Operating manual

Version 1.1.0

Geared drill

○ DH 26GT Item no. 9680224

○ DH 28GS Item no. 9680223

US

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Preface

Dear customer,

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

Company metal working machines offer a maximum of quality, technically company 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

C.H.HANSON
2000 North Aurora Rd.
Naperville,IL 60563
Call 800-827-3398

1 Safety

Glossary of symbols

	provides further instructions
	calls on you to act
❍	enumerations

This part of the operating instructions

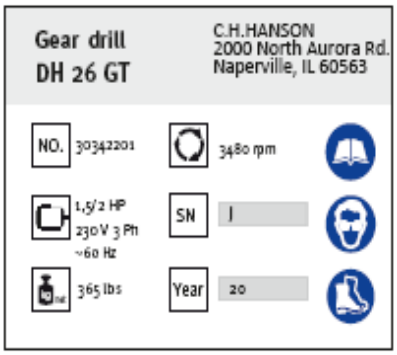
- ❍ explains the meaning and use of the warning notes included in these operating instructions,
- ❍ defines the intended use of the geared drill,
- ❍ points out the dangers that might arise for you or others if these instructions are not observed,
- ❍ informs you about how to avoid dangers.

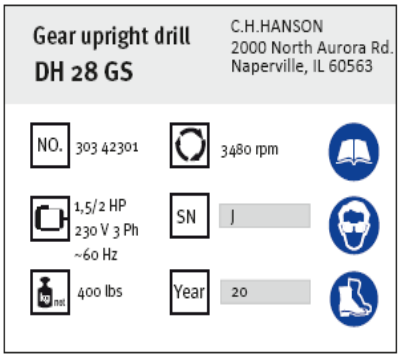
In addition to these operation instructions, please observe

- ❍ 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 geared drill.

Always keep this documentation close to the geared drill.

1.1 Type plates





INFORMATION

If you are not able to solve a problem using this manual, please do not hesitate to contact us for further professional advice:

Exclusive USA Agent

C.H.HANSON
2000 North Aurora Rd.
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Call 800-827-3398

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	Warning alert	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 geared drill and product and other types of damage. No risk of injury to people.
	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!

Activation forbidden!

Do not climb onto the machine!

Read the operating instructions before commissioning!

Disconnect the mains plug!

Wear protective glasses!

Wear protective gloves!

Wear protective boots!

Wear a protective suit!

Use ear protection!

Only switch at standstill!

Protect the environment!

Contact address

1.3 Intended use

WARNING!

In the event of improper use of the geared drill

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

the correct function of the geared drill may be affected.

The geared drill is designed and manufactured to be used in a non-explosive environment. The geared 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 geared drill is used in any way other than described above, modified without authorization of company, 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 or CE conformity will expire due to any constructive technical or procedural changes which had not been performed by the company.

It is also part of intended use that you

- observe the limits of the geared drill,
- the operating manual is observed,
- the inspection and maintenance instructions are observed.

☞ "Technical data“ on page 19

WARNING!

Extremely severe injuries.

It is forbidden to make any modifications or alternations to the operation values of the geared drill! They could endanger the personnel and cause damage to the geared drill.

1.4 Reasonably foreseeable misuses

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

Any other use has to be discussed with the manufacturer.

It is only allowed to process metal, cold and non-inflammable materials with the geared 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 adjustment and feed to the material and workpiece.

➜ Clamp workpieces firmly and vibration-free.

ATTENTION!

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

WARNING!

Risk of injury caused by workpieces flying off.

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

➜ Use cooling and lubricating agents to increase the durability of the tool and to improve the surface quality.

➜ Clamp the cutting tools and workpieces on clean clamping surfaces.

➜ Sufficiently lubricate the machine.

➜ Correctly adjust the bearing clearance and the guidings.

It is recommended:

➜ Insert the drill in a way that it is exactly positioned between the three clamping jaws of the quick action chuck.

When drilling make sure that

➜ the suitable speed is set depending on the diameter of the drill,

➜ the pressure must only be such that the drill can cut without load

➜ in case of too strong pressure the drill will get worn early or even might break resp. get jammed in the hole. If the drill gets jammed immediately stop the main motor by pressing the emergency stop button,

➜ for hard materials, e.g. steel, use commercial cooling / lubricating agents,

➜ generally always drive the turning spindle out of the workpiece.

INFORMATION

The geared drill DH32GSV with frequency converter for regulating the speed is built according to the standard EN 61800-3 class C.

WARNING!

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

1.5 Possible dangers caused by the geared drill

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

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

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

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

If the geared 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 geared drill.

INFORMATION

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

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

In the event of improper use

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

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

WARNING!

The geared drill may only be used with the safety devices activated.

Disconnect the geared drill immediately whenever you detect a failure in the safety devices or when they are not mounted!

All additional devices installed by the operator have to be equipped with the prescribed safety devices. This is your responsibility being the operating company!

☞ **"Safety devices“ on page 13**

1.6 Qualification of personnel

1.6.1 Target group

This manual is addressed to

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

Therefore, the warning notes refer to both operation and maintenance of the geared drill.

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

Unclear responsibilities constitute a safety risk!

Always disconnect plug of the geared 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. Any tasks which need to be performed beyond the operation in standard mode must only be performed by the operator, if so indicated in these instructions and if the operator has been expressively commissioned by the operating company.

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

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

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 personnel

WARNING!

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

Only authorized personnel may operate the geared drill!

Persons authorized to operate and maintain should be trained technical personnel and instructed by the ones who are working for the operating company and for the manufacturer.

Obligations of the operating company

- train the personnel,
- instruct the personnel in regular intervals (at least once a year) on
  - all safety standards that apply to the machine,
  - the operation,
  - generally accepted engineering standards.
- check the personnel‘s knowledge level,
- document the trainings/instructions,
- require personnel to confirm participation in training/instructions by means of a signature,
- check whether the personnel is working in a safety and risk-conscious manner and following the operating instructions.
- define and document the inspection deadlines for the machine in accordance with the Factory Safety Act and perform an operational risk analysis in accordance with the Work Safety Act.

Obligations of the operator

- have obtained a training regarding the handling of the geared drill,
- 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, following measures are to be performed in the following order:

➜ disconnect all poles

➜ secure against restarting

➜ check that there is no voltage

1.7 Operator positions

The operator's position is in front of the geared drill.

Img.1-1: Operator positions

1.8 Safety measures during operation

CAUTION!

Risk due to inhaling dusts and mist hazardous to health.

