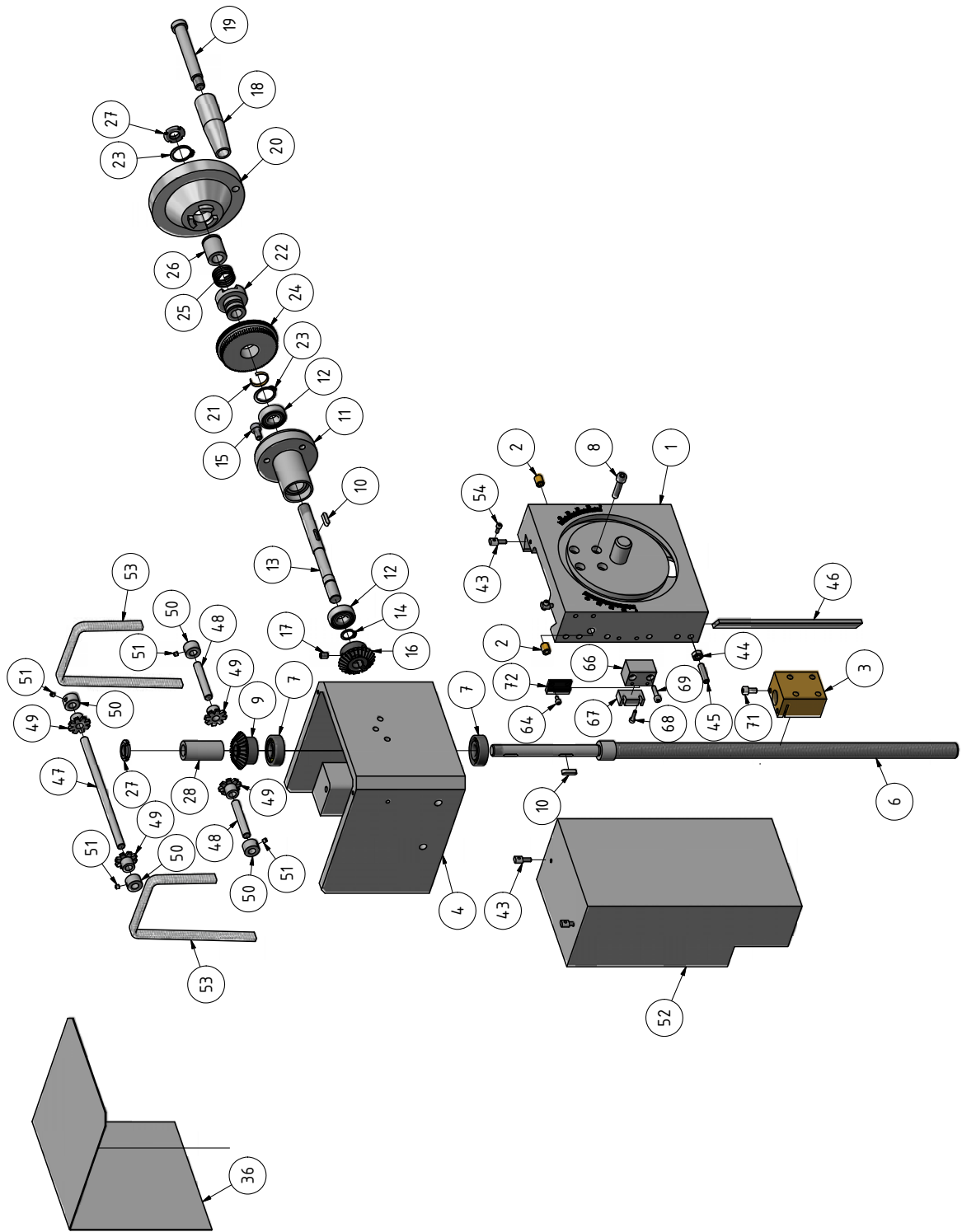


Abb.6-2: Säule - Column 1-2

## 6.8 Säule - Column 2-2

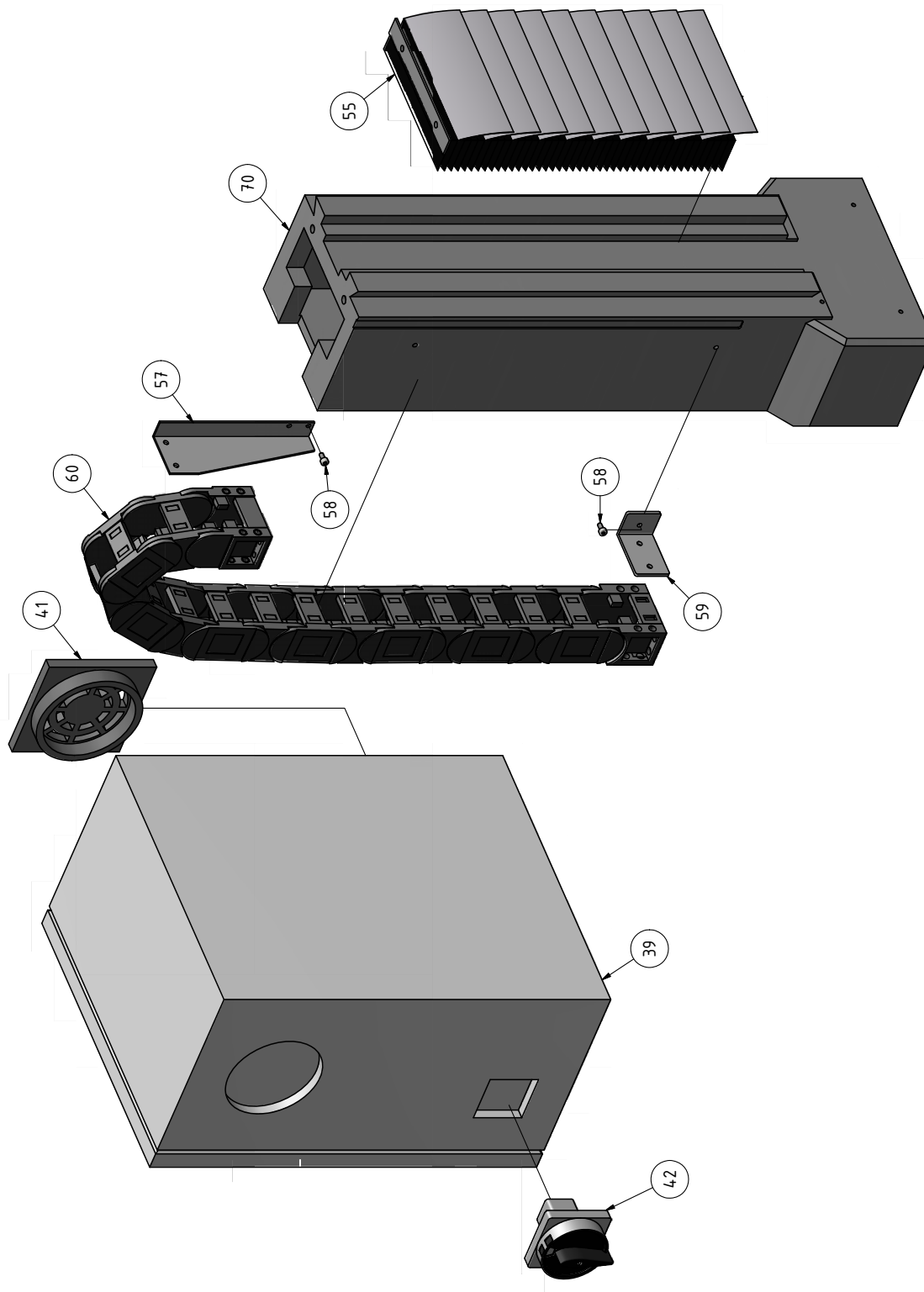


Abb.6-3: Säule - Column 2-2

Teilleiste Säule - Parts list column					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Führung	Guide	1		03338160201
2	Schmiernippel	Lubrication cup	2	8mm	0340114
3	Spindelmutter	Spindle nut	1		03338160203
4	Halter	Holder	1		03338160204
5	Innensechskantschraube	Socket head screw	2	ISO 4762 - M8 x 25	
6	Spindel	Spindle	1		03338160206
7	Kugellager	Ball bearing	2	7201 BEP	0407201
8	Innensechskantschraube	Socket head screw	4	ISO 4762 - M6 x 25	
9	Kegelrad	Bevel gear	1		03338160209
10	Passfeder	Fitting key	3	DIN 6885 - A 4 x 4 x 16	042P4416
11	Flansch	Flange	1		03338160211
12	Kugellager	Ball bearing	2	6001-RZ	0406001R
13	Welle	Shaft	1		03338160213
14	Sicherungsring	Retaining ring	1	DIN 471 - 12x1	042SR12W
15	Innensechskantschraube	Socket head screw	5	ISO 4762 - M6 x 12	
16	Kegelrad	Bevel gear	1		03338160216
17	Schraube	Screw	1	DIN 913 - M6 x 8	
18	Hülse	Sleeve	1		0333812057-1
19	Schraube	Screw	1		0333812057-1
20	Handrad	Handle	1		03338160220
21	Federblech	Spring	1		03338160221
22	Kupplung	Clutch	1		03338160222
23	Sicherungsring	Retaining ring	2	DIN 471 - 20x1,2	042SR20W
24	Skalenring	Scala ring	1		03338160224
25	Feder	Spring	1		03338160225
26	Buchse	Bushing	1		03338160226
27	Nutmutter	Groove nut	2	DIN 981 - KM 1	
28	Buchse	Bushing	1		03338160228
