OPTIMUM®
MASCHINEN - GERMANY

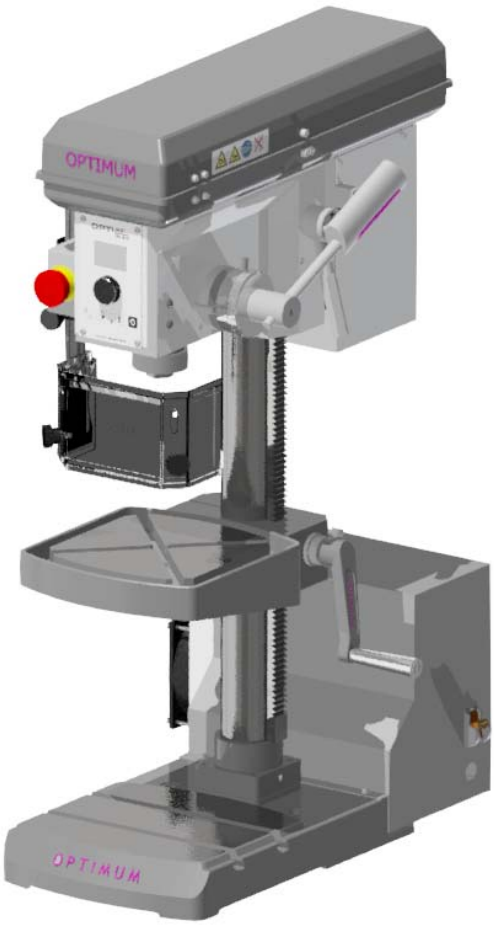
Operating Manual

Version 1.0.3

Bench drilling machine

OPTIdrill® DH 18V

Part no. 3020220



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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.

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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 drilling 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 statutory provisions for accident prevention,
- ❍ the prohibition, warning and mandatory signs as well as the warning notes on the drilling machine.

Always keep this documentation close to the drilling machine.

INFORMATION

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

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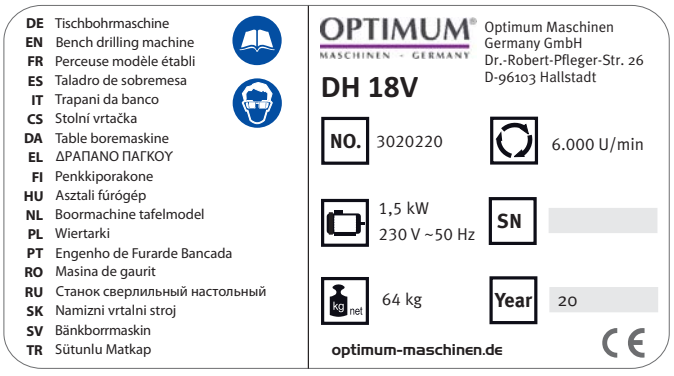
Dr. Robert-Pfleger-Str. 26

D-96103 Hallstadt, Germany

Email: info@optimum-maschinen.de

1.1 Type plate



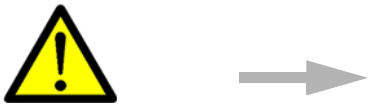
1.2 Safety instructions (warning notes)

1.2.1 Classification of hazards

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

Symbol	Alarm expression	Definition / consequence
	**DANGER!**	Impending danger that will cause serious injury or death to people.
	WARNING!	A danger that can cause serious injury or death.
	CAUTION!	A danger or unsafe procedure that can cause personal injury or damage to property.
	**ATTENTION!**	Situation that could cause damage to the drilling machine and product, as well as other types of damage. No risk of injury to persons.
	**Information**	Practical 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 with



general danger — with a warning of — injury to hands, — hazardous electrical voltage, — or — rotating parts.

1.2.2 Other pictograms

Warning: danger of slipping!

Warning: risk of stumbling!

Warning: hot surface!

Warning: biological hazard!

Warning: automatic start-up!

Warning: tilting danger!

Warning: suspended loads!

Caution, danger of explosive substances!

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Switching on forbidden!


Use ear protection!


Read the operating instructions before commissioning!


Pull out the mains plug!


Wear protective glasses!


Wear protective gloves!


Wear safety shoes!


Wear a protective suit!

1.3 Intended use

WARNING!

In the event of improper use, the bench drill

- **will endanger personnel,**
- **will endanger the machine and other material property of the operating company,**

the correct function of the bench drill may be affected.

The bench drill is designed and manufactured to be used in a non-explosive environment. The bench drill is designed and manufactured for holes in cold metals or other non flammable materials or that not constitute a health hazard using a rotating filing-stripping tool that has a number of grooves for collecting the filings.

If the bench drill is used in any way other than described above, modified without authorization of Optimum Maschinen Germany GmbH, then the geared drill 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 will expire, if any constructive, technical or procedural changes are not performed by the company Optimum Maschinen Germany GmbH.

It is also part of the intended use that you

- observe the limits of the bench drill,
- observe the operating instructions,
- and comply with the inspection and maintenance instructions.

☞ Technical specification on page 17

WARNING!

Extremely severe injuries.

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

ATTENTION!

If the bench drill 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 avoid!

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.

It is only permissible to process metal, cold and non-inflammable materials with the bench drill.

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

Operators must be 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.

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 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 exactly positioned between the three clamping jaws of the quick action chuck.

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 switch,
➜ 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.

INFORMATION

The drilling machine with regulating the speed is built according to the standard EN 61800-3 class C2.

WARNING!

This machine 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.

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Overview of the EMC categories:

Categorie C1

- required limit values Class B Group 1 according to EN 55011

Categorie C2

- Required limit values class A Group 1 according to EN 55011, Installation by EMC experts and warning: “This is a product of category C2 according to EN 61800-3. This product may cause radio interference in a residential area. In this case, it may be necessary for the operator to take appropriate action.“

Categorie C3

- Required limit values class A group 2 according to EN 55011, whereby these limit values are below those of class A group 1, plus warning: „This type is not suitable for connection to a public low-voltage network supplying residential buildings. When connecting to a public low voltage network, radio frequency interference is expected. "

This machine	☐	☒	☐	☐
Categorie	**C1**	**C2**	**C3**	**C4**
Environment	Residential area Business area Industrial area		Industrial area	
Voltage / Current	< 1000 V			> 1000 V
EMC knowledge	no requirement	Installation and commissioning by an EMC expert		

1.5 Possible dangers caused by the bench drill

The bench drill is state-of-the-art.

Nevertheless, there is a residual risk, as the bench drill operates with

- high speeds,
- rotating parts,
- electrical voltage and currents.

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

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

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,
- there may be a risk to the machine and other material values,
- the correct function of the bench drill may be affected.

Always disconnect the bench drill if cleaning or maintenance work is being carried out, or is no longer in use.

WARNING!

The bench drill may only be used with fully functional safety devices.

Disconnect the bench drill 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 Qualification of personnel

1.6.1 Target group

This manual is addressed to

- the operating companies,
- the operators,
- the maintenance personnel.

Consequently, the warning notes refer both to the use of the bench drill and to its maintenance.

Determine clearly and explicitly who will be responsible for the different activities on the geared drill (operation, setting up, maintenance and repair).

Unclear responsibilities constitute a safety risk!

Always disconnect plug of the bench drill 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:

Operator

The operator is instructed by the operating company about the assigned tasks and possible risks in case of improper behaviour. The operator may only carry out tasks that exceed normal

operation if this is stated in these instructions and the operating company 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

Due to their professional training, knowledge and experience as well as knowledge of relevant regulations, qualified personnel are able to perform the assigned tasks and to independently recognise and avoid any possible dangers.

Instructed person

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

1.6.2 Authorized persons

WARNING!

Inappropriate operation and maintenance of the bench drill constitutes a danger for the personnel, objects and the environment.

Only authorized personnel may operate the bench drill!

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

The operating company must

Obligations of the operating company

- ❍ train the personnel,
- ❍ instruct the personnel in regular intervals (at least once a year) on
  - all safety regulations relevant to the machine,
  - its operation and
  - generally accepted engineering standards.
- ❍ check the personnel‘s knowledge level,
- ❍ document the training/instruction,
- ❍ have attendance at the training/instruction confirmed by signature and
- ❍ check whether the personnel is working in a safety and risk-conscious manner and following the operating instructions.

The operator must

Obligations of the operator

- ❍ have obtained a training regarding the handling of the radial drilling machine,
- ❍ know the function and mode of action,
- ❍ before taking the machine in operation
  - have read and understood the operating manual,
  - be familiar with all safety devices and instructions.

Additional requirements apply for work on the following machine components:

Additional requirements regarding the qualification

- ❍ Electrical parts or operating agents: shall only be performed by an electrician or under the guidance and supervision of an 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 operator position is in front of the bench drill.

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 bench drill must only be operated with fully functional safety devices.

Stop the bench drill immediately if there is a failure on the safety device or becomes ineffective.

It is your responsibility!

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

- the cause of the fault has been eliminated,
- you 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 bench drill. The possible consequences are:

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

The bench drill includes the following safety devices:

- an emergency stop push button,
- a drilling table with T-slots to fix the workpiece or a vice,
- a protective cover for the pulleys with positioning switch,
- a drill chuck guard, in order to prevent interference with the rotating tool.

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.

1.10 Safety check

Check the bench drill before each start-up or at least once per shift. Inform the person responsible immediately of any damage, defects or changes in the operating function.

Check all safety devices

- at the beginning of each shift (with the machine stopped),
- once a week (with the machine in operation) and
- after all maintenance and repair work.

Check that prohibition, warning and information signs and the labels on the bench drill.

- are legible (clean them, if necessary)
- are complete (replace if necessary).

INFORMATION

Organise the checks according to the following table;

General check		
Equipment	**Check**	**OK**
Guards	Mounted, firmly bolted and not damaged	
Signs, Markers	Installed and legible	
Date:	**Checked by (signature):**	

Functional check		
Equipment	**Check**	**OK**
Emergency stop push button	After actuating the emergency-stop push button the bench drill must be switched off.	
Limit switch protective cover V-belt	The bench drill must not be switched on, if the protective cover of the V-belts is opened. An opening of the protective cover during machine operating turns off the machine.	
Drill chuck guard	The bench drill can only be switched on if the drill chuck guard is closed. The engine must switch off when the drill chuck guard is opened during operation.	
Date:	**Checked by (signature):**	

1.11 Emergency-stop push button

CAUTION!

The drilling spindle keeps turning for a short time even after actuating the emergency stop push button depending on the preset speed.

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.

1.12 Drilling table

Seats for T-slots are attached to the clamping table.

WARNING!

Risk of injury due to workpieces flying off at high speed. Securely fix the workpiece on the drilling table.

1.13 Separating protective devices

1.13.1 Protective cover of the V-belt

A protective cover for the belt pulleys is mounted on the drilling head. There is a switch integrated in the protective cover which monitors that the cover is closed.

Information

The machine cannot be started, if the protective cover is not closed.

1.13.2 Drill chuck 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 drill chuck guard is not closed.

1.14 Personal protective equipment

For some works you need personnel protective equipment as protective equipment. These are

- Safety helmet,
- protective glasses or face guard,
- protective gloves,
- safety shoes with steel toe caps,
- ear protection.

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

CAUTION!

Dirty or contaminated personnel protective equipment can cause illness.

Clean your personal protective equipment

- **after each use,**
- **regularly once a week.**

Personal protective equipment for special works

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.

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1.15 Safety during operation

We specifically point out the dangers in the description of work with and on the bench drill.

WARNING!

Before switching on the bench drill make sure that there are

- **no dangers generated for persons,**
- **no objects are damaged.**

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.
- Do not work on the bench drill if your concentration is reduced, for example, because you are taking medication.
- Observe the accident prevention regulations issued by your Employers Liability Insurance Association or other supervisory authorities applicable to your company.
- Inform the supervisor about all hazards or faults.
- Stay on the bench drill until the machine completely stopped moving.
- Use the specified personal protective equipment. Ensure you wear close-fitting clothing and, if necessary, a hairnet.
- Do not use protective gloves when drilling.

1.16 Disconnecting and securing the bench drill

WARNING!

Dangerous voltage even if the master switch is switched off.

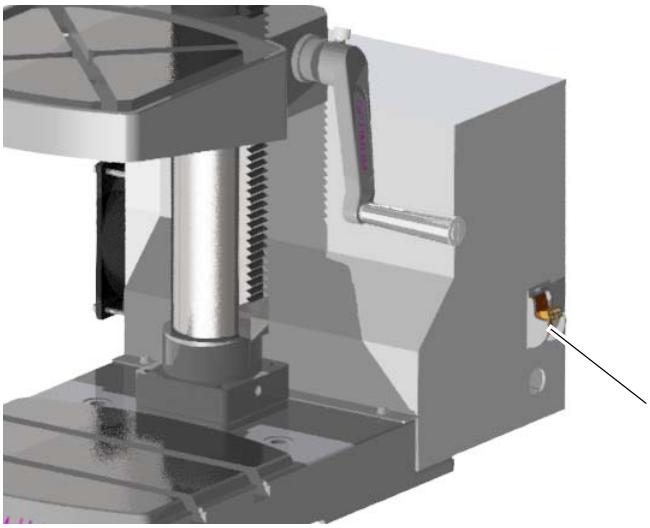
The areas marked by the pictogram might contain live parts, even if the master switch is switched off.