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

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

CAUTION!

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

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

1.9 Safety devices

Use the geared drill only with properly functioning safety devices.

Stop the geared drill immediately if there is a failure on the safety device or if it is not functioning for any reason.

It is your responsibility!

If a safety device has been activated or has failed, the geared 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 on the geared drill. The possible consequences are:

- **injuries may occur due to workpiece or parts of workpieces flying off,**
- **contact with rotating parts,**
- **fatal electrocution,**

The geared 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 drill chuck guard, in order to prevent interference with the rotating tool.

INFORMATION

The geared drill can only be switched on if the drill chuck protection is closed.

WARNING!

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

1.10 Safety check

Check the geared 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),
- after all maintenance and repair work.

Check that prohibition, warning and information signs and the labels on the geared 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**
Protective covers	Mounted, firmly bolted and not damaged	
Date:	**checked by (signature):**	

General check		
Equipment	**Check**	**OK**
Signs, Markers	Installed and legible	
Date:	**checked by (signature):**	

Functional check		
Equipment	**Check**	**OK**
EMERGENCY-STOP push button	After actuating an EMERGENCY STOP push button the geared drill must be switched off.	
Drill chuck protection	The geared drill must only be switched on, if the drill chuck protection is closed. The engine must switch off when the drill chuck protection is opened during operation.	
Date:	**checked by (signature):**	

1.11 EMERGENCY-STOP push button

ATTENTION!

Also after actuating the EMERGENCY-STOP switch, the drilling spindle is turning - depending on the previously selected speed - for a few seconds more.

Img.1-2: Emergency stop

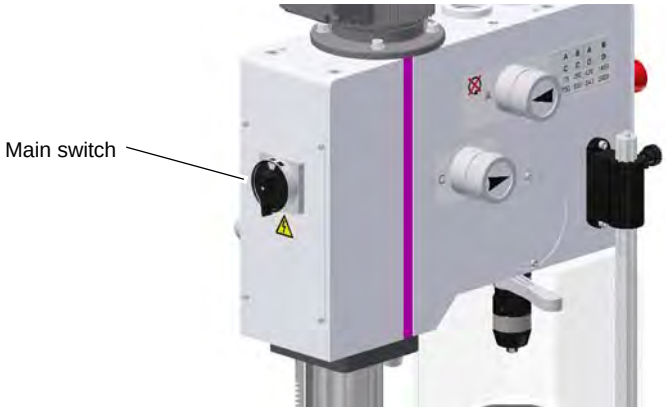
1.11.1 Main switch

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

The power supply is interrupted by switchingoff the main plug.

Except for the areas marked by the pictogram in the margin. In these areas there might be voltage, even if the main switch is switched-off.

Img.1-3: Main switch DH 28 GS



Img.1-4: Main switch DH 26 GT

Img.1-5: Main switch DH32GSV

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.

1.11.2 Drill chuck protection

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

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

INFORMATION

You cannot start the machine if the drill chuck protection is not closed.

Img.1-6: Drill chuck protection

1.12 Personal protective equipment

For certain work individual protection gear as protective equipment. This includes:

- 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 works where your face and eyes are exposed to hazards.

Use protective gloves when handling pieces with sharp edges.

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

1.13 Safety during operation

We specifically point out the dangers when describing the work with and on the geared drill.

WARNING!

Before switching on the geared drill make sure that there are no

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

Avoid any unsafe work methods:

- Make sure that nobody is endangered by your work.
- The instructions mentioned in these operating instructions have to be strictly observed during assembly, operation, maintenance and repair.
- Do not work on the geared 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 responsible for your company.
- Inform the supervisor about all hazards or faults.
- Stay at the geared drill until all movements have come to a complete standstill.
- Use the prescribed personnel protective equipment. Make sure to wear a well-fitting work suit and, if necessary, a hairnet.
- Do not use protective gloves when drilling.

1.14 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 geared drill. Any changes must be documented, the operating instructions updated and machine operators instructed accordingly.

1.14.1 Disconnecting and securing the geared drill.

Switch off the geared drill with the main switch and secure the main switch with a padlock against unauthorised switching-on or switching-on by accident.

All machine parts as well as any dangerous voltages are switched off. Excepted are only the positions which are marked with the adjoining pictogram.

1.15 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 responsible for your company.

Fasten the loads properly. Never walk under suspended loads!

1.15.1 Mechanical maintenance work

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!

1.16 Accident report

Inform your supervisors and company 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.

1.17 Electrical system

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

A second person must be present during work on live components to disconnect the power in the event of an emergency. Disconnect the machine immediately if there is a malfunction in the power supply!

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

The operator of the machine must ensure that the electrical systems and operating equipment are inspected with regards to their proper condition, namely,

- 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 certain intervals.

The deadlines must be set so that arising, foreseeable defects can be detected in time.

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

The inspection prior to initial commissioning is not required if the operator receives confirmation from the manufacturer or installer that the electrical systems and operating equipment comply with the accident prevention regulations, see conformity declaration.

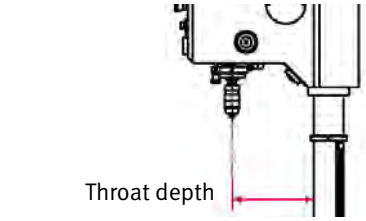
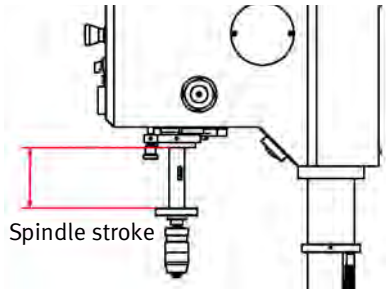
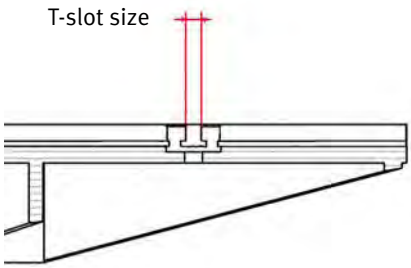
Permanently installed electrical systems and operating equipment are considered constantly monitored if they are continually serviced by qualified electricians and inspected by means of measurements in the scope of operation (e.g. monitoring the insulation resistance).

1.18 Inspection deadlines

Define and document the inspection deadlines for the machine in accordance with the Factory Safety Act and perform an operational risk analysis in accordance with the Work Safety Act. Also use the inspection intervals in the maintenance section as reference values.