29	Zahnrad	Gear	1		03338160229
32	Innensechskantschraube	Socket head screw	4	ISO 4762 - M6 x 16	
33	Gewindestift	Grub screw	1	ISO 4028 - M4 x 8	
36	Abdeckung	Cover	1		03338155236
38	Scheibe	Washer	2	DIN 125 - A 6,4	
39	Schaltschrank	Switch box	1		03338160239
41	Lüfter	Fan	2		03338160241
42	Hauptschalter	Main switch	1		03338160242
43	Schraube	Screw	4		03338160243
44	Sechskantmutter	Hexagon nut	6	ISO 4032 - M6	
45	Gewindestift	Grub screw	6	ISO 4026 - M6 x 25	
46	Keilleiste	Gib	1		03338160246
47	Welle	Shaft	1		03338160247

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48	Welle	Shaft	2		03338160248
49	Zahnrad	Gear	4		03338160249
50	Buchse	Bushing	4		03338160250
51	Gewindestift	Grub screw	4	DIN 913 - M4 x 4	
52	Gegengewicht	Balance weith	1		03338160252
53	Kette	Chain	2		03338160253
54	Innensechskantschraube	Socket head screw	2	ISO 4762 - M3 x 8	
55	Faltenbalg	Cover	1		03338160255
57	Halter	Holder	1		03338160257
58	Innensechskantschraube	Socket head screw	3	ISO 4762 - M4 x 8	
59	Halter	Holder	1		03338160259
60	Energiekette	Energie chain	1		03338160260
66	Halter	Holder	1		03338160266
67	Sensor Verfahrweg	Sensor traveling distance	1		03338160267
68	Innensechskantschraube	Socket head screw	2	ISO 4762 - M3 x 12	
69	Innensechskantschraube	Socket head screw	2	ISO 4762 - M4 x 16	
70	Säule	Column	1		03338160270
71	Innensechskantschraube	Socket head screw	2	ISO 4762 - M5 x 10	
72	Signalgeber	Transmitter	1		03338160272