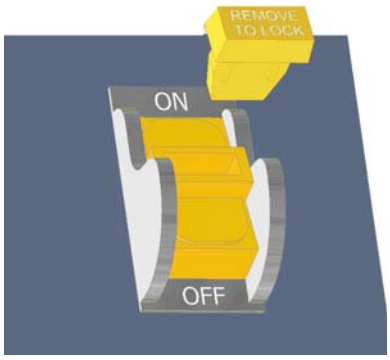
The bench drill is equipped with a master switch.

When the master switch is switched off, the power supply to the machine is completely interrupted.

Switch off the bench drill by pressing the master switch and secure the master switch against restarting by pulling off the safety bar from the master switch and keeping it in a secure place.
It is only possible to restart the machine after having plugged in the safety bar.

All machine parts as well as all dangerous voltages are switched off.





Master switch

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1.17 Safety during maintenance

Inform the operators in good time of any maintenance and repair works.

Report all safety relevant changes and performance details of the bench drill or their operational behaviour. Any changes must be documented, the operating instructions updated and machine operators instructed accordingly.

Unplug the power cord !

1.17.1 Using lifting equipment

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

- **they have sufficient load carrying,**
- **and that it is in perfect condition.**

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

Fasten the loads properly. Never walk under suspended loads!

1.17.2 Mechanical maintenance

Reinstall all protection and safety devices after any maintenance work once the work has been completed.This includes:

- covers,
- safety instructions and warning signs,
- grounding cables.

Check if they are working properly!

1.18 Accident report

Inform your supervisors and Optimum Maschinen Germany GmbH immediately in the event of accidents, possible sources of danger and any actions which almost led to an accident (near misses).

There are many possible causes for "near misses".

The sooner they are notified, the quicker the causes can be eliminated.

1.19 Electronics

Have the machine and/or the electric equipment checked regularly. Immediately eliminate all defects such as loose connections, defective wires, etc.

Define and document the inspection deadlines for the machine in accordance with § 3 of the Factory Safety Act and perform an operational risk analysis in accordance with § 6 of the Work Safety Act.

2 Technical specification

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

2.1 Electrical connection	
Connection	230V ~ 50Hz (60 Hz)
Motor power	1.5 Kw

2.2 Drilling capacity	
Drilling capacity in steel (S235JR) [mm]	16
Drilling capacity in steel (S235JR) [mm]	13
Throat [mm]	130
Spindle sleeve travel [mm]	65

2.3 Spindle seat	
Spindle seat	MT2

2.4 Drilling table	
Table size [mm] Length x Width of the working surface	230 x 245
T-slot size / distance / number [mm]	12mm / 90° / 2
Spindle - Table [mm] distance	0 - 370
Spindle - Foot [mm] maximum distance	485
Working surface foot [mm] Length x width of working surface	200 x 240
Diameter of column [mm]	60
Rotatable drilling table	360°

2.5 Required space	
☞ Dimensions on page 19	
Weight [kg]	64

2.6 Speeds	
Spindle speeds [rpm]	100 - 6000
Number of transmission stages (V-belt)	5

2.7 Environmental conditions	
Temperature	5 - 35 °C

2.7 Environmental conditions	
Relative humidity	25-80%

2.8 Operating material	
Toothed rod	commercial lubricating grease
Column, bare steel parts	acid-free oil, e.g. machine oil, motor oil

2.9 Emissions	
Maximum sound pressure level at 1 m distance from the machine and 1.60 m above the ground.	72 dB (A) at idle +/- 2 dB (A)

The noise emission of the bench drill is 70 to 74 dB(A).
If the bench drill is installed in an area where various machines are in operation, the noise exposure (immission) on the operator of the milling machine at the working place may exceed 80 dB(A).

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 the age and wear of the machine.

Furthermore, the noise emission also depends on production engineering factors, e.g. speed, material and clamping conditions.

INFORMATION

The specified numerical value represents the emission level and does 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 of damping behaviour**,**
- other noise sources, e.g. the number of machines,
- other processes taking place in 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 should, however, allow the operator of the machine to more easily evaluate the hazards and risks.

CAUTION!

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

We generally recommend the use of noise and ear protection.

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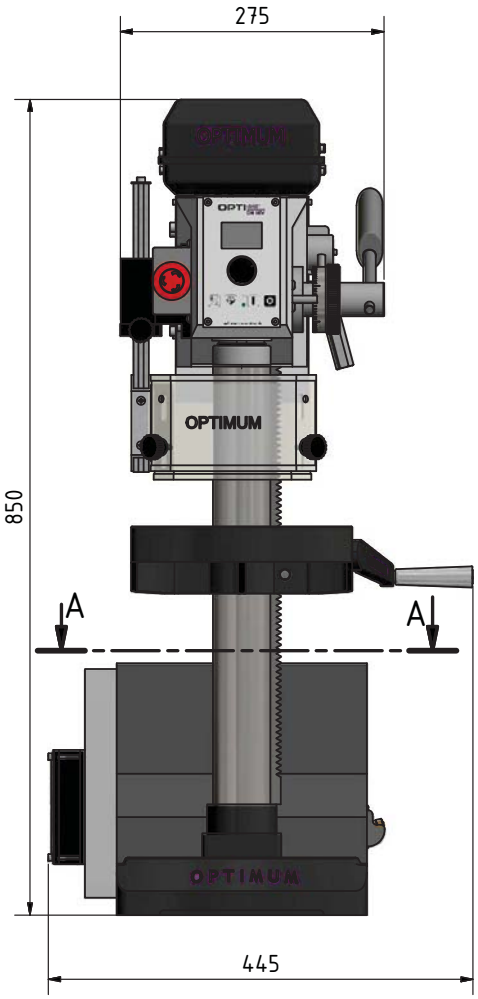
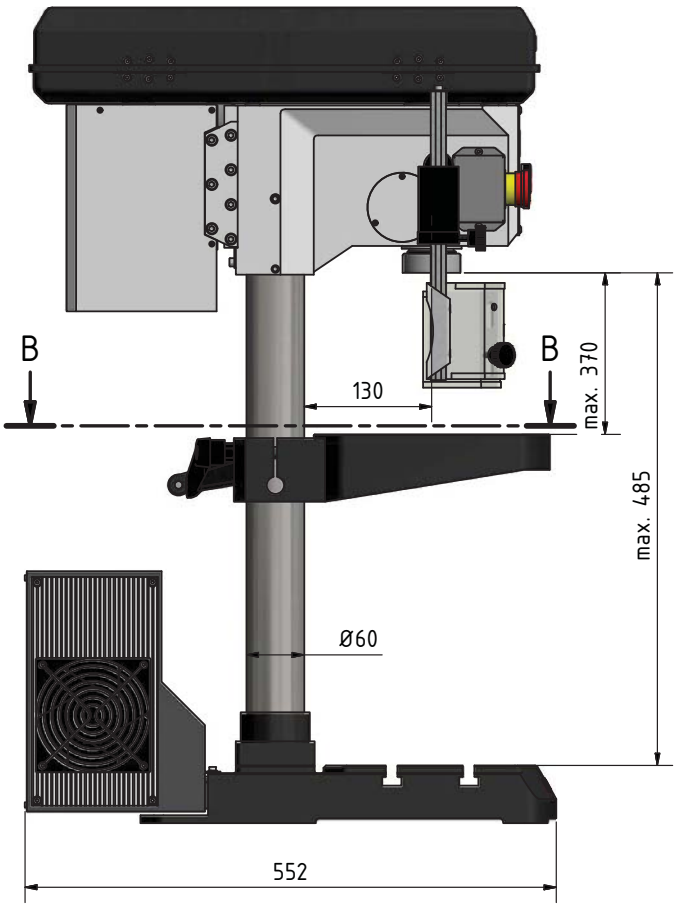
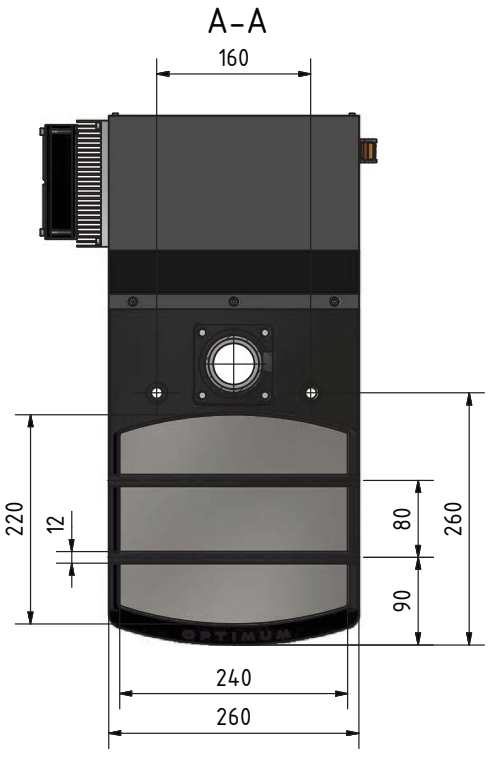
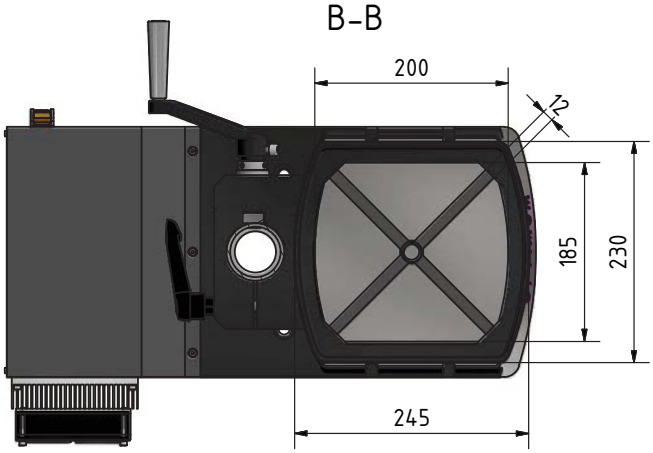
2.10 Dimensions









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3 Delivery, interdepartmental transport and unpacking

CAUTION!

Injuries caused by parts falling over or off a forklift, pallet truck or transport vehicle. Only use means of transport that can carry the total weight and are suitable for it.

3.1 Notes on transport, installation and unpacking

Improper transport of individual devices and minor machines, unsecured devices and minor machines stacked on top of each other or next to each other in packed or already unpacked condition is accident-prone and can cause damage or malfunctions for which we do not grant any liability or guarantee.

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

3.1.1 General risks during internal transport

CAUTION: DANGER OF TIPPING!

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

Employees must be outside the danger zone, the reach of loads. Warn employees and, if necessary, advise employees of the hazard.

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 disturbances as well as for sufficient strength and load capacity.

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 internal transport is therefore essential.

3.2 Unpacking the machine

Transport the drilling machine in its packing crate near its final installation location with a lift truck before unpacking it. If the packaging shows signs of possible transport damage, take the necessary precautions not to damage the machine when unpacking it. If any damage is discovered, the carrier and/or shipper must be notified immediately to be able to initiate the necessary steps for a claim.

Inspect the machine completely and carefully, making sure that all materials, such as shipping documents, manuals and accessories supplied with the machine have been received.

3.3 Transport

The machine can be transported with forklifts or lift trucks. The commonly accepted and local regulations regarding machine transport apply.

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 drilling machine. Use only transport and load suspension devices that can support the total weight of the drilling 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. Fasten the loads properly. Never walk under suspended loads!

3.4 Set-up and assembly

3.4.1 Installation site requirements

Organise the working area around the bench drill according to the local safety regulations.

INFORMATION

In order to attain good functionality and a high processing accuracy as well as a long service life of the machine, the place of installation 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 near 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 bench drill. Pay attention also to the load-bearing capacity and evenness of the floor.
- The substructure must be prepared in such a way as to ensure that, if any lubricant is used, it cannot penetrate the floor.
- Protruding parts - such as the dog, handles, etc. - must be secured, where necessary, by means of on-site measures so that persons are not endangered.
- Provide sufficient space for the personnel preparing and operating the machine and transporting the material.
- Also make sure the machine is accessible for setting and maintenance works.
- Provide for sufficient backlight (Minimum value: 500 lux, measured at the tool tip). At lower illumination intensities, additional illumination has to be ensured e.g. by means of a separate workplace lamp.

INFORMATION

The power plug of the bench drill must be readily accessible.

3.4.2 Assembly of the drilling machine

WARNING!

Danger of crushing when assembling and installing the machine components.

INFORMATION

The drilling machine is delivered premounted.

Only put up the drilling machine at the installation site and pin up the drill chuck on the seat cone.

3.5 Installation

➜ Check the horizontal orientation of the base of the bench drill with a spirit level.