2 Technical data

The following information represents the dimens ions and indications of weight and the manu - facturer‘s approved machine data.

	DH 26 GT - GTV	DH 28 GS - GSV
Electrical connection	230V ~60 Hz 1.1 HP / 1.5 HP	230V ~60 Hz 1.1 HP / 1.5 HP
Electrical connection, infinitely variable drive	-	-
Drilling capacity in steel (S235JR) [mm]	26	28
Continuous drilling capacity in steel (S235JR)	24	25
	235mm	260mm
	127mm	127mm
Spindle seat	MT3	MT3
Table size Length x Width of the working surface	380 x 380mm	376 x 394mm
	14mm	14mm
Distance spindle - table [mm]	450	875
Maximum distance [mm] spindle - stand	610	1200
Working surface stand [mm] Length x Width of the working surface	350 x 322	322 x 320

	DH 26 GT - GTV	DH 28 GS - GSV
Rotatable drilling table	360°	360°
Dimensions of the machine	Seite 22	Seite 23
Dimensions of the machine infinitely variable drive	-	-
Required space	Keep a work area of at least one metr e around the machine free for operation and maintenance.	
Total weight [lbs]	365	400
Spindle speeds [rpm]	90 | 180 | 300 505 | 600 | 1010 1740 | 3480	90 | 180 | 300 505 | 600 | 1010 1740 | 3480
Spindle speeds, infinitely variable drive [min $^{-1}$]	-	-
Stage number	8	8
Stage number, infinitely variable drive	-	-
Environmental conditions temperature	5 - 35 °C	5 - 35 °C
Environmental conditions Relative humidity	25 - 80 %	25 - 80 %
Operating material gear	Commercial Operating material anti-friction bearing grease	
Operating material Toothed rod and drill column		
Coolant equipment	-	-
	-	-

2.1 Emissions

The generation of noise emitte d by the geared drill is 76 dB(A).
If the geared drill is installed in an area wh ere various machines are in operation, the noise exposure (immission) on the oper ator of the geared drill at the working place may exceed 80 dB(A).

INFORMATION

This numerical value was measured on a new ma chine 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 or 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.

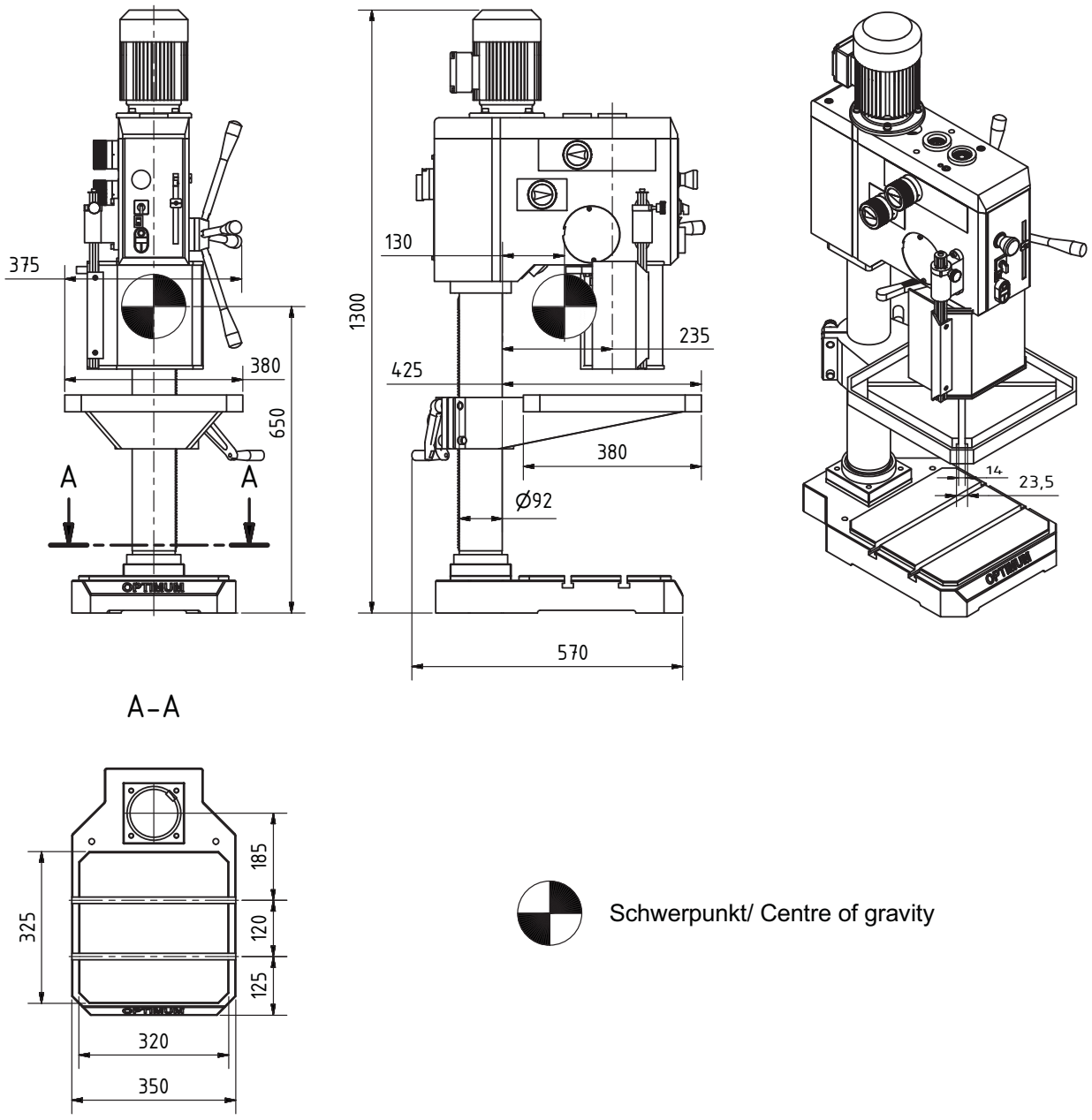
Furthermore, it is possible that the admissible exposure level might be different from country to country due to national regulations.
This information about the noise emission should, however, allow the operator of the machine to more easily evaluate the hazards and risks.

CAUTION!