**6.9 Frästisch - Milling table 1-2**

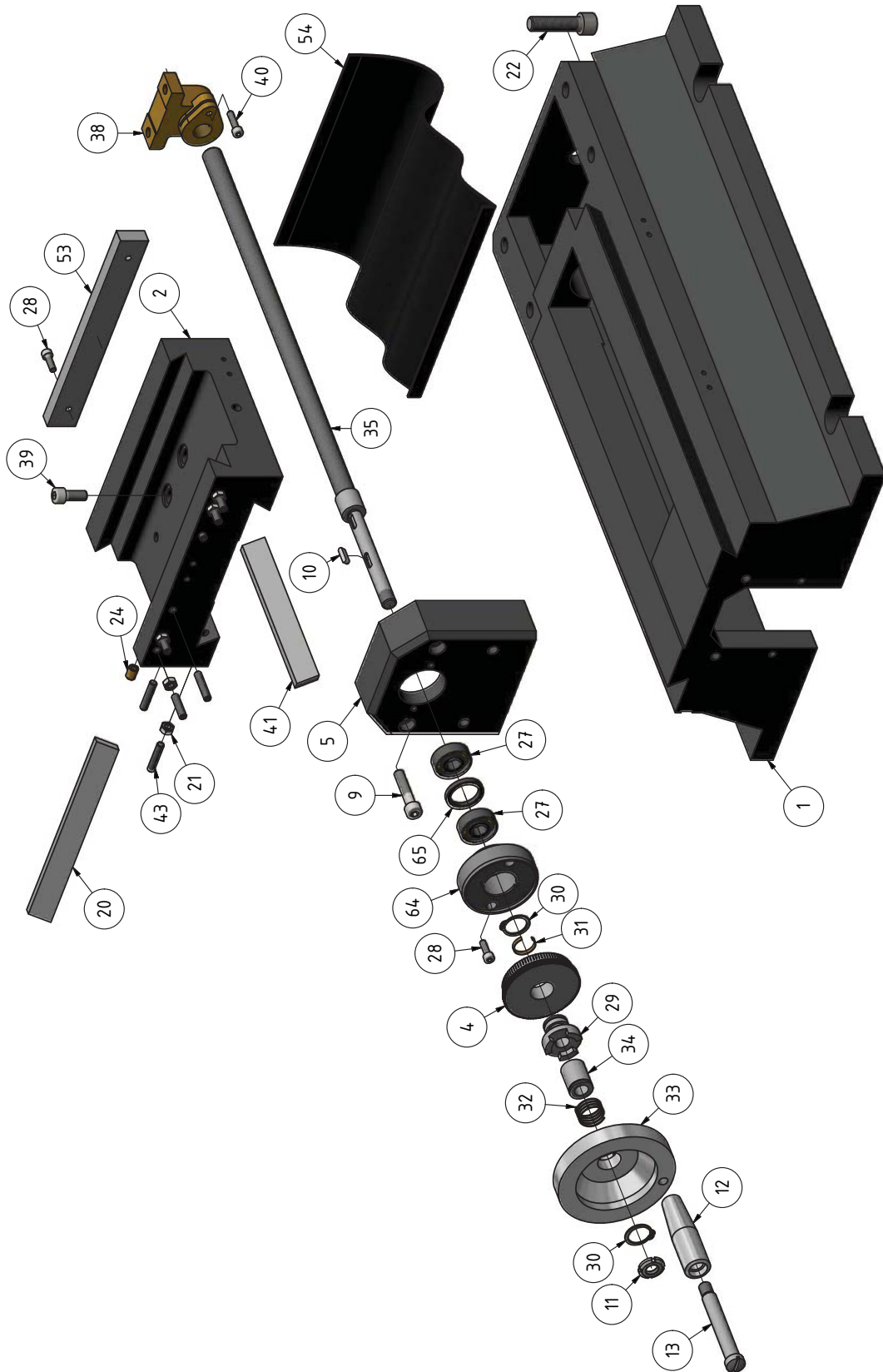


Abb.6-4: Frästisch - Milling table 1-2

## 6.10 Frästisch - Milling table 2-2

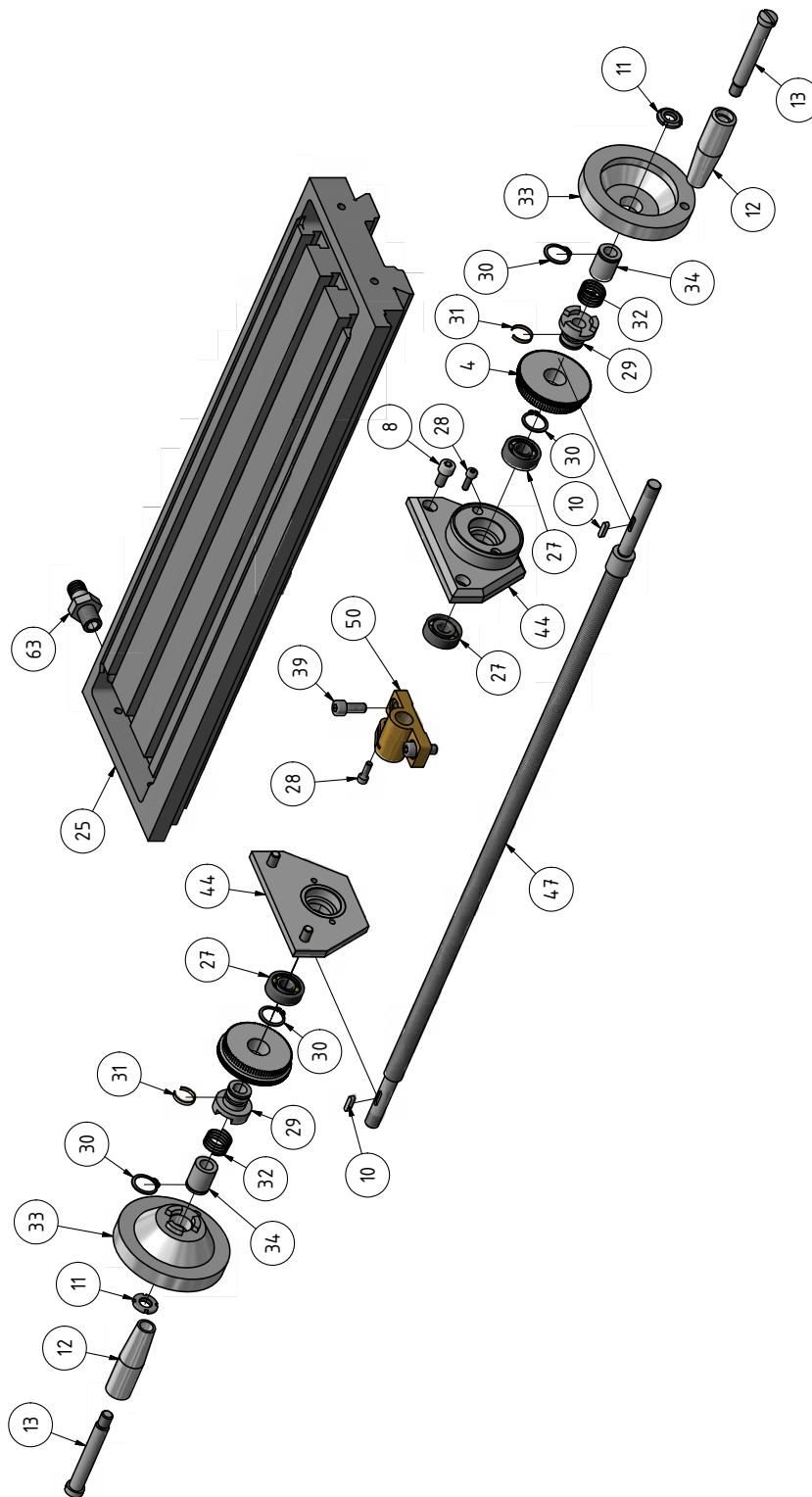


Abb.6-5: Frästisch - Milling table 2-2

Teilleiste Frästisch - Parts list milling table					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Führung	Guide	1		03338160301
2	Tischführung	Table guide	1		03338160302
3	Lagerbock	Bearing block	1		03338160303
4	Skalenring	Scale ring	3		03338160304
5	Lagerbock	Bearing block	1		03338160305
8	Innensechskantschraube	Socket head screw	4	ISO 4762 - M8 x 16	
9	Innensechskantschraube	Socket head screw	2	ISO 4762 - M8 x 40	
10	Passfeder	Fitting key	4	DIN 6885 - A 4 x 4 x 16	042P4416
11	Nutmutter	Groove nut	3	DIN 981 - KM 1	03338160311
12	Hülse	Sleeve	3		03338160312
13	Schraube	Screw	3		03338160313
14	Innensechskantschraube	Socket head screw	8	ISO 4762 - M5 x 10	
15	Unterlegscheibe	Washer	8	DIN 125 - A 5,3	
16	Innensechskantschraube	Socket head screw	2	ISO 4762 - M6 x 12	
18	Gewindestift	Grub screw	1	ISO 4026 - M4 x 8	
19	Unterlegscheibe	Washer	2	DIN 125 - A 6,4	
20	Keilleiste	Gib	1		03338160320
21	Sechskantmutter	Hexogen nut	8	ISO 4032 - M6	
22	Innensechskantschraube	Socket head screw	4	ISO 4762 - M12 x 45	
23	Unterlegscheibe	Washer	4	DIN 125 - A 13	
24	Schmiernippel	Lubrication cup	2	8	0340114
25	Frästisch	Mill table	1		03338160325
26	Flansch X-Achse	Flange X-axis	1		03338155326