➜ Check that the foundation has sufficient load-bearing capacity and rigidity.

➜ Place the bench drill on the provided foundation.

➜ Fix the bench drill in the provided through-holes on the machine foot.

WARNING!

The condition of the foundation and the fixing type of the machine foot to the foundation must be in a way that it can bear the loads of the bench drill. The foundation must be level. Check that the bench drill foundation is horizontal by using a spirit level.

3.5.1 Fixing

In order to provide for the necessary stability of the bench drill, connect the machine with its foot to the foundation.

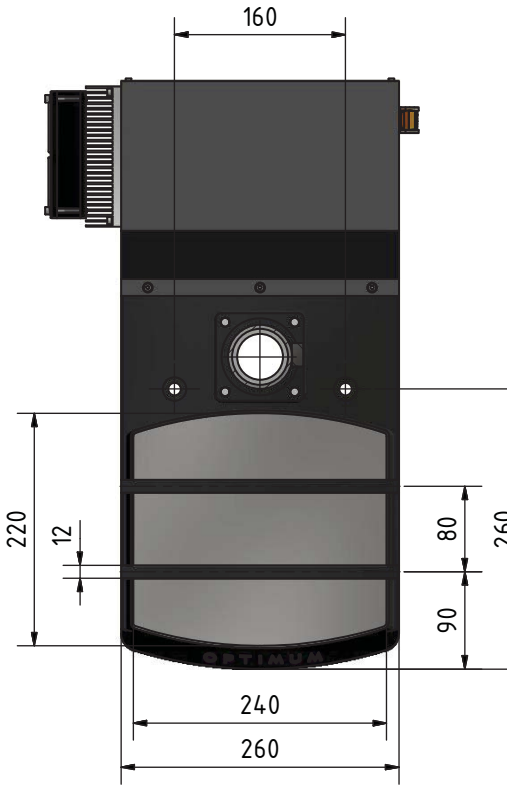
➜ Fix the foot of the bench drill to the foundation with the provided through-holes.

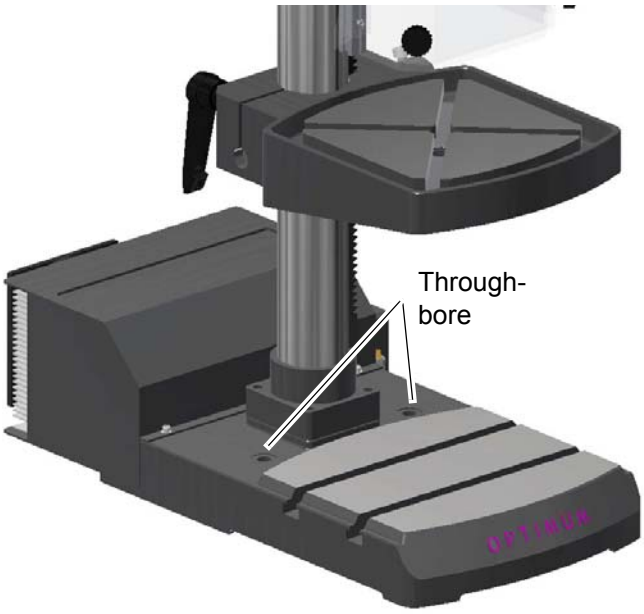
ATTENTION!

Tighten the fixing screws of the bench drill only as much that it is safely fixed and cannot break away or tilt over.

If the fixing screws are too tight in particular in connection with an uneven substructure it may result in a broken stand of the machine.

3.5.2 Assembly drawing





3.5.3 First commissioning

WARNING!

First commissioning may only take place after proper installation.

There is a danger to persons and equipment, if the first commissioning of the drilling machine is carried out by inexperienced personnel. We do not accept any liability for damages caused by incorrectly performed commissioning.

Only use tool holders in the intended admissible speed range.

☞ **Qualification of personnel on page 10.**

Thoroughly read the operating instructions before commissioning the bench drill. They allow a safe commissioning of the machine. Follow the safety instructions of the operating manual.

3.5.4 Electrical connection

The machine is installed and ready to operate. Please verify if the type of current, voltage and protection fuse correspond to the values specified. A protective earth ground wire connection must be available. Mains fuse 10A to 16A

CAUTION !

Arrange the machine's connection cable in such a way that it will not cause a tripping hazard.

3.5.5 Warming up the machine

ATTENTION!

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

If the machine is cold, 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.

Mount and install the machine. Connect it to the mains and perform a test run. This also helps to run in the mechanic components of the machine before the first machining.

Please proceed as follows:

- ➜ Position the V-belt at the level for the highest spindle speed on the belt drive.
- ➜ Turn the control dial for the spindle speed to the left to the minimum value.
- ➜ Start the machine.
- ➜ Turn the control dial as far right as the spindle speed of about 2000 rpm is achieved and allow the machine to turn idle for about 10 minutes.
- ➜ Repeat the running-in period of 10 minutes at about 4500 rpm.
- ➜ Repeat the running-in period of 10 minutes at about 6000 rpm.

4 Operation

4.1 Control and indicating elements

Pos.	Designation	Pos.	Designation
1	Lever for belt tension	2	Belt drive with housing
3	Lever for spindle sleeve feed	4	Emergency stop
5	Spindle stop	6	Spindle start
7	Setting the zero point (start of workpiece)	8	Drilling mode | Tapping mode
9	Table height adjustment	10	Display speed | drilling depth | thread depth
11	Mechanical drilling depth adjustment	12	Control dial ❍ Rotating, setting the depth and speed. ❍ Pressing, accept value.
13	Drill chuck guard		

4.2 Safety

Commission the machine only under the following conditions:

- ❍ The machine is in proper working order.
- ❍ The machine is used as prescribed.
- ❍ Follow the operating instructions.
- ❍ All safety devices are installed and activated.

All failures should be eliminated immediately. Stop the machine immediately in the event of any anomaly in operation and make sure it cannot be started up accidentally or without authorization. Notify the person responsible immediately of any modification.

☞ Safety during operation on page 15

4.3 Switching on the machine

➜ Switch on the master switch.
➜ Select the speed or speed range. ☞ Speed variation on page 29
➜ Actuate the push button "Start".

4.4 Switching off the machine

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.

➜ Actuate the push button "Stop".
➜ For a long-term standstill of the machine switch it off at the master switch.

4.5 Adjustment of the electronic drilling depth / thread depth

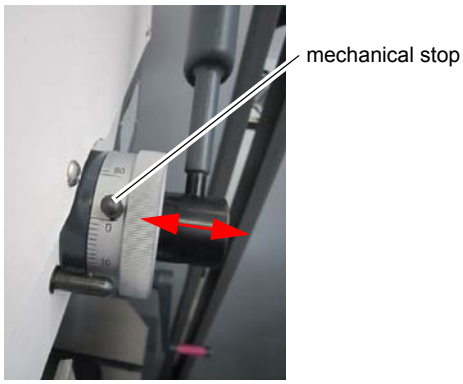
To access the electronic depth adjustment.

➜ Close drill chuck protection.
➜ **Press** the **operating mode**  and the **zero point**  button.
➜ Then **release** the **zero point** button **first**. The arrow for displaying the depth is shown in the display.
➜ Use the control dial to set the depth and confirm the value by pressing the control dial. The arrow indicating the depth in the display disappears.

4.6 Adjustment of the mechanical drilling depth

To adjust the mechanical drilling depth.

➜ Pull out the drilling depth stop.
➜ Rotate the drilling depth stop.
➜ Push the drill depth stop in stop position again.



Img.4-1: Mechanical drill depth stop

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4.7 Disassembly, assembly of drill chucks and drill bits

4.7.1 Fitting the drill chuck

The drill chuck or the tool is secured in the drill spindle against turning over by means of a form-locking connection (driver).

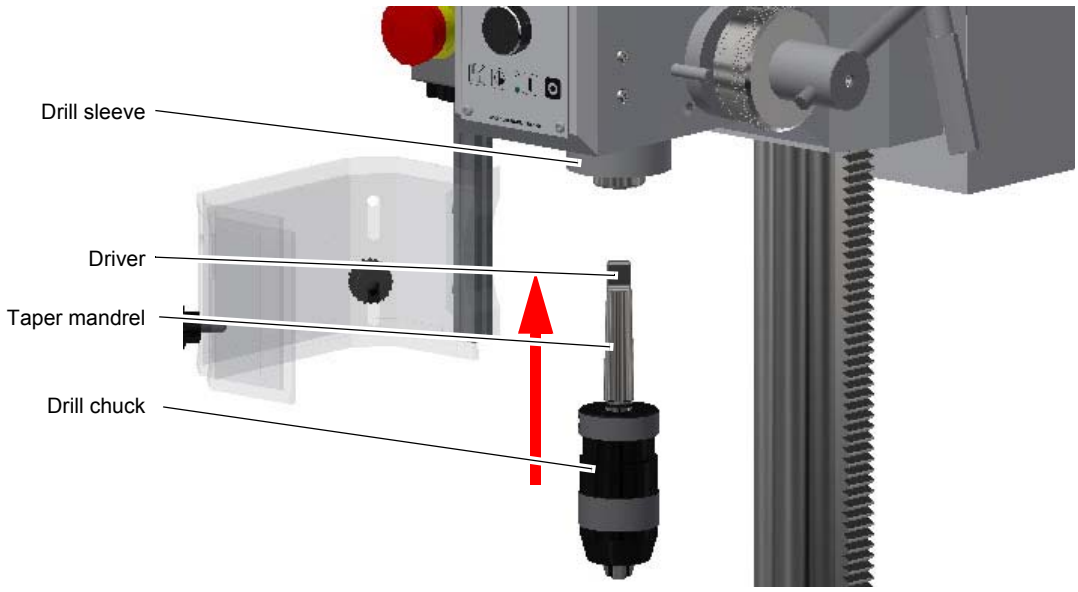
A frictionally engaged connection keeps and centres the drill chuck or the drill in the drill spindle.

➜ Check and, if necessary, clean the conical seat in the drilling spindle and at the taper mandrel of the tool.

➜ Press the taper mandrel into the drill spindle.

CAUTION!

Make sure that the clamped tool is firmly and correctly fitted.



Img.4-2: Taper mandrel

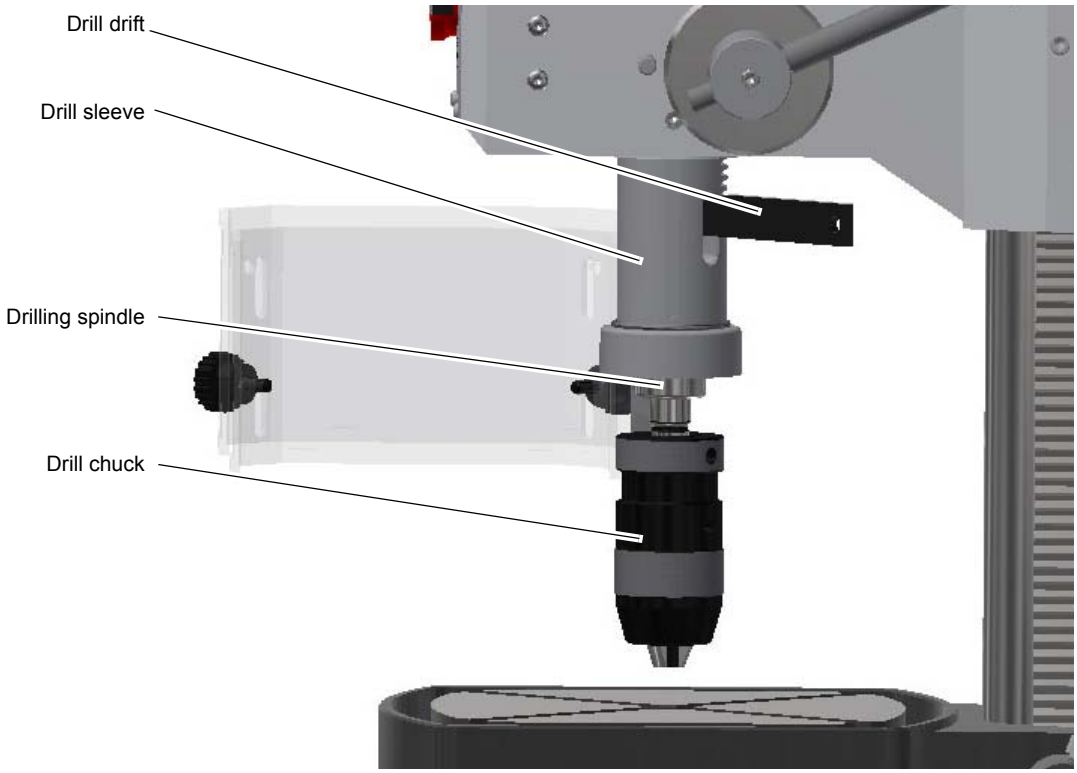
4.7.2 Unfitting the drill chuck

The drill chuck and the taper mandrel are loosened from the drill spindle by means of a drill drift.