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

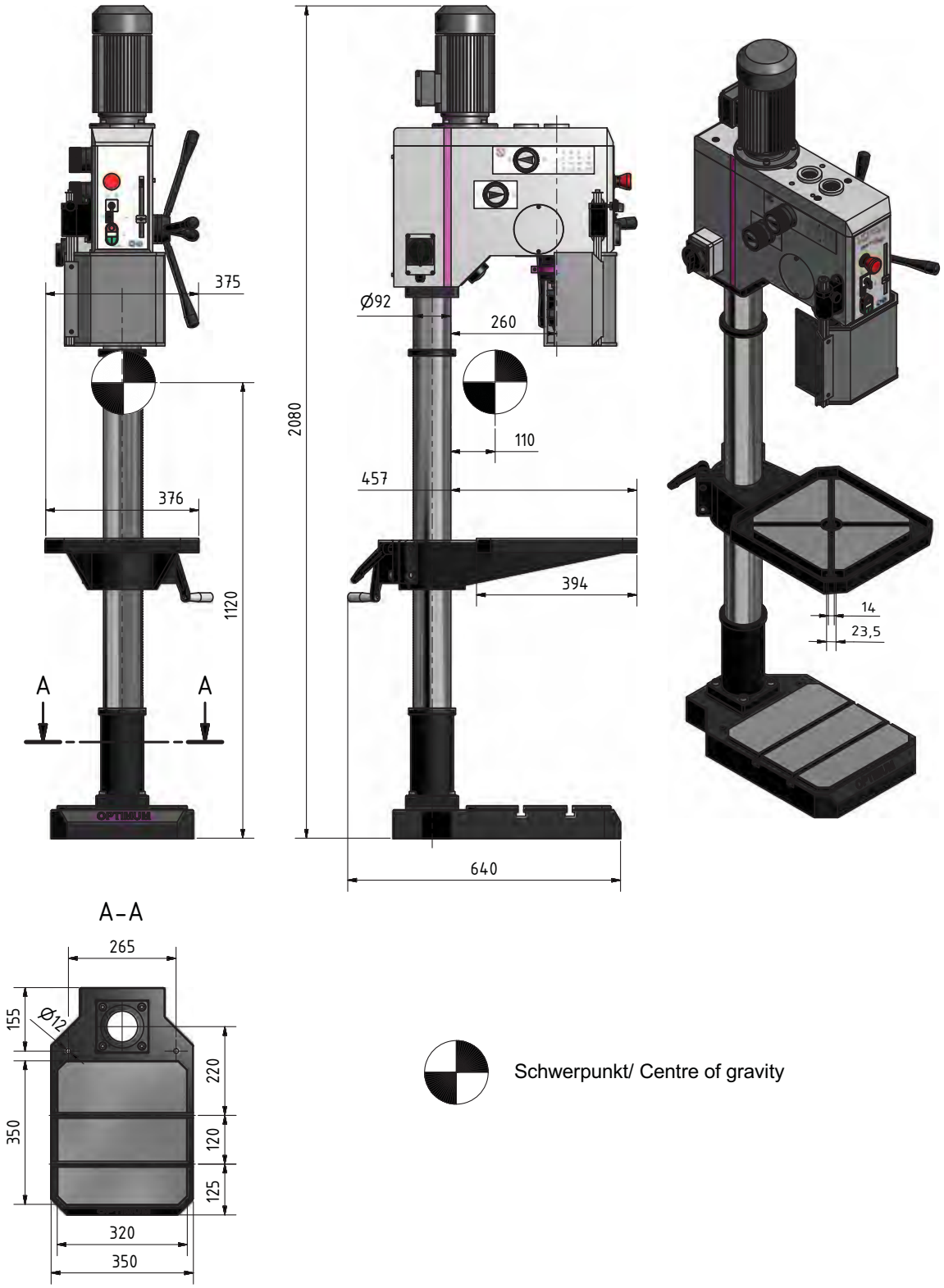
We generally recommend the use of noise protection and hearing protection.

2.2 Dimensions DH 26 GT



Img. 2-1: Dimensions DH26 GT

2.3 Dimensions DH 28 GS



Img. 2-2: Dimensions DH28 GS

3 Assembly

3.1 Scope of delivery

When the machine is delivered, check immediately that the machine has not been damaged during transport and that all components are included. Compare the parts supplied the information on the packaging list.

3.2 Transport

- Centres of gravity

- Load suspension points
  (Marking of the positions for the load suspension gear)

- Prescribed transportation position
  (Marking of the top surface)

- Means of transport to be used
- Weights

WARNING!

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

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 capacity and that it is in perfect condition.

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

Fasten the loads properly.

Never walk under suspended loads!

3.3 Installation and assembly

3.3.1 Requirements regarding the installation site

Organize the working area around the geared 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 nearby machines generating chips or dust.

- The installation site must be free from vibrations also at a distance of presses, planing machines, etc.
- The substructure must be suitable for the geared drill. Also make sure that the floor has sufficient load bearing capacity and is level.
- The substructure must be prepared in a way that possibly used coolant cannot penetrate into the floor.
- Any parts sticking out such as stops, handles, etc. have to be secured by measures taken by the customer if necessary in order to avoid endangerment of persons.
- Provide sufficient space for the 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 main switch of the geared drill must be freely accessible.

3.3.2 Assembly

WARNING!

Danger of crushing and overturning.

The geared drill must be installed by at least 2 people.

INFORMATION

The geared drill is delivered pre-assembled.

3.4 Installation

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

➜ Check that the foundation has sufficient floor-load capacity and rigidity. The total weight amounts: ☞ "Total weight [kg]“ on page 20

➜ Position the geared drill on the intended foundation.

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

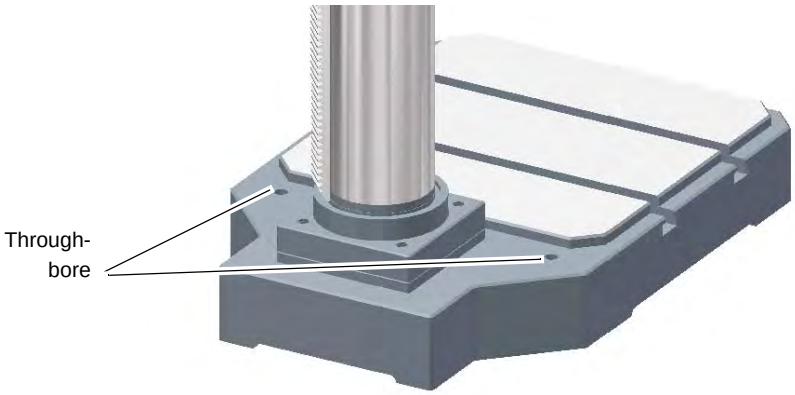
WARNING!