27	Kugellager	Ball bearing	4	7201	0407201
28	Innensechskantschraube	Socket head screw	7	ISO 4762 - M5 x 16	
29	Kupplung	Clutch	3		03338160329
30	Sicherungsring	Retaining ring	6	DIN 471 - 20x1,2	042SR20W
31	Federblech	Spring	3		03338160331
32	Feder	Spring	3		03338160332
33	Handrad	Handle	3		03338160333
34	Buchse	Bushing	3		03338160334
35	Spindel	Spindle	1		03338160335
38	Spindelmutter	Spindle nut	1		03338160338
39	Innensechskantschraube	Socket head screw	4	ISO 4762 - M8 x 20	
40	Innensechskantschraube	Socket head screw	1	ISO 4762 - M5 x 20	
41	Keilleiste	Gib	1		03338160341
42	Gewindestift	Grub screw	4	ISO 4026 - M6 x 25	
43	Gewindestift	Grub screw	8	ISO 4026 - M6 x 30	
44	Lagerbock	Bearing block	2		03338160344
45	Kugellager	Bearing	1	6201	0406201R
46	Sicherungsring	Retaining ring	1	DIN 472 - 32 x 1,2	042SR32W
47	Spindel	Spindle	1		03338160347

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50	Spindelmutter	Spindle nut	1		03338160350
52	Innensechskantschraube	Socket head screw	12	ISO 4762 - M4 x 8	
53	Halter	Holder	1		03338160353
54	Gummiabdeckung	Rubber cover	1		03338160354
57	Halter	Holder	1		03338160357
58	Sensor Verfahrweg	Sensor traveling distance	2		03338160358
59	Innensechskantschraube	Socket head screw	2	ISO 4762 - M4 x 16	
60	Innensechskantschraube	Socket head screw	4	ISO 4762 - M3 x 12	
62	Schraube	Screw	2	DIN 7991 - M4x10	
63	Anschluss	Plug	1		03338160363