WARNING!

Only disassemble the drill chuck if the bench drill is disconnected from the electrical supply.

- ➜ Switch off the bench drill on the master switch or disconnect the mains plug.
- ➜ Move the drill sleeve down.
- ➜ Turn the drilling spindle until the openings of the sleeve and of the drilling spindle are superimposed.
- ➜ Loosen the taper mandrel of the drill chuck with the help of a drill drift.



Img.4-3: Unfitting the drill chuck

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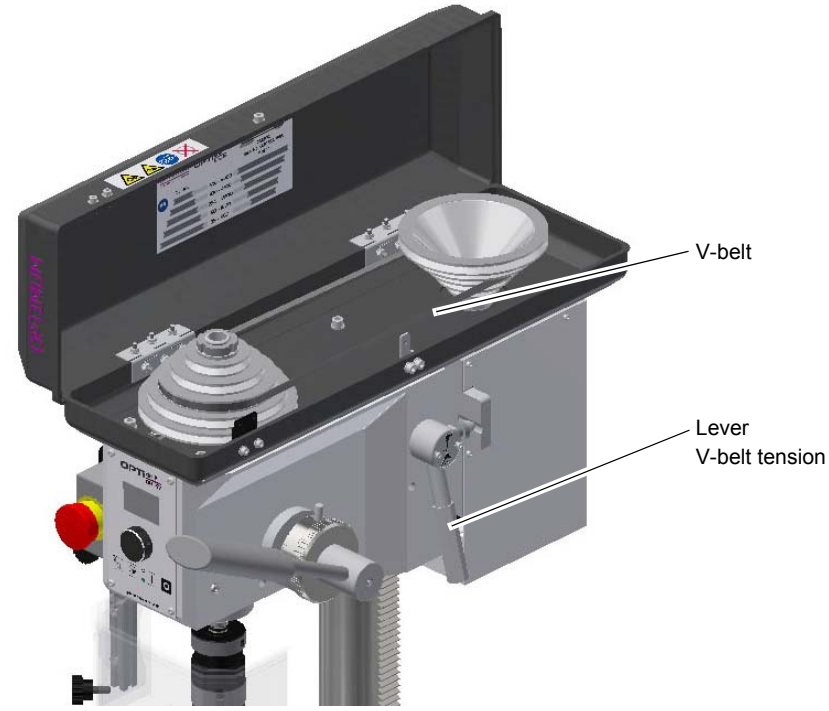
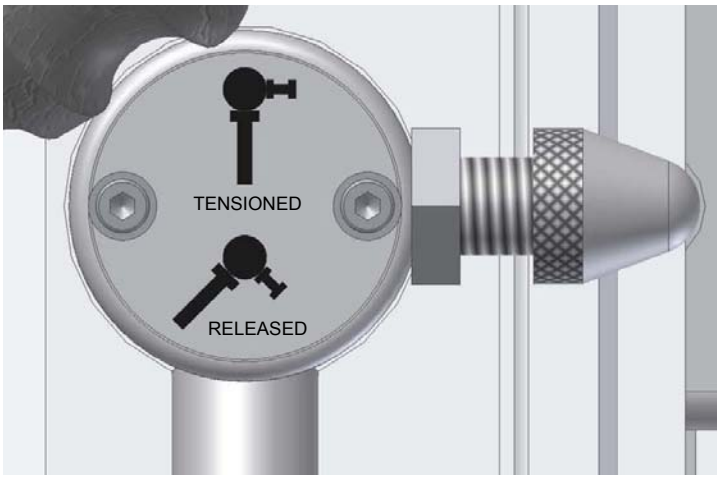
4.8 Speed variation

➜ Switch off the machine by using the main switch.
➜ Open the protective cover.
➜ Loosen the lever of the V-belt tensioning.
➜ Position the V-belt respectively on the required transmission stage.
➜ Tighten the clamping lever again and thus tighten the belt drive.
➜ Close the protective cover.





Img.4-4: Lever V-belt tensioning

4.9 Drilling

➜ Insert and tighten the drill bit.
➜ Clamp the workpiece.
➜ Unlock the emergency-stop.
➜ Close drill chuck protection.
➜ Put the drill bit with the drilling lever onto the workpiece and set the workpiece zero.
➜ Select the operation mode - drilling (LED is lit).
➜ Adjust the set point of the drilling depth.
☞ Adjustment of the electronic drilling depth / thread depth on page 26
☞ Adjustment of the mechanical drilling depth on page 26
➜ Push Start.

The spindle turns; the holes are drilled.

If necessary, change the preset speed with the control dial.

➜ Press Stop.

4.10 Tapping

INFORMATION

The speed preset by the controller is about 100 to 150 rpm.

➜ Tighten the screw tap.
➜ Clamp the workpiece.
➜ Unlock the emergency-stop.
➜ Close drill chuck protection.
➜ Put the screw tap with the drilling lever onto the workpiece and set the workpiece zero.
➜ Select the operation mode - tapping (LED is lit).
➜ Adjust the set point of the thread depth. ☞ Adjustment of the electronic drilling depth / thread depth on page 26
➜ Push Start.

The spindle turns; the threads are drilled.

The spindle begins to rotate as soon as the drilling lever is moved downwards.

Insert the screw tap in the workpiece; the screw tap is pulled into the workpiece. Move the spindle in the same direction with the drilling lever, but do not use any tractive force on the threads. After reaching the thread depth setting, the rotation direction reverses and the screw tap rotates back out of the workpiece.

The spindle stops rotating in the upper position.

The spindle begins to roatate again as soon as the drilling lever is moved downwards.

4.11 Cooling

The friction generated during rotation can cause the edge of the tool to become very hot.

The tool should be cooled during the drilling process. Cooling the tool with a suitable cooling lubricant ensures better working results and a longer edge life of the tools.

This is best realised by a separate cooling equipment. If there is no cooling equipment included in the delivery volume, you can cool by means of a spray gun or a washing bottle.

CAUTION!

Danger of injury due to brushes getting caught or pulled in.

Use a spray gun or a washing bottle for cooling.

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 being collected.

Respect the environment when disposing of lubricants and coolants.

Follow the manufacturer's disposal instructions.

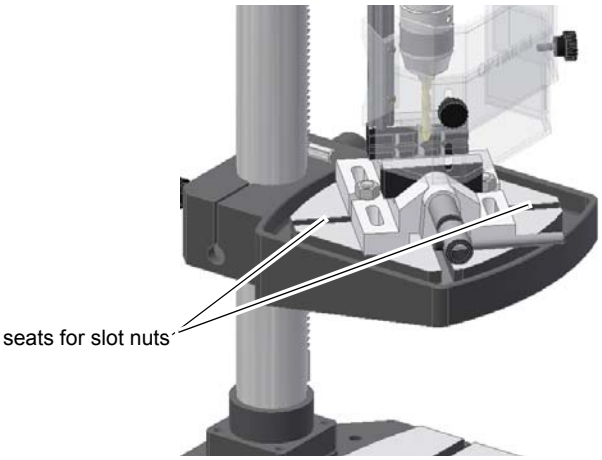
4.12 Before starting work

Before starting work, select the desired speed. It is depending on the used drilling diameter and on the material.

☞ Determining the cutting speed and the speed on page 33

WARNING!

For drilling jobs, it is necessary to clamp the workpiece firmly to prevent the bit catching on the pieces. A machine vice or clamping claws is a suitable clamping device.



Img.4-5: seats for slot nuts

Put a wooden or plastic board beneath the workpiece to avoid drilling through to the work table, vice, etc.

If required, adjust the desired drilling depth by means of the drilling depth stop in order to obtain a uniform drilling depth.

Please make sure to use a suitable dust suction when treating wood since wood dust may be health hazardous. Wear a suitable dust mask when performing works at which dust is generated.

4.13 During work

The spindle sleeve feed is done via the spindle sleeve lever. Make sure that the feed is constant and not too fast. The spindle sleeve is returned to its initial position by the return spring.

WARNING!

Seizing of clothes and / or hair.

- **Make sure to wear well-fitting work during drilling work.**
- **Do not use gloves.**
- **If necessary, use a hairnet.**

CAUTION!

Danger of bumps from the spindle sleeve lever.

Do not release the spindle sleeve lever when repositioning the drilling spindle sleeve.

CAUTION!

Danger of crushing. Do not place your hand between the drilling head and the spindlesleeve.

INFORMATION

The smaller the bit the more easily it may break.

In the case of deep drilling, remove the bit from time to time to remove filings from the drill. Add a few drops of oil to reduce friction and prolong the service life of the bit.

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5 Determining the cutting speed and the speed

5.1 Table cutting speeds / infeed

Material table						
Material to be processed	Recommended cutting speed **Vc** in m/min	Recommended infeed **f** in mm/revolution				
		Drill bit diameter **d** in mm				
		2...3	>3...6	>6...12	>12...25	>25...50
Unalloyed construction steels < 700 N/mm²	30 - 35	0.05	0.10	0.15	0.25	0.35
Alloyed construction steels > 700 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Alloyed steels < 1000 N/mm²	20 - 25	0.04	0.08	0.10	0.15	0.20
Steels, low stability < 800 N/mm²	40	0.05	0.10	0.15	0.25	0.35
Steel, high stability > 800 N/mm²	20	0.04	0.08	0.10	0.15	0.20
non-rust steels > 800 N/mm²	12	0.03	0.06	0.08	0.12	0.18
Cast iron < 250 N/mm²	15 - 25	0.10	0.20	0.30	0.40	0.60
Cast iron > 250 N/mm²	10 - 20	0.05	0.15	0.25	0.35	0.55
CuZn alloy brittle	60 - 100	0.10	0.15	0.30	0.40	0.60
CuZn alloy ductile	35 - 60	0.05	0.10	0.25	0.35	0.55
Aluminum alloy up to 11% Si	30 - 50	0.10	0.20	0.30	0.40	0.60
Thermoplastics	20 - 40	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with organic filling	15 - 35	0.05	0.10	0.20	0.30	0.40
Thermosetting materials with anorganic filling	15 - 25	0.05	0.10	0.20	0.30	0.40

5.2 Speed table

Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100
Drill bit **Ø** in mm	Speed **n** in rpm															
1,0	1274	1911	2548	3185	3822	4777	5732	6369	7962	9554	11146	12739	15924	19108	25478	31847
1,5	849	1274	1699	2123	2548	3185	3822	4246	5308	6369	7431	8493	10616	12739	16985	21231
2,0	637	955	1274	1592	1911	2389	2866	3185	3981	4777	5573	6369	7962	9554	12739	15924
2,5	510	764	1019	1274	1529	1911	2293	2548	3185	3822	4459	5096	6369	7643	10191	12739
3,0	425	637	849	1062	1274	1592	1911	2123	2654	3185	3715	4246	5308	6369	8493	10616
3,5	364	546	728	910	1092	1365	1638	1820	2275	2730	3185	3640	4550	5460	7279	9099
4,0	318	478	637	796	955	1194	1433	1592	1990	2389	2787	3185	3981	4777	6369	7962
Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100