The condition of the underground and the fixing type of the machine foot to the underground must be in a way that it can bear the loads of the geared drill. The underground must be level. Check if the underground of the geared drill is level using a spirit level.

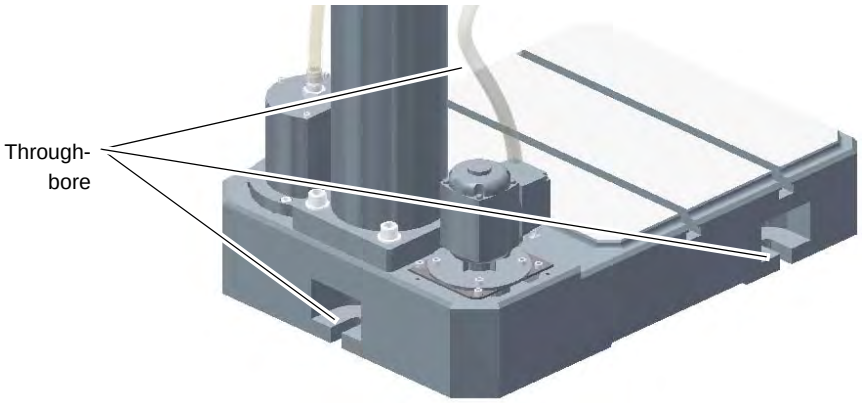
3.5 Fixing

In order to provide for the necessary stability of the geared drill,
it is necessary to firmly connect the geared drill with its foot to the substructure. We recommend you to use shear connector cartridges resp. heavy-duty anchors.

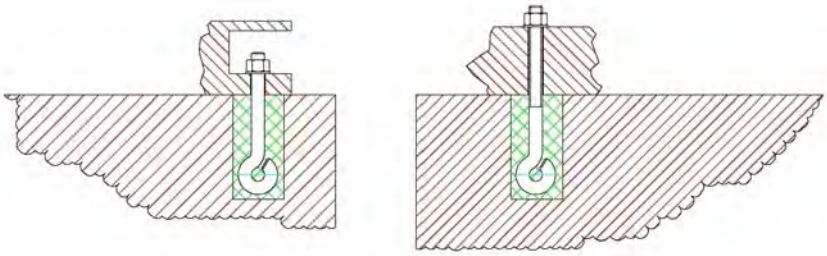
➜ Fix the foot of the geared drill to the substructure with the provided through-holes.



Img.3-1: Marking of the fixing points of the DH 26 GT, DH 28 GS



Img.3-2: Marking of the fixing points of the DH 32 GS



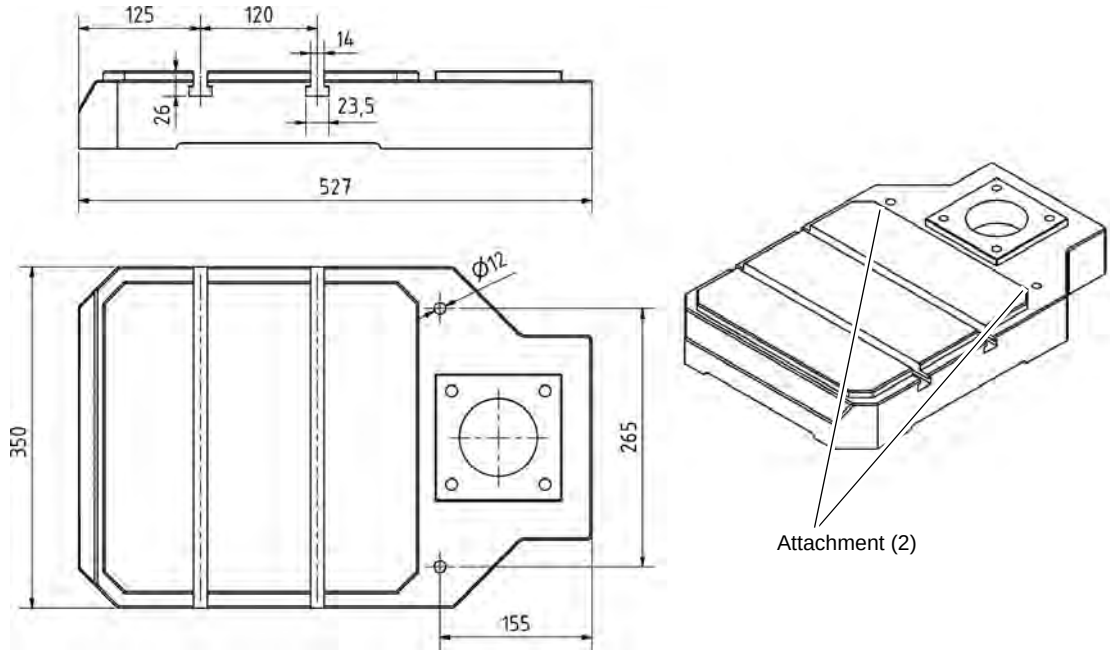
Img.3-3: Example for the floor fixture DH 28 GS and DH 32 GS

ATTENTION!

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

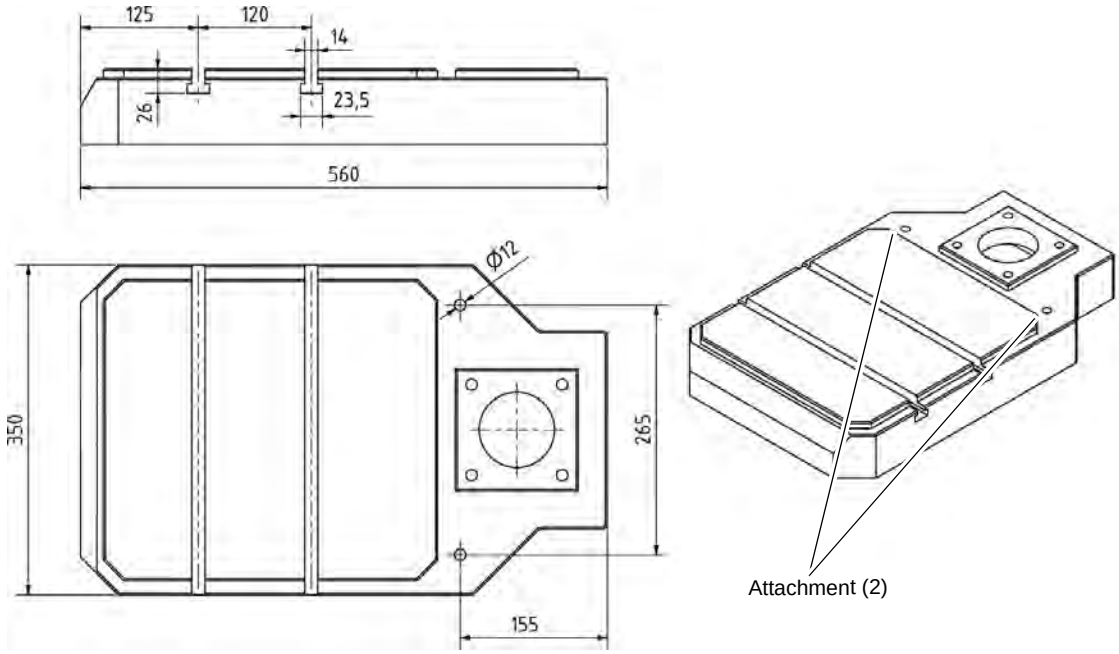
If the fixing screws are too tight in particular in connection with an uneven substructure it may result in a broken stand.