## 6.11 Fräsfutterschutz - Milling chuck cover

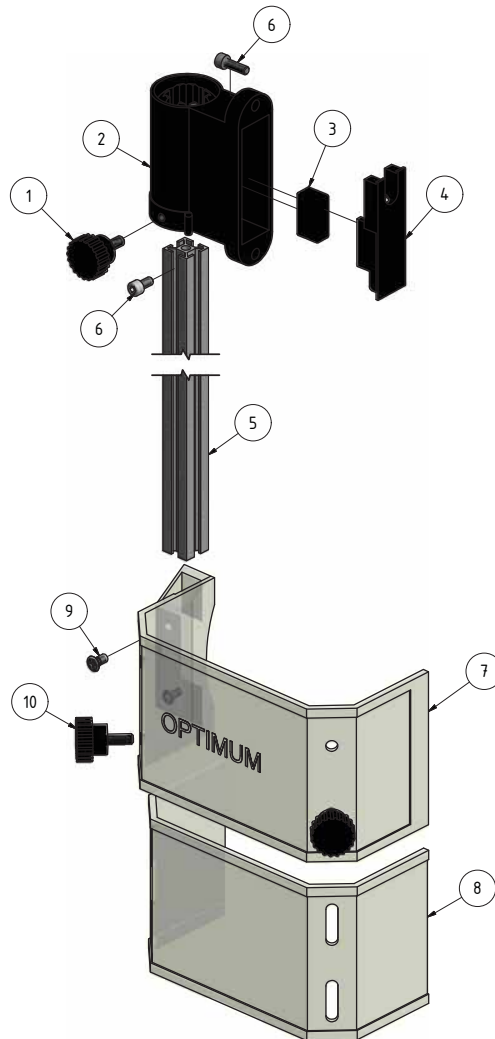
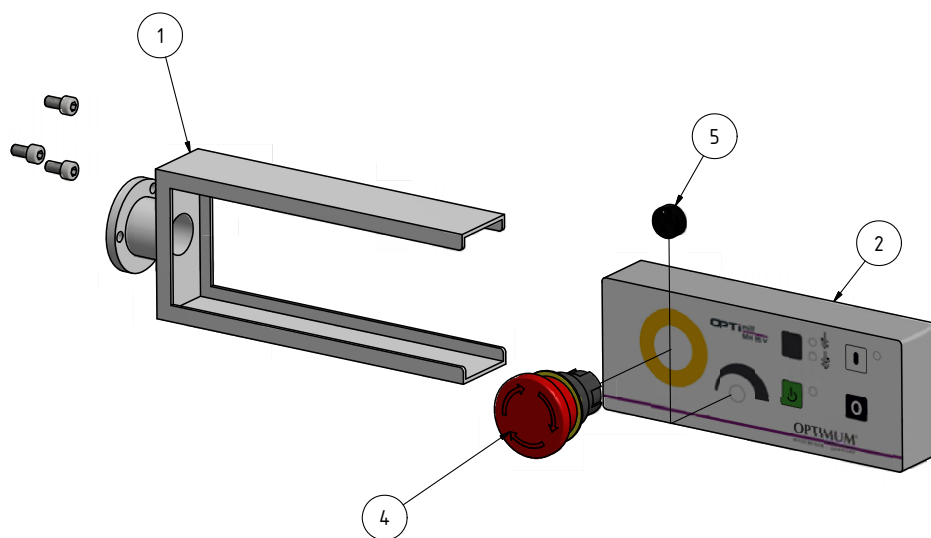


Abb. 6-6: Fräsfutterschutz - Milling chuck cover

Teilliste Fräsfutterschutz - Parts list milling chuck protection					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Rändelschraube	Knurled screw	1		
2	Halterung	Fixture	1		
3	Mikroschalter	Microswitch	1		
4	Platte	Plate	1		
5	Alu- Profil	Aluminium profile	1		
6	Schraube	Screw	2	M5x10	
7	Fräsfutterschutz A	Mill chuck cover A	1		
8	Fräsfutterschutz B	Mill chuck cover B	1		
9	Schraube	Screw	2	M5x10	
10	Rändelschraube	Knurled screw	2		

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## 6.12 Bedienpanel - Operating panel



Teilleiste Bedienpanel - Parts list operating panel

Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Halterung	Support	1		03338155501
2	Bedienpanel komplett	Operating panel complete	1		03338155502
4	Not-Halt Schalter	Emergency stop button	1		0460058
5	Knipf Potentiometer	Potentiometer knob	1		03338160505