Drilling_VC_GB.fm

Drill bit **Ø** in mm	Speed **n** in rpm															
4,5	283	425	566	708	849	1062	1274	1415	1769	2123	2477	2831	3539	4246	5662	7077
5,0	255	382	510	637	764	955	1146	1274	1592	1911	2229	2548	3185	3822	5096	6369
5,5	232	347	463	579	695	869	1042	1158	1448	1737	2027	2316	2895	3474	4632	5790
6,0	212	318	425	531	637	796	955	1062	1327	1592	1858	2123	2654	3185	4246	5308
6,5	196	294	392	490	588	735	882	980	1225	1470	1715	1960	2450	2940	3920	4900
7,0	182	273	364	455	546	682	819	910	1137	1365	1592	1820	2275	2730	3640	4550
7,5	170	255	340	425	510	637	764	849	1062	1274	1486	1699	2123	2548	3397	4246
8,0	159	239	318	398	478	597	717	796	995	1194	1393	1592	1990	2389	3185	3981
8,5	150	225	300	375	450	562	674	749	937	1124	1311	1499	1873	2248	2997	3747
9,0	142	212	283	354	425	531	637	708	885	1062	1238	1415	1769	2123	2831	3539
9,5	134	201	268	335	402	503	603	670	838	1006	1173	1341	1676	2011	2682	3352
10,0	127	191	255	318	382	478	573	637	796	955	1115	1274	1592	1911	2548	3185
11,0	116	174	232	290	347	434	521	579	724	869	1013	1158	1448	1737	2316	2895
12,0	106	159	212	265	318	398	478	531	663	796	929	1062	1327	1592	2123	2654
13,0	98	147	196	245	294	367	441	490	612	735	857	980	1225	1470	1960	2450
14,0	91	136	182	227	273	341	409	455	569	682	796	910	1137	1365	1820	2275
15,0	85	127	170	212	255	318	382	425	531	637	743	849	1062	1274	1699	2123
16,0	80	119	159	199	239	299	358	398	498	597	697	796	995	1194	1592	1990
17,0	75	112	150	187	225	281	337	375	468	562	656	749	937	1124	1499	1873
18,0	71	106	142	177	212	265	318	354	442	531	619	708	885	1062	1415	1769
19,0	67	101	134	168	201	251	302	335	419	503	587	670	838	1006	1341	1676
20,0	64	96	127	159	191	239	287	318	398	478	557	637	796	955	1274	1592
21,0	61	91	121	152	182	227	273	303	379	455	531	607	758	910	1213	1517
22,0	58	87	116	145	174	217	261	290	362	434	507	579	724	869	1158	1448
23,0	55	83	111	138	166	208	249	277	346	415	485	554	692	831	1108	1385
24,0	53	80	106	133	159	199	239	265	332	398	464	531	663	796	1062	1327
25,0	51	76	102	127	153	191	229	255	318	382	446	510	637	764	1019	1274
26,0	49	73	98	122	147	184	220	245	306	367	429	490	612	735	980	1225
27,0	47	71	94	118	142	177	212	236	295	354	413	472	590	708	944	1180
28,0	45	68	91	114	136	171	205	227	284	341	398	455	569	682	910	1137
29,0	44	66	88	110	132	165	198	220	275	329	384	439	549	659	879	1098
30,0	42	64	85	106	127	159	191	212	265	318	372	425	531	637	849	1062
31,0	41	62	82	103	123	154	185	205	257	308	360	411	514	616	822	1027
32,0	40	60	80	100	119	149	179	199	249	299	348	398	498	597	796	995
33,0	39	58	77	97	116	145	174	193	241	290	338	386	483	579	772	965
34,0	37	56	75	94	112	141	169	187	234	281	328	375	468	562	749	937
35,0	36	55	73	91	109	136	164	182	227	273	318	364	455	546	728	910
36,0	35	53	71	88	106	133	159	177	221	265	310	354	442	531	708	885
37,0	34	52	69	86	103	129	155	172	215	258	301	344	430	516	689	861
38,0	34	50	67	84	101	126	151	168	210	251	293	335	419	503	670	838
Vc in m/min	4	6	8	10	12	15	18	20	25	30	35	40	50	60	80	100

Drilling_Vc_GB.fm

Drill bit Ø in mm	Speed **n** in rpm															
39,0	33	49	65	82	98	122	147	163	204	245	286	327	408	490	653	817
40,0	32	48	64	80	96	119	143	159	199	239	279	318	398	478	637	796
41,0	31	47	62	78	93	117	140	155	194	233	272	311	388	466	621	777
42,0	30	45	61	76	91	114	136	152	190	227	265	303	379	455	607	758
43,0	30	44	59	74	89	111	133	148	185	222	259	296	370	444	593	741
44,0	29	43	58	72	87	109	130	145	181	217	253	290	362	434	579	724
45,0	28	42	57	71	85	106	127	142	177	212	248	283	354	425	566	708
46,0	28	42	55	69	83	104	125	138	173	208	242	277	346	415	554	692
47,0	27	41	54	68	81	102	122	136	169	203	237	271	339	407	542	678
48,0	27	40	53	66	80	100	119	133	166	199	232	265	332	398	531	663
49,0	26	39	52	65	78	97	117	130	162	195	227	260	325	390	520	650
50,0	25	38	51	64	76	96	115	127	159	191	223	255	318	382	510	637

5.3 Examples to calculatory determine the required speed for your drilling machine

The necessary speed is depending on the diameter of the drill bit, on the material which is being machined as well as on the cutting material of the drill bit.

Material which needs to be drilled: St37

Cutting material (drill bit): HSS spiral bit

Set point of the cutting speed [V_c] according to the table: 40 meters per minute

Diameter [d] of your drill bit: 30 mm = 0,03 m [meters]

Selected infeed [f] according to the table: about 0.35 mm/rev

Speed $n = \frac{\vartheta c}{\pi \times d} = \frac{40m}{min \times 3,14 \times 0,03m} = 425(rpm)$

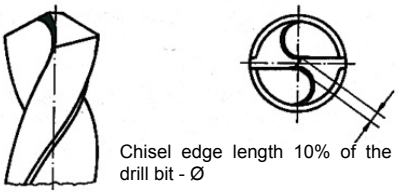
Set a speed on your drilling machine which is less than the determined speed.

INFORMATION

In order to facilitate the production of larger drill holes they need to be pre-drilled. This way, you reduce the cutting forces and improve the guiding of the drill bit.

The pre-drilling diameter is depending on the length of the chisel edge. The chisel edge does not cut, but it squeezes the material. The chisel edge is positioned at an angle of 55° to the major cutting edge.

As a general rule of thumb it applies: The pre-drilling diameter is depending on the length of the chisel edge.



Chisel edge length 10% of the drill bit - Ø

Recommended working steps for a drilling diameter of 30 mm

Example:

1st working step: Pre-drilling with Ø 5 mm.

2nd working step: Pre-drilling with Ø 15 mm.

3rd working step: Drilling with Ø 30 mm.

Drilling_VC_GB.fm

6 Maintenance

In this chapter you will find important information about

- Inspection,
- Maintenance and
- Repair.

ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

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

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

ENVIRONMENTAL PROTECTION

During work on the spindle head, please make sure that

- **collecting containers with sufficient capacity for the amount of liquid to be collected are used.**
- **liquids and oils should not be split on the ground.**

Clean up any spilt liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current legal requirements on the environment.

Collect leakages

Do not re-introduce liquids spilt outside the system during repair or as a result of leakage from the reserve tank; collect them in a collecting container for disposal.

Disposal

Never dump oil or other environmentally hazardous substances which are harmful to the environment in water inlets, rivers or channels.

Used oils must be delivered to a collection centre. Please consult your supervisor for further information on your nearest collection point.

6.1 Safety

WARNING!

The consequences of incorrect maintenance and repair work may include:

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

Only qualified personnel should carry out maintenance and repair work on the machine.

6.1.1 Preparation

WARNING!

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

Attach a warning sign which secures against unauthorized switching on.

6.1.2 Restarting

Before restarting, run a safety check.

☞ Safety check on page 12

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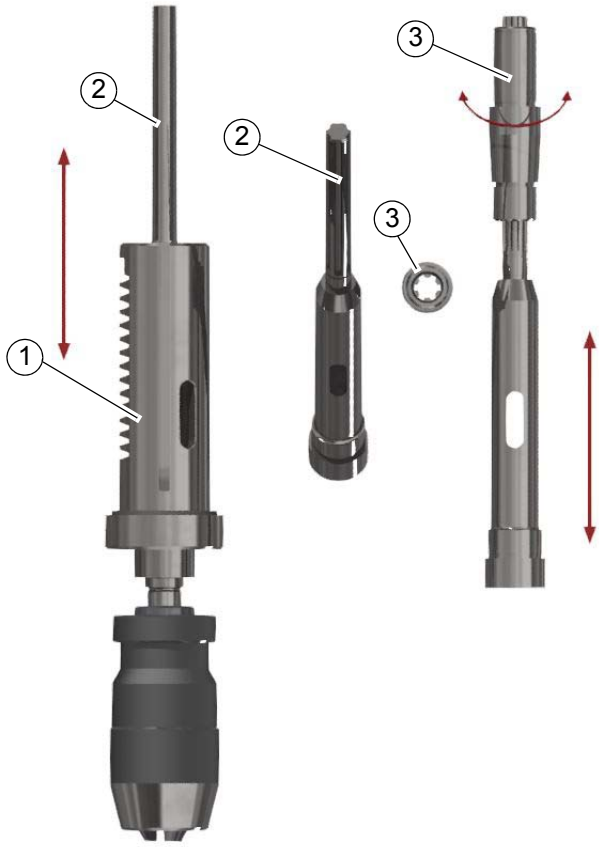
WARNING!

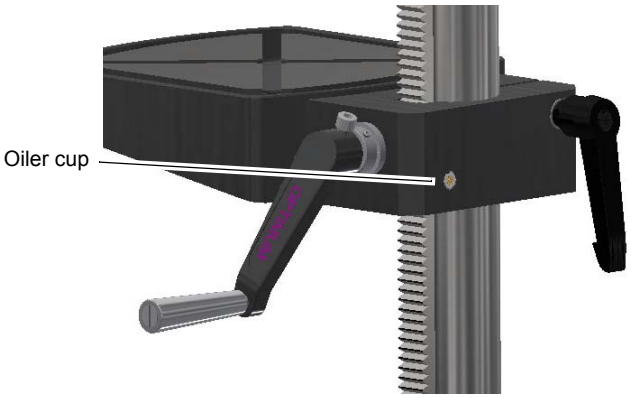
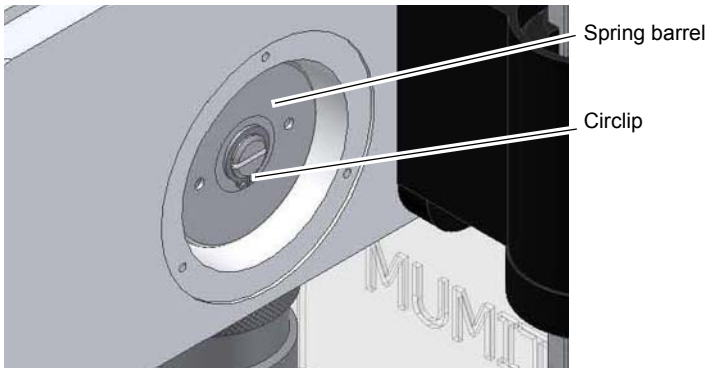
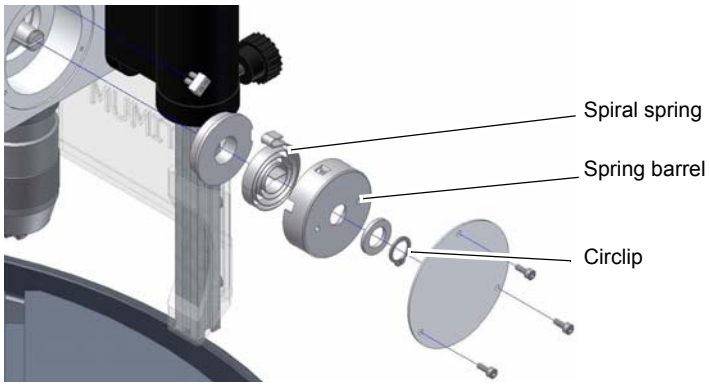
Before starting the machine you must be sure that
- ❍ **no dangers generated for persons,**
- ❍ **the machine is not damaged.**

6.2 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 shift After each maintenance or repair work	**Bench drilling machine**	Examination for outside damages. ☞ Safety check on page 12	
Every month	**Drilling column**	**Oiling**	➜ Lubricate the drill column regularly with commercial oil, machine oil, engine oil.
Every 6 months	**V-belts at the drill head**	**Visual inspection**	➜ Check whether the V-belts have become porous and worn.
Every 6 months	**Electronics**	**Testing**	➜ Check the electrical equipment / parts of the bench drill. ☞ Electronics on page 16 ☞ Qualification of personnel on page 10

Interval	Where?	What?	How?
in case of need	**Toothing of the spindle**	**Lubrication**	Any unusual rattling noises can be eliminated by **regreasing**. The sleeve (1) moves downwards or upwards with the toothed spindle (2) in the fixed driven sleeve (3) during drill feed. The noises are caused by the necessary clearance between the two toothings of the sleeve and spindle. The grease in the delivery condition may have been used up.  Img.6-1: Regreasing is carried out from above via the spindle drive. Apply grease at the visible toothed area of the spindle. It is recommended to use a grease which can remain permanently inside the toothing. The grease "Staburag NBU 30 PTM" from Klüber is recommended and has proved to be a successful assembly grease for clearance fits.

Interval	Where?	What?	How?
Every month	**Oiler cup**	**Oiling**	➜ Lubricate all oiler cups with machine oil, do not use grease guns or the like. ☞ Operating material on page 18  Img.6-2: Oiler cup
as required	**Spindle return springB16H | B16HV**	**Readjusting**	**CAUTION!** **Parts can be thrown towards you. When disassembling the key housing, please make sure that the machine is only maintained and prepared by qualified staff.**  Abb.6-3: Spindle return spring  Abb.6-4: Exploded view spring barrel

INFORMATION

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

6.3 Repair

6.3.1 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 customer service's information or contact Stürmer Maschinen GmbH in Germany who can provide you with a specialist dealer's contact information. 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 parts from series expressly authorised by Optimum Maschinen Germany GmbH.