3.5.1 Assembly drawing DH 26 GT



Img. 3-4: Assembly drawing DH 26 GT

3.5.2 Assembly drawing DH 28 GS



Img. 3-5: Assembly drawing DH 28 GS

3.6 First commissioning

ATTENTION!

Before commissioning the machine, check all screws, fixtures and/or safety devices and tighten up the screws if necessary!

WARNING!

Risk by using improper tool holders or operating them at inadmissible speeds.
Only use the tool holders (e.g. drill chuck) which were delivered with the machine or which are offered as optional equipment by company.
Only use tool holders in the intended admissible speed range.
Tool holders may only be modified in compliance with the recommendation of company or of the manufacturer of the clamping devices.

WARNING!

When first commissioning the geared drill by inexperienced staff you endanger people and the machine.
We do not accept any liability for damages caused by incorrectly performed commissioning.

Qualification of personnel“ auf Seite 10

3.6.1 Warming up the machine

ATTENTION!

If the geared 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.

3.6.2 Power supply

Connect the electrical supply cable.

Check the fusing (fuse) of your electrical supply according to the technical instructions regarding the total connecte d power of th e geared drill.

ATTENTION!

Imperatively make sure that all 3 phases (L1, L2, L3) are correctly connected.

Most motor defects result of wrong connections. For instance if a motor phase is not correctly clamped or connected to the neutral conductor (N)
Effects may be as follows:

- The motor is getting hot very rapidly.
- Increased motor noises.
- The motor has no power.

ATTENTION!

Make sure that the direction of rotation of th e drive motor is correct. The switch position of the rotation selector switch for right-hand ed rotation (R) has to turn the drill spindle clockwise. If necessary, exchange two phase connections. The guarantee will become null and void if the machine is connected incorrectly.

4 Operation

4.1 Safety

Commission the machine only under the following conditions:

- The machine is in proper working order.
- The machine is used as prescribed.
- The operating manual is followed.
- 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 17

A frictionally engaged connection keeps and centres the quick-action drill chuck with the taper mandrel in the drill spindle.

4.2 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 60

INFORMATION

The data of the speed tables are guide values. In some cases it may be advantageous to increase or decrease these values.

When drilling a cooling or lubricating agent should be used.

For stainless materials do not center as the material would compact and the drill bit will become rapidly blunt.

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.

The workpieces need to be tensed in flexibly and stably (vice, screw clamp).

Img.4-1: seats for clamping blocks

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.

4.3 During work

The spindle sleeve is advanced by means of the star wheel. 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 levers on the star wheel.

Do not release the star wheel when repositioning the drilling spindle sleeve.

Pull back the drilling spindle sleeve by hand.

CAUTION!

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

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.

4.4 Cooling

CAUTION!

Danger of injury due to brushes getting caught or pulled in. Use a spray gun or a squeeze bottle for cooling, or the coolant system of the machine.

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. Use a spray gun or a squeeze bottle for cooling the tool.

INFORMATION

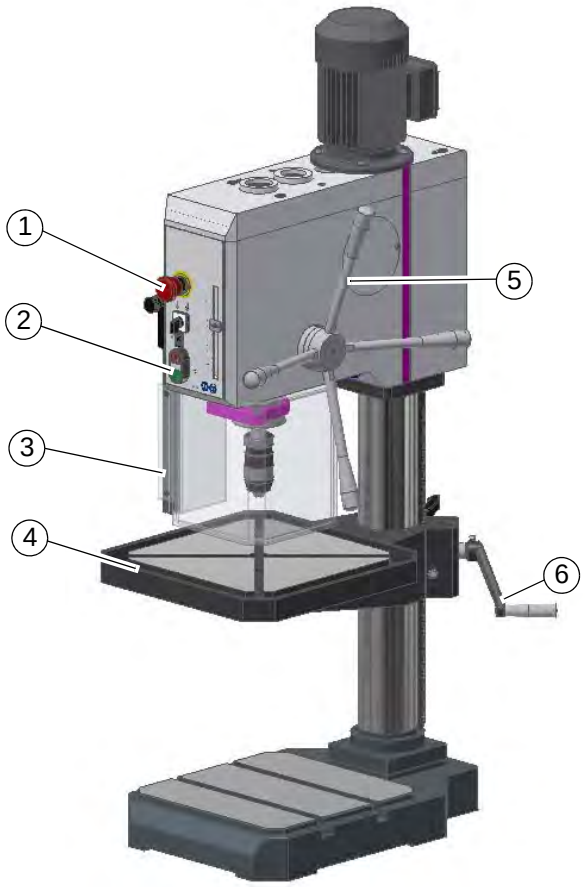
Use a water-soluble and non-pollutant drilling emulsion as a cooling agent.This can be acquired from authorised distributors.

Make sure that the cooling agent is being collected.

Respect the environment when disposing of any lubricants and coolants.