## 6.13 Maschinenschilder - Machine labels

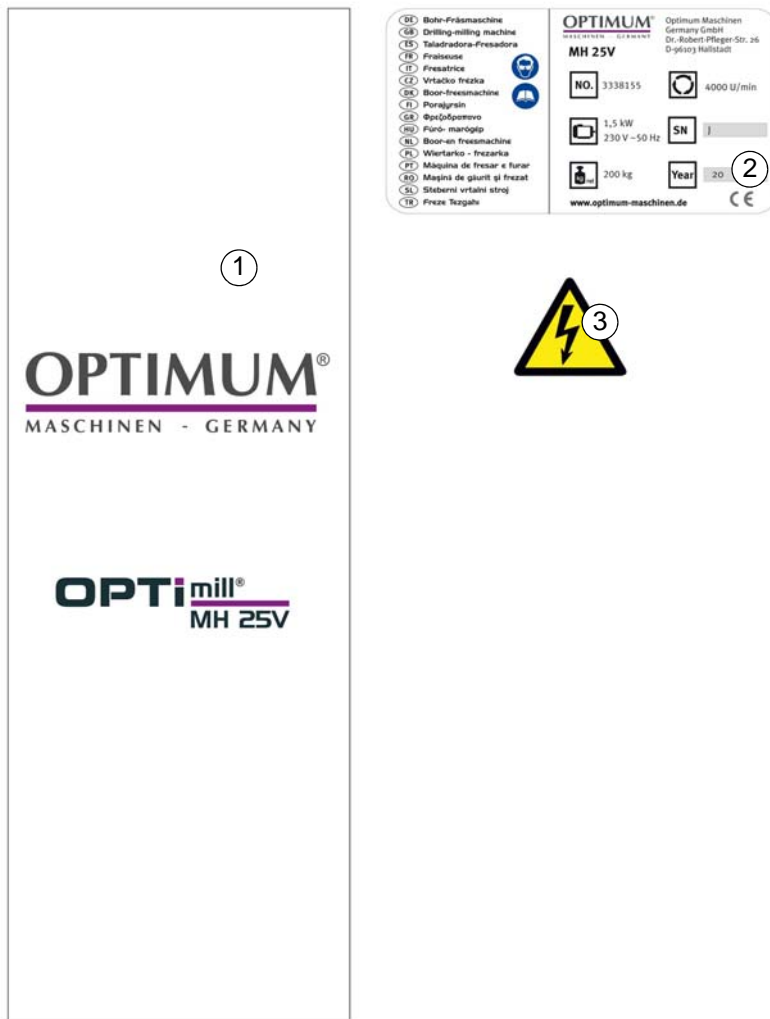


Abb. 6-7: Maschinenschilder - Machine labels

Ersatzteilliste Maschinenschilder - Spare part list machine labels					
Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Article no.
1	Frontschild	Front lable	1		03338155L01
2	Maschinenlabel	Machine lable	1		03338155L02
3	Sicherheitsschild	Safety lable	1		03338155L03

## Schaltplan - Wiring diagram

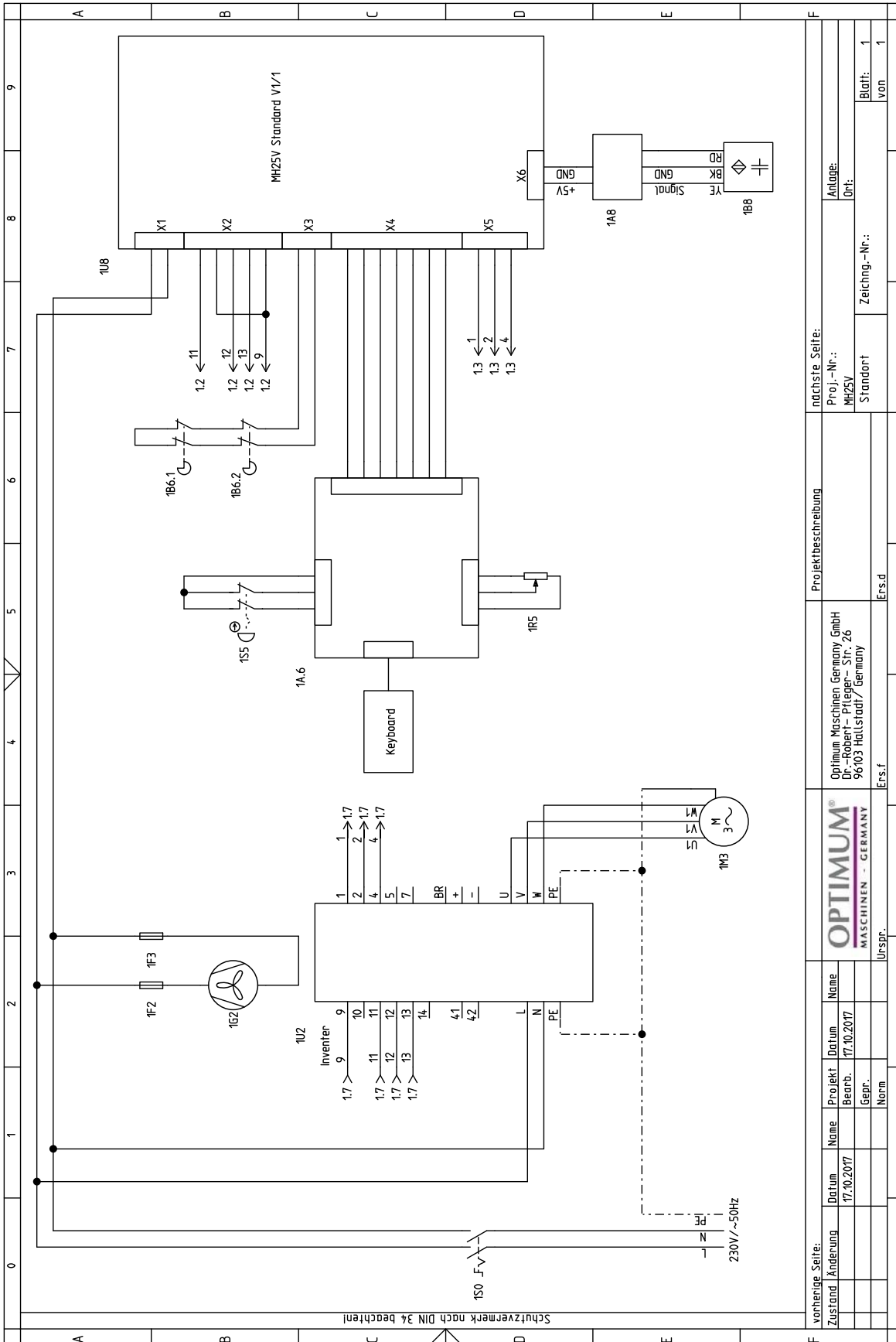


Abb.6-8: Schaltplan - Wiring diagram

vorherige Seite:		Projektbeschreibung		nächste Seite:	
Zustand	Änderung	Optimum Maschinen Germany GmbH D-96103 Hallstadt / Germany 96103 Hallstadt / Germany		Proj.-Nr.:	Anlage:
				MH25V	Ort:
				Standard	Zeichng.-Nr.:
					Blatt:
					von
					1
					1
				Ers.f	Ers.d
				Urspr.	