7 Ersatzteile - Spare parts

7.1 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.*

7.2 Hotline Ersatzteile - Spare parts Hotline

+49 (0) 951-96555 -118

ersatzteile@stuermer-maschinen.de

7.3 Service Hotline

+49 (0) 951-96555 -100

service@stuermer-maschinen.de

7.3.1 Bohrkopf - Drilling head

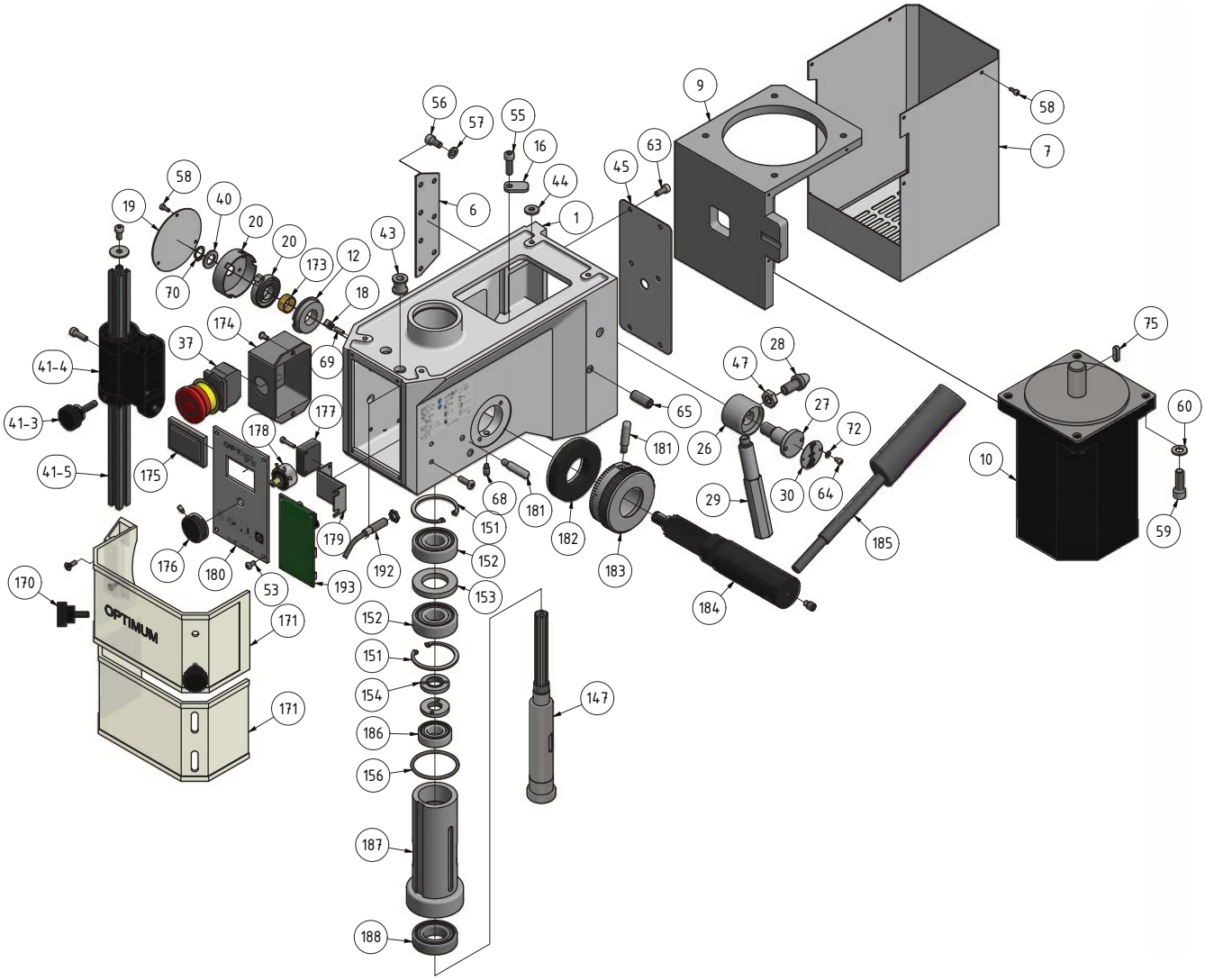


Abb. 7-1: Bohrkopf - Drilling head

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7.4 Keilriemenscheiben - Pulleys

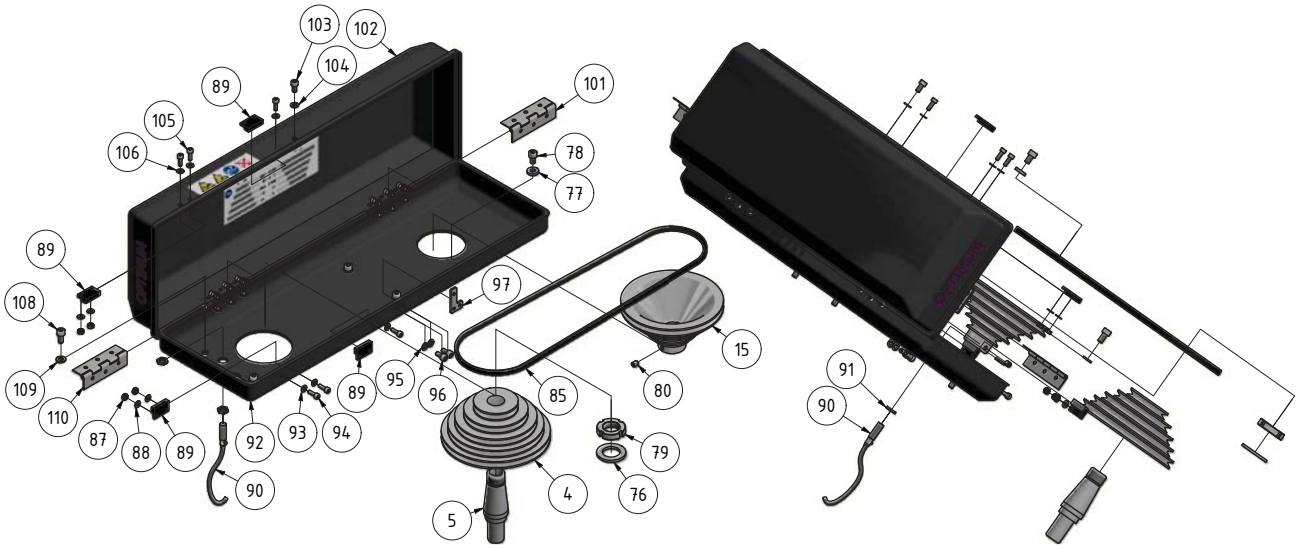

Abb. 7-2: Keilriemenscheiben - Pulleys

7.4.1 Säule und Bohrtisch - Column and drilling table

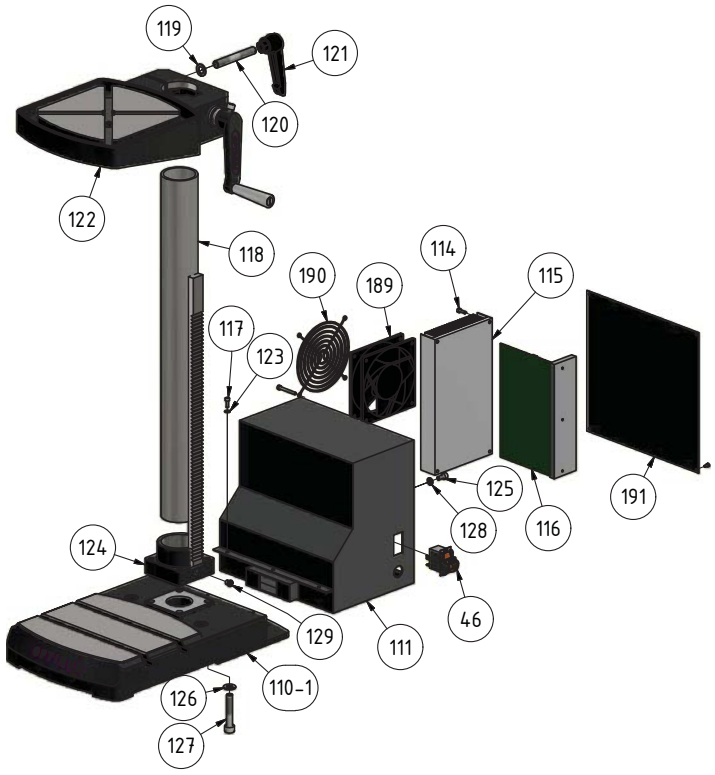

Abb. 7-3: Säule und Bohrtisch - Column and drilling table

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7.4.2 Bohrtisch - Drilling table

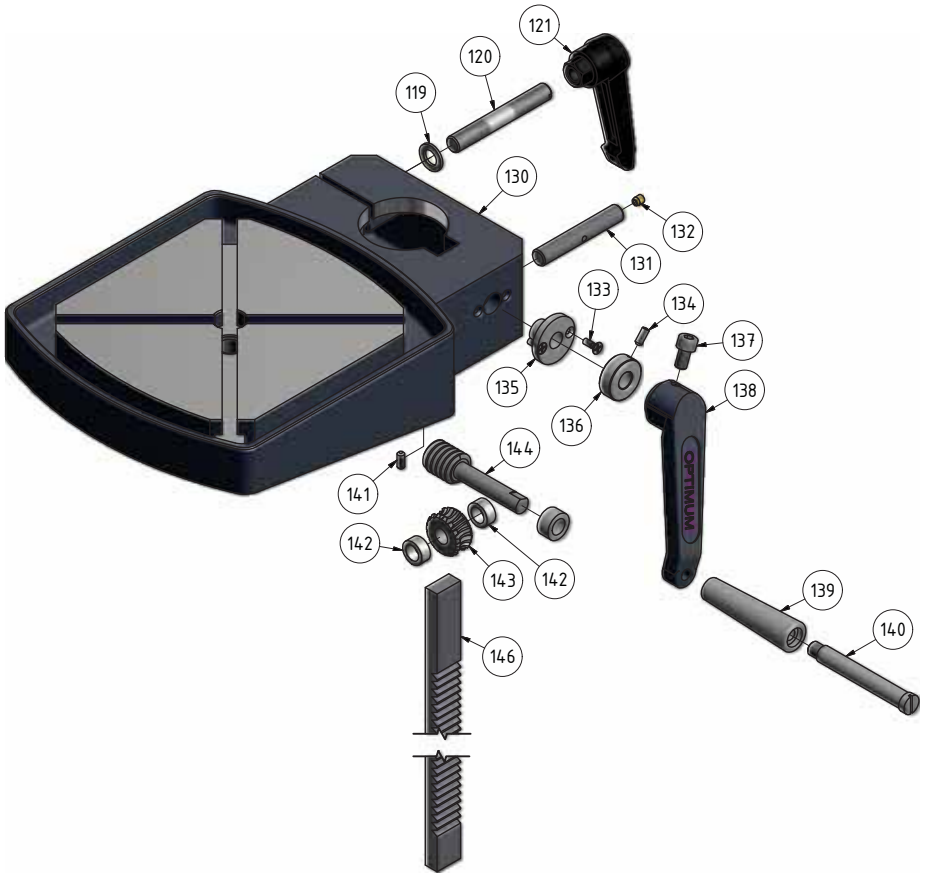

Abb. 7-4: Bohrtisch - Drilling table

Ersatzteilliste - Parts list - DH18V					
Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1	Bohrkopf	Drilling head	1		
4	Riemenscheibe	Pulley	1		0302021804
5	Mitnehmer	Carrier	1		0302021805
6	Halteplatte	Holder plate	1		0302021806
7	Abdeckung Motor	Cover motor	1		0302021807
9	Motorplatte	Engine plate	1		0302021809
10	Motor	Motor	1	230V / 1,5 kW	0302021810
12	Federsitz	Spring seat	1		0302021812
15	Riemenscheibe Motor	Pulley motor	1		0302021815
16	Anschlag	Stopper	1		0302021816
18	Spanner Spiralfeder	Spanner spiral spring	1		0302021818
19	Abdeckplatte	Covering plate	1		
20	Spiralfeder inkl. Gehäuse	Spiral spring incl. Housing	1		0302021820
26	Buchse Schnellspanngriff	Bushing quick action grip	1		0302021826
27	Klemmschraube	Clamping screw	1		0302021827
28	Bolzen Spannen	Bolt span	1		0302021828