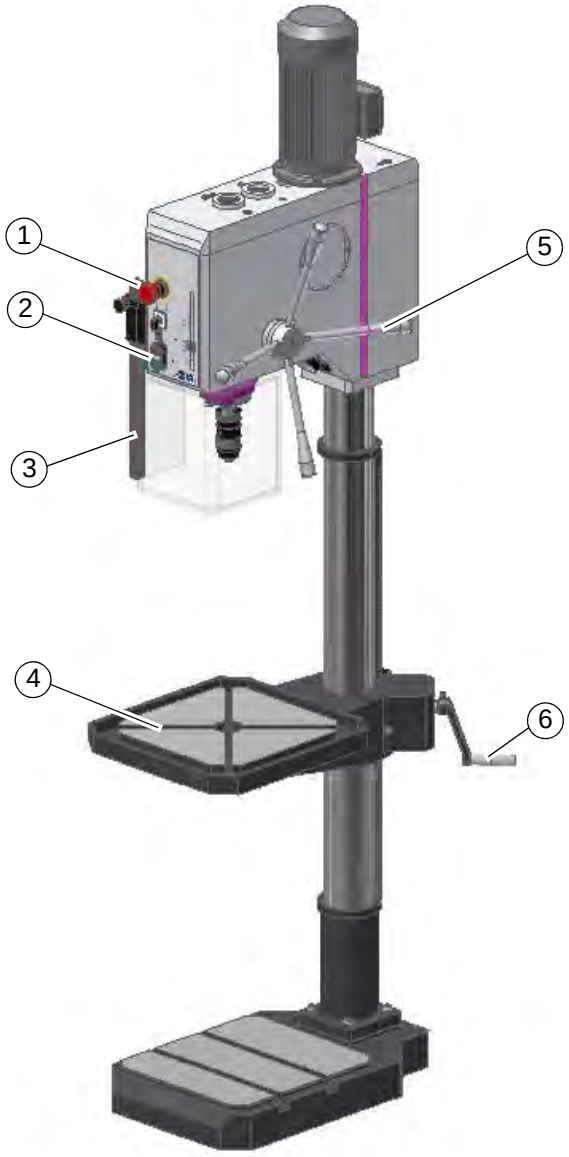
Follow the manufacturer’s disposal instructions.

4.5 Control and indicating elements DH 26 GT



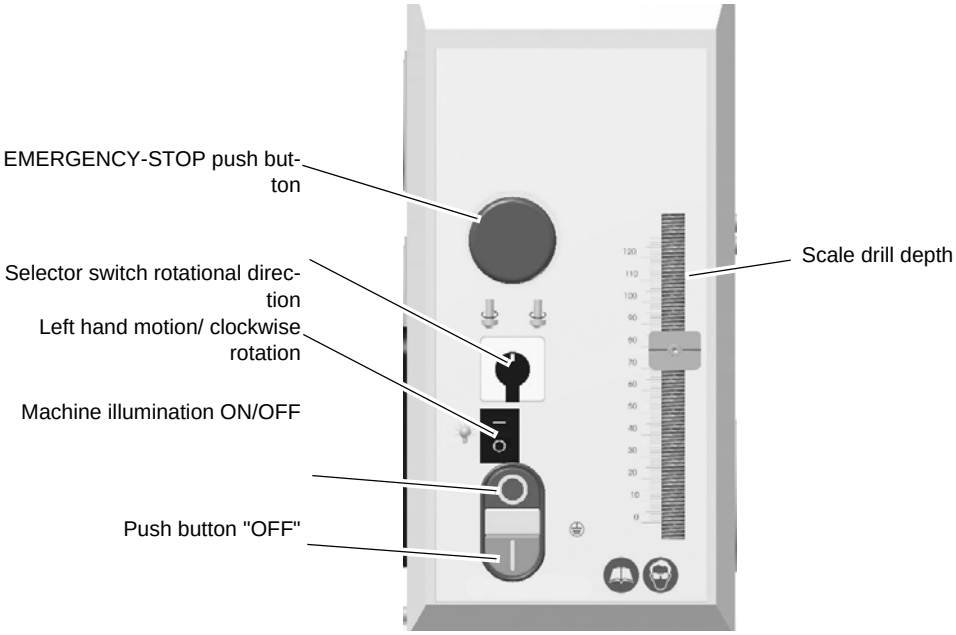
Pos.	Designation	Pos.	Designation
1	EMERGENCY-STOP button	2	Push button ON / OFF
3	Drill chuck protection	4	Drilling table
5	Lever for spindle sleeve feed	6	Table height adjustment

4.6 Control and indicating elements DH 28 GS



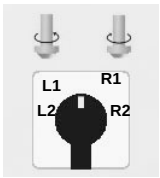
Pos.	Designation	Pos.	Designation
1	EMERGENCY-STOP button	2	Push button ON / OFF
3	Drill chuck protection	4	Drilling table
5	Lever for spindle sleeve feed	6	Table height adjustment

4.7 Control panel DH 26 GT and DH 28 GS



Img.4-2: Operating element on the control panel

Rotation direction switch



The direction of rotation of the geared drill can be performed using the rotation direction switch.

It is possible to select two speed stages for each direction of rotation using the switch.

- ❍ The labelling “R” means right-handed rotation.
- ❍ The labelling “L” means left-handed rotation.

☞ "Speed table- DH 26 GT l DH 28 GS“ on page 39

ATTENTION!

Wait until the rotation of the drill spindle has come to a complete halt before changing the rotation direction using the rotation direction switch.

A change over of the rotation direction during operation may result in a destruction of the motor and of the rotation direction switch.

Push button ON

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

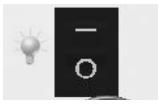
Push button OFF

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

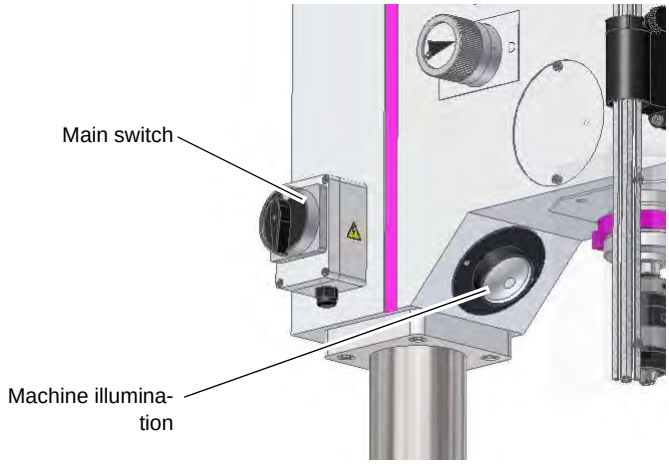
Operation control lamp

The operating control lamp on the operating panel has to flash.

Machine illumination ON/OFF



Switches the backlight on or off.