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Teileliste elektrische Bauteile- Parts list electrical parts					
Pos.	Bezeichnung	Description	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1A1	Steuerplatine	Control board	1		033381602A1
1F2					
1F3	Sicherung	Fuse	2		
1G2	Ventilator Schaltkasten	Fan switch box	1		
1M3	Spindelmotor	Spindle motor	1	SSM15 - A2 - 1.5-15/90, Senlima Electric Motor, 1.5 KW ; 400/230V, 3.5 / 6.1A ; 10.1 Nm, S1 ; IP54 ; Ins. class F	
1S0	Hauptschalter	Main switch	1		
1U2	Frequenzumrichter	Frequency converter	1	Emerson, M100-022, 00075 A 1.5KW ; 50 - 60Hz , I/P 200 - 240V - 1/3ph 18.1 / 9.1 A , O/P 0 - 240V - 3ph - 7.5A	033381601U2
1B6.1	Schalter Werkzeugwechsler	Toll changer swtch			
1B6.2	Schalter Fräsfutterschutz	Mill chuck switch	1		
1B8	Drehzahlsensor	Rotation speed sensor	1		
1S5	Not-Halt-Schalter	Emergency stop button	1		0460058
1R5	Potentiometer	Potentiometer	1		



## 7 Malfunctions

### 7.1 Milling machine malfunctions

Malfunction	Cause/ possible effects	Solution
Milling machine cannot be switched on	<ul style="list-style-type: none"> <li>Power-on sequence not observed.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Resetting an emergency stop situation on page 26.</li> <li>☞ Power failure, Restoring readiness for operation on page 26</li> <li>☞ Switching the milling machine on on page 26</li> </ul>
Tool "burnt".	<ul style="list-style-type: none"> <li>Incorrect speed.</li> <li>Chips are not coming out of the drilled hole.</li> <li>Blunt tool.</li> <li>Operating without cooling agent.</li> </ul>	<ul style="list-style-type: none"> <li>Choose a different speed, excessive feed.</li> <li>Withdraw the tool more frequently.</li> <li>Sharpen or replace tool.</li> <li>Use coolant.</li> </ul>
Taper cannot be inserted in quill.	<ul style="list-style-type: none"> <li>Remove any dirt, grease or oil from the internal conical surface of the spindle sleeve or the taper.</li> </ul>	<ul style="list-style-type: none"> <li>Clean surfaces well. Keep surfaces free from grease.</li> </ul>
The taper cannot be pushed out.	<ul style="list-style-type: none"> <li>Taper sleeve has shrunk onto the cone.</li> </ul>	<ul style="list-style-type: none"> <li>Let the machine run at highest speed for two minutes to warm it up and attempt to remove the taper again.</li> <li>☞ Removal on page 28</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 qualified personnel.</li> </ul>
Rattle the spindle if the workpiece surface is rough.	<ul style="list-style-type: none"> <li>Upcut mill machining not possible under the current operating conditions.</li> <li>Clamping lever of the movement axes not tightened.</li> <li>Loose collet, loose drill chuck, drawbar loose.</li> <li>Tool is blunt.</li> <li>The workpiece is not fastened.</li> <li>Excessive slack in bearing.</li> <li>Spindle moves up and down.</li> </ul>	<ul style="list-style-type: none"> <li>Perform conventional milling.</li> <li>Tighten the clamping lever.</li> <li>Check, re-tighten.</li> <li>Sharpen or renew the tool.</li> <li>Clamp the workpiece firmly.</li> <li>Readjust the bearing slack or replace the bearing.</li> <li>Readjust the bearing slack or replace the bearing.</li> </ul>



## 8 Appendix

### 8.1 Copyright

This document is protected by copyright. All derived rights are reserved, especially those of translation, re-printing, use of figures, broadcast, reproduction by photo-mechanical or similar means and recording in data processing systems, either partial or total.

Subject to technical changes without notice.

### 8.2 Terminology/Glossary

Term	Explanation
Milling table	Supporting surface, clamping surface for the workpiece with traverse in X and Y directions
Taper mandrel	Tool housing taper, drill taper, drill chuck taper.
Workpiece	piece to be milled, drilled or machined.
Drawbar	Threaded rod to fix the taper mandrel in the quill.
Drill chuck	Drill bit adapter
Collet	Holder for end mill
Drill-mill head	Upper part of the milling machine
Quill	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
Quill lever	Manual operation for the drill feed
Quick action - drill chuck	Drill bit adapter can be fixed by hand.
Workpiece	Part to be drilled, part to be machined.
Tool	Milling cutter, drill bit, etc.
Emergency stop	Stops the operation of a machine.
Emergency switch-off	Interrupts the power supply to the machine.

### 8.3 Change information operating manual

Chapter	Short summary	new version number
2 , 4 , 6	Drawbar replaced with quick tool system BT30	1.0.1
3	Interdepartmental transport	1.0.2



## 8.4 Liability claims/warranty

Besides 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 were promised as part of a single contractual provision.

Liability or warranty claims are processed at OPTIMUM GmbH's discretion 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. Title to replaced products or components is transferred to us.

The automatically generated original proof of purchase which shows the date of purchase, the type of machine and the serial number, if applicable, must be present 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 from the following circumstances are excluded from liability and warranty claims:

- Use of the product beyond the technological capability and intended use, in particular due to overloading of the machine.
- Damage caused personally through incorrect use or failure to observe our operating instructions,
- negligent or incorrect handling and use of improper operating materials.
- Unauthorized 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.

Neither are the following covered by liability and 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 fulfil any additional warranty are neither an acceptance of the defects nor an acceptance of its obligation to compensate. Such services neither delay nor interrupt the warranty period.

The court of jurisdiction for businessmen is Bamberg.

If one of the aforementioned agreements is totally or partially inoperative and/or invalid, a provision closest to the intent of the warrantor is considered agreed upon, which remains within the framework of the limits of liability and warranty which are specified by this contract.

## 8.5 Advice for disposal / Options of reuse

Please dispose of your equipment in an environmentally friendly manner, by not placing waste in the environment but in a professional manner.