29	Schnellspanngriff	Quick action grip	1		0302021829
30	Label B16HV	Label B16HV	1		0302021830
37	Schalter Not-Halt	Emergency- stop switch	1		0460049
40	Scheibe	Washer	1		
41	Bohrfutterschutz komplett	Drill chuck protection compete	1		03003231125
41-3	Griffschraube	Knurled screw	1		030031712014
41-4	Halterung Bohrfutterschutz	Fixing drill chuck proetection	1		03008131201CPL
41-5	Alu-Profil	Aluminum profile	1		03011233209
43	Buchse	Bushing	1		0302021843
44	Scheibe	Washer	1		
45	Platte	Plate	1		
46	Hauptschalter	Main switch	1		0302021846
47	Sechskantmutter	Hexagonal nut	1	M10	
53	Innensechskantschraube	Socket head screw	4	GB 70-85 - M4 x 8	
55	Innensechskantschraube	Socket head screw	1	GB 70-85 - M6 x 20	
56	Innensechskantschraube	Socket head screw	7	GB 70-85 - M6 x 12	
57	Scheibe	Washer	7	GB 97.1-85 - 6	
58	Innensechskantschraube	Socket head screw	9	GB 70-85 - M3 x 8	
59	Innensechskantschraube	Socket head screw	4	GB 70-85 - M8 x 25	
60	Scheibe	Washer	4	GB 97.1-85 - 8	
62	Scheibe	Washer	2	GB 97.1-85 - 5	
63	Innensechskantschraube	Socket head screw	4	GB 70-85 - M5 x 12	
64	Innensechskantschraube	Socket head screw	2	GB 70-85 - M3 x 5	
65	Gewindestift	Setscrew	2	GB 77-85 - M10 x 25	
69	Spannstift	Split pin	2	3x12	
70	Sicherungsring	Circlip	1	GB 894.1 - 12	042SR12W
72	Scheibe	Washer	2		
75	Paßfeder	Key	1	5 x20	042P5520
76	Scheibe	Washer	1		
77	Scheibe	Washer	1	GB 97.1-85 - 6	
78	Innensechskantschraube	Socket head screw	1	GB 70-85 - M6 x 10	
79	Nutmutter	Groove nut	1	GB 810-88 - M22x1,5	
80	Gewindestift	Setscrew	1	GB 80-85 - M6 x 8	
85	Treibriemen	V-belt	1		0302021885
86	Innensechskantschraube	Socket head screw	6	GB 70-85 - M4 x 12	
87	Sechskantmutter	Hexagonal nut	4	M4	
88	Scheibe	Washer	4	GB 97.1-85 - 4	
89	Reed Kontakt	Reed contact	2	PS-3150	
90	Drehzahlsensor	Rotation speed sensor	1		03020335121
91	Sechskantmutter	Hexagonal nut	2		
92	Riemengehäuse Unterteil	Belt housing bottom part	1		0302021892
93	Scheibe	Washer	4	GB 97.1-85 - 4	
94	Innensechskantschraube	Socket head screw	4	GB 70-85 - M4 x 12	
95	Scheibe	Washer	3	GB 97.1-85 - 5	
96	Innensechskantschraube	Socket head screw	3	GB 70-85 - M5 x 10	

97	Platte Schließer	Plate closer	1		
98	Sechskantmutter	Hexagonal nut	12	M4	
99	Scheibe	Washer	12	GB 97.1-85 - 4	
100	Innensechskantschraube	Socket head screw	6	GB 70-85 - M4 x 12	
101	Scharnier	Articulation	1		
102	Riemengehäuse Oberteil	Belt housing upper part	1		03020218102
103	Innensechskantschraube	Socket head screw	3	GB 70-85 - M5 x 10	
104	Scheibe	Washer	3	GB 97.1-85 - 5	
105	Innensechskantschraube	Socket head screw	4	GB 70-85 - M4 x 12	
106	Scheibe	Washer	4	GB 97.1-85 - 4	
108	Innensechskantschraube	Socket head screw	4	GB 70-85 - M6 x 12	
109	Scheibe	Washer	4	GB 97.1-85 - 6	
110	Scharnier	Articulation	1		
110-1	Bodenplatte	Base plate	1		030202181101
111	Gehäuse Steuerung	Housing control board	1		03020218111
112	Innensechskantschraube	Socket head screw	2	GB 70-85 - M4 x 10	
113	Scheibe	Washer	2	GB 97.1-85 - 4	
114	Innensechskantschraube	Socket head screw	4	GB 70-85 - M4 x 12	
115	Kühlrippen	Cooling fins	1		03020218115
116	Steuerung	Controller		V3	0302BCV3M
117	Innensechskantschraube	Socket head screw	3	GB 70-85 - M4 x 12	
118	Bohrsäule	Column	1		03020218118
119	Scheibe	Washer	1		
120	Klemmschraube	Clamping screw	1		03020218120
121	Klemmhebel	Clamping lever	1		03020218121
122	Bohrtisch	Drilling table	1		03020219130
123	Scheibe	Washer	3	GB 97.1-85 - 4	
124	Halterung	Attachment	1		03020218124
125	Innensechskantschraube	Socket head screw	4	GB 70-85 - M6 x 12	
126	Scheibe	Washer	4	GB 97.1-85 - 10	
127	Innensechskantschraube	Socket head screw	4	GB 70-85 - M10 x 55	
128	Scheibe	Washer	4	GB 97.1-85 - 6	
129	Gewindestift	Setscrew	1	GB 79-85 - M10 x 10	
130	Bohrtisch	Drilling machine table	1		
131	Welle	Shaft	1		03020219131
132	Schmiernippel	Lubrication cup	1		
133	Senkschraube	Countersunk screw	2	ISO7046/M4x12	
135	Führungsbuchse	Guide bush	1		03020219135
136	Buchse	Bush	1		03020219136
137	Innensechskantschraube	Socket head screw	1	GB70-85/M8x12	
138	Kurbel	Crank lever	1		03020219138
139	Griff	Handle	1		03020219139
140	Schraube	Screw	1		
141	Gewindestift	Grub screw	1	GB80-85/M5x12	
142	Abstandsring	Spacer ring	2		03020219142
143	Schneckenrad	Worm gear	1		03020219143

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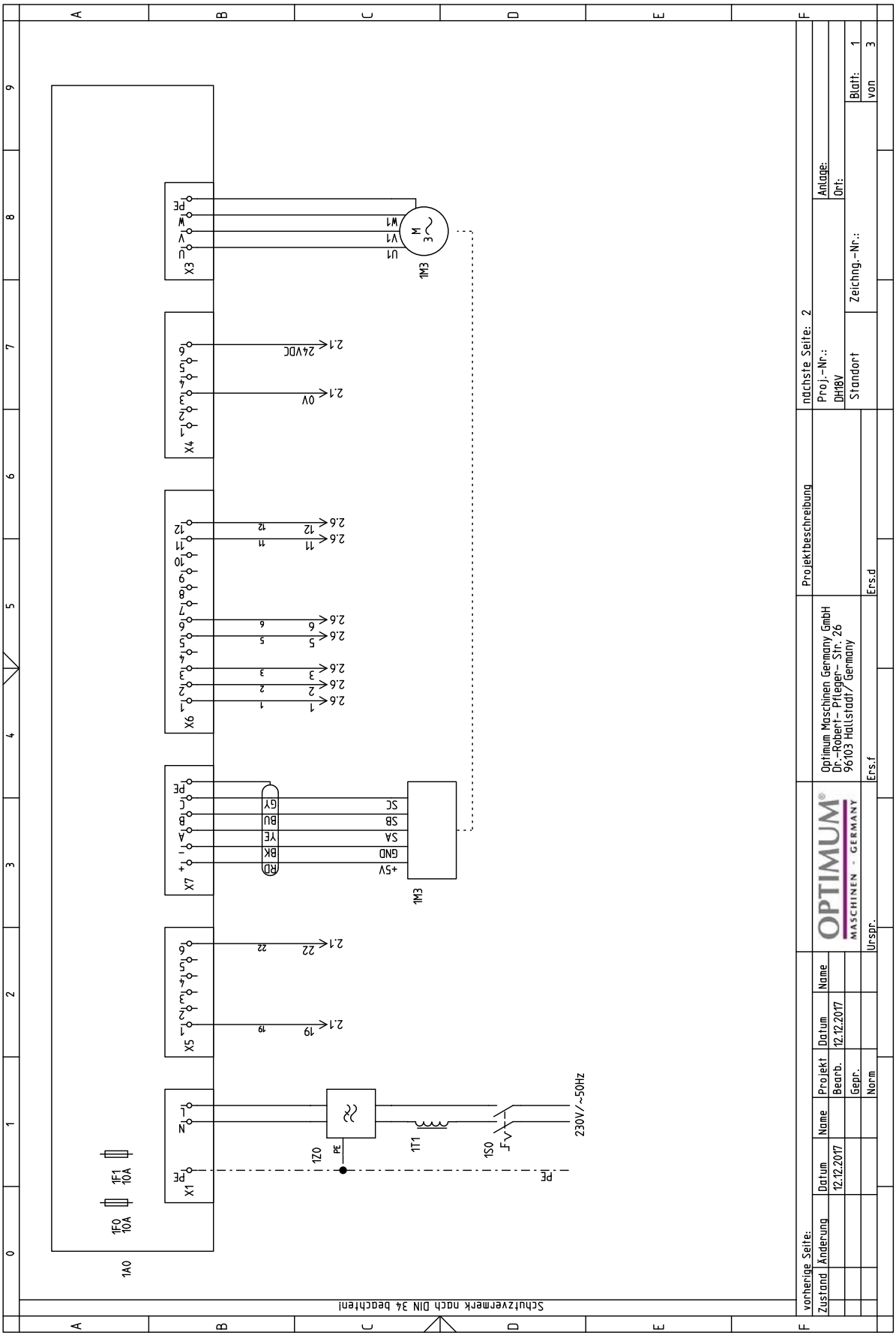
144	Antriebswelle	Input shaft	1		03020219144
146	Zahnstange	Gear rack	1		03020219146
147	Spindel	Spindle	1		
151	Sicherungsring	Retaining ring	2		
152	Kugellager	Ball bearing	2	6204	0406204R
153	Abstandsring	Spacer	1		
154	Spannmutter	Lock screw	2		
156	O-Ring	O-Ring	1		
159	Schaltkasten	Switch box	1		03020219159
160	Deckel	Cover	1		03020219160
170	Rändelschraube	Knurled screw	2		
171	Bohrfutterschutz	Drill chuck protection	1		03003171207
173	Gleitlager	Plain bearing	1	16x18x8	03020216173
174	Gehäuse	Housing	1		
175	Digitalanzeige	Digital display	1		
176	Drehknopf	Rotary knob	1		
177	Sensor Verfahrweg	Travel sensor	1		03020220177
178	Potentiometer	Potentiometer	1		
179	Winkel	Angle	1		
180	Steuerung (komplett)	Control (complete)	1		03020220180
181	Stift	Pin	2	8x35	03020283091
182	Ring	Ring	1		
183	Skalenring	Scale ring	1		0302016006
184	Welle	Shaft	1		03020220184
185	Spannhebel	Tension lever	1		0302016046
186	Kugellager	Ball bearing	1	6003	0406003
187	Pinole	Sleeve	1		
188	Kugellager	Ball bearing	1	6005	0406005
189	Lüfter	Fan	1		
190	Schutzgitter	Safety guard	1		
191	Abdeckung	Cover	1		
192	Sensor	Sensor	1		033381702B2
193	Steuerplatine	Control board	1		03020220180CB

Ersatzteilliste elektrische Komponente - Parts list electrical components

Pos.	Bezeichnung	Designation	Menge	Grösse	Artikelnummer
			Qty.	Size	Item no.
1F0/1F1	Sicherung	Fuse		10A	
1A0	Brushless controler	Brushless controler	1	V3	0302BCV3M
1Z0	Netzfilter	Line filter	1		
1T1	Drossel	Inductror	1		
1S0	Hauptschalter	Main switch	1		0302021846
1M3	Antriebsmotor	Drive motor	1		
2B6.1	Sensor Verfahrweg	Travel sensor	1		03020220177
2S2.1	Not-Halt Schalter	Emergency-stop switch	1		
SB2.3	Reed Kontakt	Reed contact	1		
2S2.2	Schalter Bohrfutterschutz	Switch drill chuck protection	1		030031712018V2

2A3	Digitalanzeige	Digital display	1		
2B3	Sensor Gewindeschneiden	Tapping sensor	1		
2B6.2	Drehzahlsensor	Speed sensor	1		03020335121