Please do not simply throw away the packaging and later the disused machine, but dispose of both in accordance with the guidelines laid down by your city council/local authority or by an authorised disposal company.





## 8.6 Storage

### ATTENTION!

**Incorrect and improper storage might result in damage or destruction of electrical and mechanical machine components.**

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

**Follow the instructions and information on the transport crate:**



- Fragile goods  
(Goods require careful handling)
- Protect against moisture and humid environment
- Prescribed position of the packing case  
(Marking the top surface - arrows pointing up)
- Maximum stacking height



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

Consult Optimum Maschinen Germany GmbH if the machine and accessories are stored for more than three months or are stored under different environmental conditions than those specified here.

## 8.7 Dismantling, disassembling, packing and loading

### INFORMATION

It is in your interest and in the interest of the environment that all machine component parts are only disposed of in the intended and approved manner.

Please note that electrical devices comprise a variety of reusable materials as well as environmentally hazardous components. Please ensure that these components are disposed of separately and professionally. If in doubt, consult your municipal waste disposal company. If appropriate, call on the help of a specialist waste disposal company for reconditioning of the material.

Please make sure that electrical components are disposed of professionally and in accordance with the statutory provisions.

The machine contains electrical and electronic components and must not be disposed of as household waste. According to the European directive 2002/96/EG regarding disused electrical and electronic devices and the implementation in national law, disused electrical tools and electrical equipment must be stored separately and recycled in an environmentally friendly manner.

As the equipment operator, you should obtain information regarding the authorized collection or disposal system which applies for your company.

Please make sure that electrical components are disposed of professionally and in accordance with legal regulations. Please only dispose of used batteries via the collection boxes in shops or at municipal waste management companies.





## 8.7.1 Decommissioning

### CAUTION!

Disused equipment must be decommissioned in a professional manner in order to avoid later misuse and danger the environment or persons.

- Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.
- Dispose of machine components and operating fluids using the intended disposal methods.



## 8.7.2 Dismantling

→ Pull the power cord or unplug the connection cable and disconnect the connection cable.

## 8.7.3 Disassembly

→ Remove the drive motor.

## 8.7.4 Packing and loading

→ Place the machine on a pallet for removal.

📖 Set-up and assembly on page 21

## 8.8 Disposal of new device packaging

All used machine packaging materials and packaging aids are recyclable and generally must be recycled

The packaging wood can be disposed of or recycled.

Any packaging components made of cardboard can be chopped up and disposed off via the waste paper collection.

The films are made of polyethylene (PE) or the cushion parts are made of polystyrene (PS). These materials can be reused after reconditioning if they are recycled at a collection station or an appropriate waste management company.

Only dispose of packaging materials correctly sorted so that they can be directly reused.

## 8.9 Disposal of lubricants and cooling lubricants

### ATTENTION!

Please imperatively make sure to dispose of the used coolant and lubricants in an environmentally friendly manner. Observe the disposal instructions of your municipal waste management companies.



### INFORMATION

Used coolant emulsions and oils should not be mixed, as only waste oils that have not been mixed can be recycled without prior treatment.

Disposal instructions for used lubricants are provided by the manufacturer. If necessary, request the product-specific data sheets.



## 8.10 Disposal through municipal collection facilities

Disposal of used electrical and electronic components

(To be used in European Union countries and other European countries with a separate collection system for these devices).

The sign on the product or on its packing indicates that the product must not be handled as common household waste, but that must be disposed of via a central collection point for recycling. Your contribution to the correct disposal of this product will make an important contribu-





tion to protection of the environment and public health. Incorrect disposal constitutes a risk to the environment and public health. Material recycling will help reduce the consumption of raw materials. For further information about the recycling of this product, please consult your District Office, the municipal waste collection station or the shop where you have bought the product.

### 8.11 RoHS, 2002/95/EC

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



### 8.12 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
- Any experiences with the lathe which might be important for other users
- Recurring malfunctions

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## EC Declaration of Conformity

according to Machinery directive 2006/42/EC, Annex II 1.A

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

hereby declares that the following product

**Product designation:** Hand-controlled milling machine

**Type designation:** MH25V

fulfills all the relevant provisions of the directive specified above and the additionally applied directives (in the following) - including the changes which applied at the time of the declaration.

**Description:**

Hand-controlled milling machine

**The following additional EU Directives have been applied:**

EMC Directive 2014/30/EU ; Restriction of the use of certain hazardous substances in electrical and electronic equipment 2015/863/EU

**The following harmonized standards were applied:**

- EN 13128:2001+A2:2009/AC:2010 Safety of machine tools - Milling machines (including boring machines)
- EN 60204-1:2014 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- EN 13849-1:2015 - Safety of machinery - Safety related parts of controls - Part 1: General design principles
- EN 13849-2:2012 - Safety of machinery - Safety related parts of controls - Part 2: Validation
- EN ISO 12100:2013 - Safety of machinery - General principles for design - Risk assessment and risk reduction
- EN 50370-2 - Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 2: Immunity
- EN 55011:2014-11 - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement - class A
- EN 61000-3-2:2015-03 - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase)
- EN 61000-3-3:2014-03 - Electromagnetic compatibility (EMC) - Part 3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection

Name and address of the person authorized to compile the technical file:

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

Kilian Stürmer (CEO, General Manager)  
Hallstadt, 2019-12-11



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## Quellenverzeichnis von Ihrem Fachhändler Metallbau Mehner

Optimum Fräsmaschinen und CNC Fräsmaschinen:  
Optimum OPTImill MH25 Übersicht

- OPTImill MH 25 V / MH 25 SV
  - OPTImill MH 25 V SV Ersatzteile
  - OPTImill MH 25 V SV Zubehör
- CNC OPTImill MH 25 V / MH 25 SV
  - OPTImill MH 25 V SV Ersatzteile
  - OPTImill MH 25 V SV Zubehör
- 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