7.5 Schaltplan - Wiring diagram



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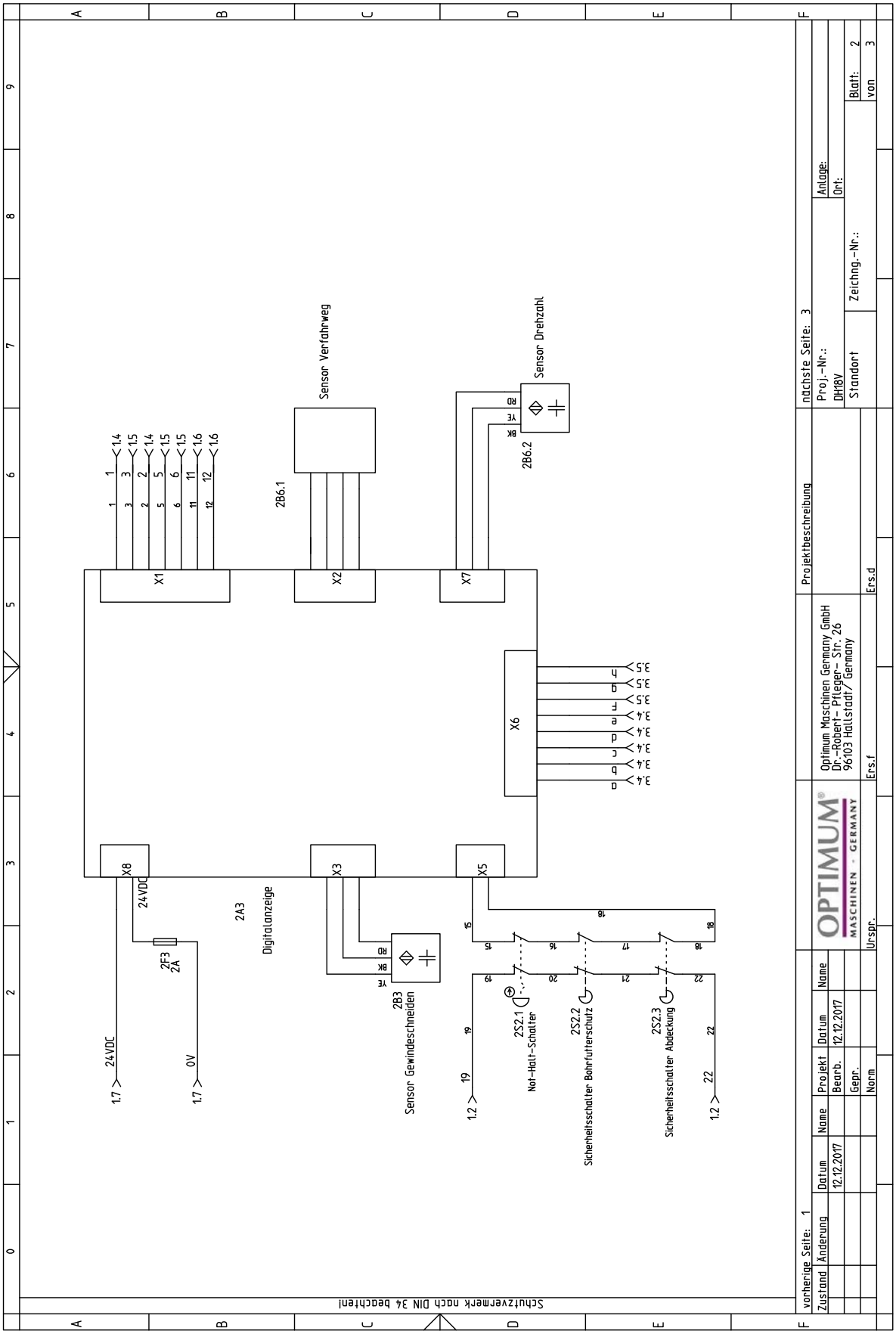

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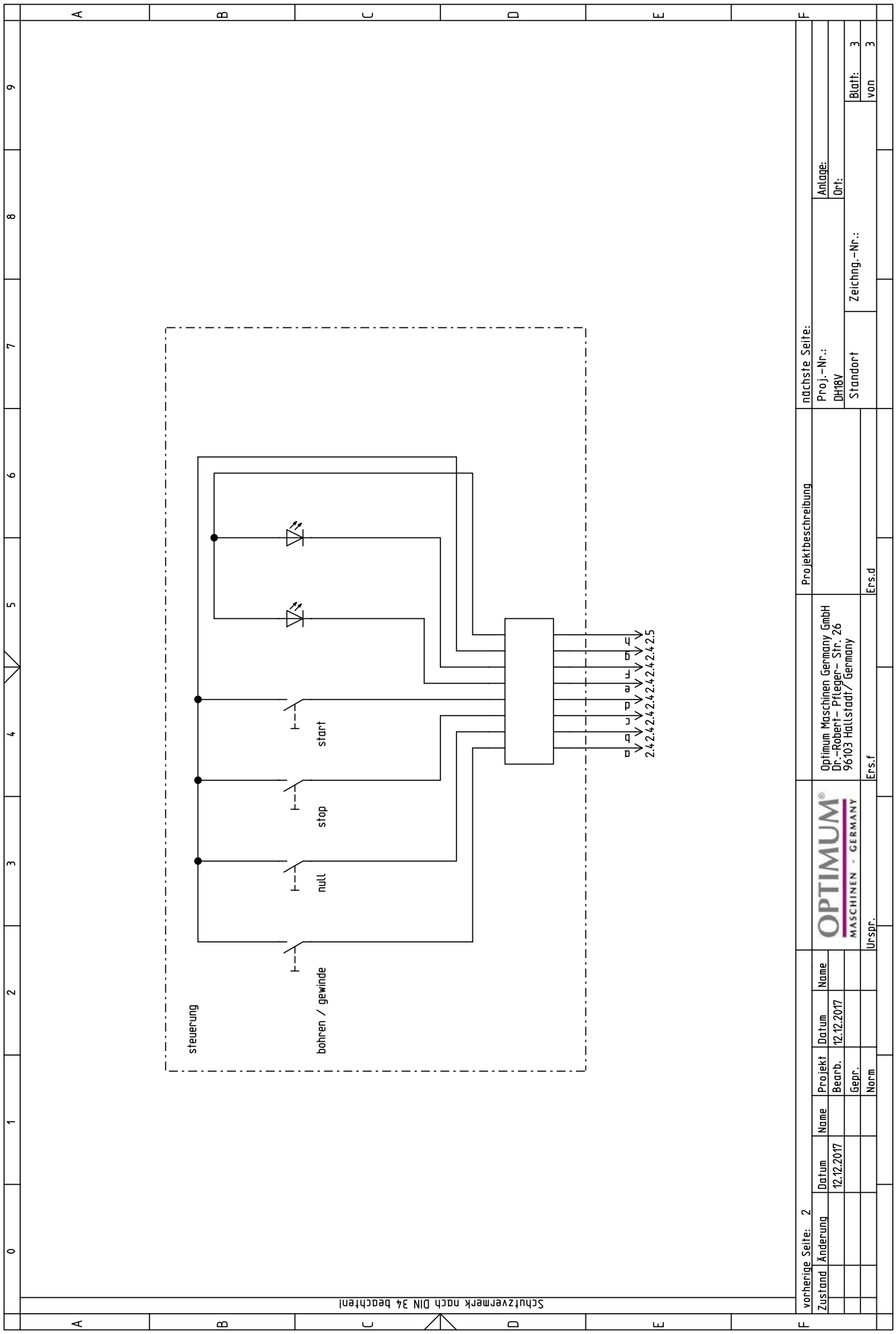
steuerung
bohren / gewinde
null
stop
start
2.4 2.4 2.4 2.4 2.4 2.4 2.5
Optimum Maschinen Germany GmbH
Dr.-Robert- Pfleger- Str. 26
96103 Hallstadt / Germany
Projektbeschreibung
nächste Seite:
Proj.-Nr.:
DH18V
Standort
Zeichng.-Nr.:
Anlage:
Ort:
Blatt: 3
von 3
vorherige Seite: 2
Zustand
Änderung
Datum
Name
Projekt
Bearb.
Gepr.
Norm
Urspr.
Ers.f
Ers.d
Schutzvermerk nach DIN 34 beachten!

8 Malfunctions

Malfunction	Cause/ possible effects	Solution
Noise during work.	• Spindle is too little lubricated • Tool is blunt or wrongly clamped	• Lubricate spindle (only possible when disassembled) • Use new tool and check tension (fixed setting of the bit, drill chuck and taper mandril)
Bit „burnt“	• Drill speed too high /feed too high • Chips do not come out of the drill hole. • Drill blunt • No or too little cooling	• Select another speed • Extract drill more often during work • Sharpen or use new drill • Use cooling agent
Drill tip is running off centre, the drilled hole is non-round	• Hard points on the workpiece • Length of the cutting spirals/or angles on the tool are unequal • Drill deformed	• Use new drill
Drill is defective	• No base / support used.	• Use support and clamp it with the workpiece
Drill is running non-round or shaking	• Bit deformed • Bearing worn down • Drill is not correctly clamped. • Drill chuck defective	• Use new drill • Have the spindle bearings replaced • Correctly clamp drill • Replace the drill chuck
It is not possible to insert the drill chuck or the taper mandrel	• Dirt, grease or oil on the taper inside of the drill chuck or on the taper surface of the drill spindle	• Clean surfaces well • Keep surfaces free of grease
Motor does not start.	• Motor is wrongly connected • Fuse is defective	• Have it checked by qualified
Motor is overheating and there is no power	• Motor overloaded? • Too low mains voltage • Motor is wrongly connected	• Reduce feed Disconnect immediately and have it checked by authorized personnel • Have it checked by qualified
Precision of the work deficient	• Irregularly heavy or tensed work-piece • Inexact horizontal position of the work-piece holder	• Balance the piece statically and secure without straining • Adjust workpiece-holder
Drilling spindle sleeve does not return to its initial position	• Spindle return spring does not work • Locking bolt inserted	• Check spindle return spring, replace it, if necessary • Pull out locking pin
The drilling sleeve may not be moved downwards.	• Locking bolt inserted • Drill depth adjustment no released	• Pull out locking pin • Release drill depth adjustment
Spindle bearing overheating	• Bearing worn down • Bearing pretension is too high • Working at high drilling speed over a longer period of time.	• Replace • Increase bearing clearance for fixed bearing (taper roller bearing) • Reduce drill speed and feed rate

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Malfunction	Cause/ possible effects	Solution
Rattle the spindle if the workpiece surface is rough.	• Excessive slack in bearing. • Spindle moves up and down • Adjustment strip loose • Clamping chuck is loose • Tool is blunt. • Workpiece is loose	• Reduce bearing clearance or replace bearing • Readjust bearing clearance (fixed bearing)? • Adjust strip to the correct slack using the adjusting screw • Check, re-tighten • Sharpen or renew the tool. • Clamp the workpiece firmly.

9 Appendix

9.1 Copyright

9.2 Terminology/Glossary

Term	Explanation
Drill chuck	Drill bit adapter
Drill head	Upper part of the bench drill
Drill sleeve	Fixed hollow shaft which runs in the drill spindle.
Drilling 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 holding fixture to be clamped manually.
Workpiece	Part to be drilled, part to be machined.
Tool	Drill bit, countersink, etc.

9.2.1 Change information operating manual

Chapter	Short summary	new version number
4	Pre selected speed for tapping	1.0.1
1	EMC categories	1.0.2
3	Interdepartmental transport	1.0.3

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9.3 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. Ownership of replaced products or components is transferred 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 from 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 device.
  - 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
  - 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
- The following items are also not subject to 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 fulfil any additional warranty are neither an acceptance of the defects nor an acceptance of its obligation to compensate. These services neither delay nor interrupt the warranty period.
- The court of jurisdiction for legal disputes between businessmen is Bamberg.
- If any of the aforementioned agreements is totally or partially inoperative and/or invalid, a provision which nearest approaches the intent of the guarantor and remains within the framework of the limits of liability and warranty which are specified by this contract is deemed agreed.

9.4 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 box:

- Fragile goods
  (Goods require careful handling)

- Protect against moisture and humid environment

☞ Environmental conditions on page 17

- 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 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.

9.5 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.

9.5.1 Decommissioning

CAUTION!

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

- **Unplug the power cord.**
- **Cut the connection cable.**
- **Remove all operating materials from the used device which are harmful to the environment.**
- **If applicable remove batteries and accumulators.**
- **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.**

9.5.2 Disposal of new device packaging

All used packaging materials and packaging aids from 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 passed to a collection station or to the appropriate waste management enterprise.

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

9.5.3 Disposal 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 comprise a variety of reusable materials as well as environmentally hazardous components. Please ensure that these components are disposed of separately and professionally. 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.

9.5.4 Disposal of electrical and electronic components

Please make sure that the electrical components are disposed of professionally and according to the statutory provisions.

The device is composed of electrical and electronic components and must not be disposed of as household waste. According to the European Directive 2011/65/EU regarding electrical and electronic used devices and the implementation of national legislation, used power tools and electrical machines need to be collected separately and supplied to an environmentally friendly recycling centre.

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

Please make sure that the electrical components are disposed of professionally and according to the legal regulations. Please only throw depleted batteries in the collection boxes in shops or at municipal waste management companies.

9.5.5 Disposal of lubricants and coolants

ATTENTION!

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

INFORMATION

Used coolant emulsions and oils should not be mixed since it is only possible to reuse oils without pre-treatment when they have not been mixed.

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

9.6 Disposal via municipal collection facilities

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 is needs to be disposed of at a central collection point for recycling. Your contribution to the correct disposal of this product will protect the environment and the public health. Incorrect disposal constitutes a risk to the environment and public health. Recycling of material will help reduce the consumption of raw materials. For further information about the recycling of this product, please consult your District Office, municipal waste collection station or the shop where you have purchased the product.

9.7 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 inform us of the following:

- Modified settings
- Any experiences with the bench drill which might be important for other users
- Recurring malfunctions

Optimum Maschinen Germany GmbH
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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: Drilling machine

Type designation: DH18V

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 drilling 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 12717: 2001 - Machine tools - Safety - Drilling machines

EN 60204-1 - 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 (CISPR 11) - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement - class A

EN 61000-6-3:-2 - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)

EN 61000-6-3:-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 <= 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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  - OPTIdrill DH 18V Zubehör

- OPTIdrill Zubehör

Ihr Ersatzteil nicht in den Listen?
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