Img. 4-3: Machine illumination DH 28 GS

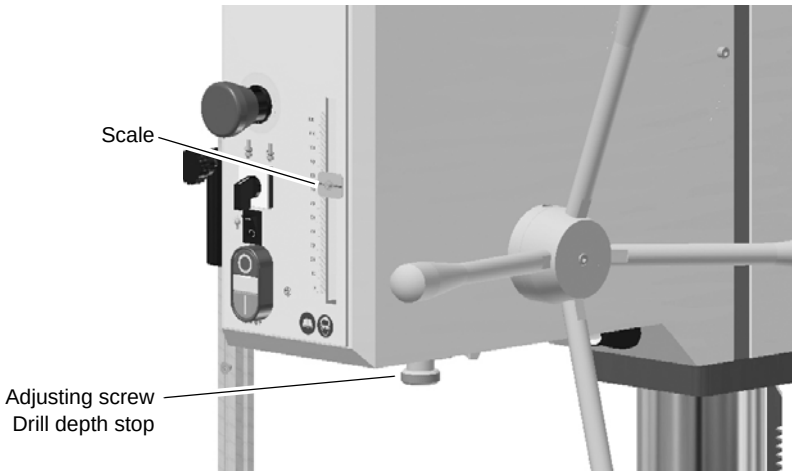
Main switch

Interrupts or connects the power supply.

4.7.1 Drill depth stop

When drilling several holes of the same depth you can use the drill depth stop.

➜ Adjust the desired drilling depth by means of the scale and of the adjusting screw



Img. 4-4: Drill depth stop

4.8 Switching on the machine - DH 26 GT | DH 28 GS

INFORMATION

You cannot start the machine if the drill chuck protection is not closed.

➜Switch on the main switch.

➜Close drill chuck protection

➜Select the direction of rotation.

➜Select the gear stage ☞ "Speed table- DH 26 GT | DH 28 GS“ on page 39.

➜Actuate the push button "ON".

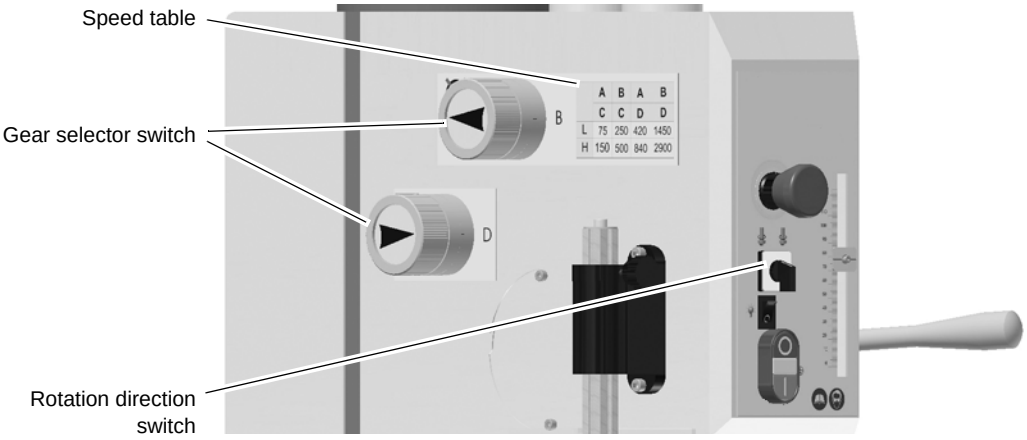
4.9 Switching off the machine - DH 26 GT | DH 28 GS

➜Actuate the push button "OFF".

➜For a long-term standstill of the machine switch it off at the main switch.

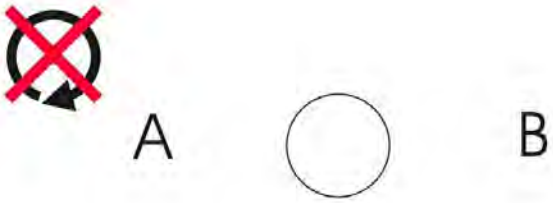
4.9.1 Gear selector switch - DH 26 GT | DH 28 GS

The speed is selected by means of the gear selector switches. You obtain a total of 8 speed ranges in connection with the speed stages on the rotation direction switch.



Img.4-5: Gear selector switch

4.9.2 Speed table- DH 26 GT DH 28 GS



	A	B	A	B
	C	C	D	D
L	90	300	505	1740
H	180	600	1010	3480

Img.4-6: Speed table

INFORMATION

Observe the speed table on the drillin g head when selecting the speed.

ATTENTION!

Wait until the rotation of the drill spindle has come to a complete halt before changing the speed using the gear selector switches.

A change over of the gearing during operation may result in a destruction of the gear.

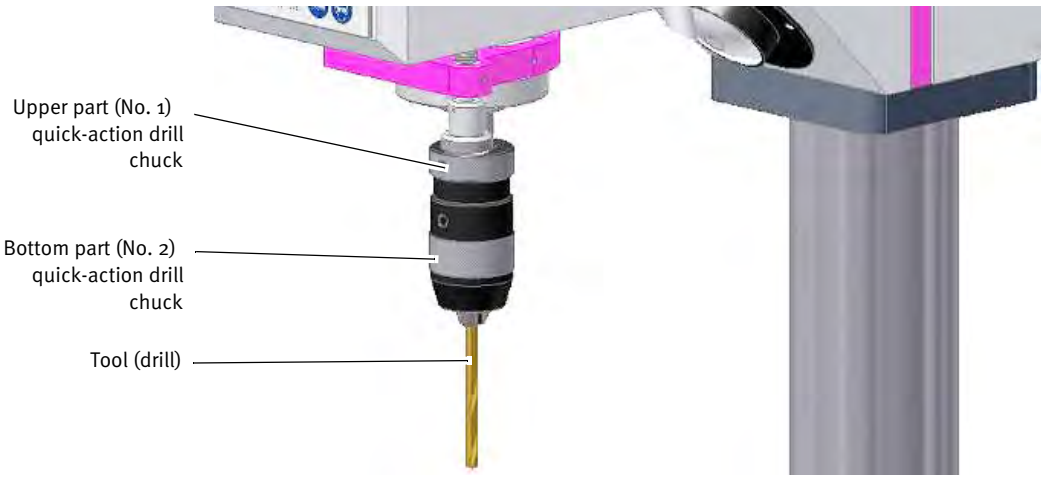
4.10 Disassembly, assembly of drill chucks and drill bits - DH 26 GT DH 28 GS

4.10.1 Use the quick-action drill chuck

The drill chuck consists of two parts (1 and 2).

Hold the upper part (No. 1) of the drill chuck. With the bottom part of the drill chuck (No. 2) it is possible to tighten or loosen th e jaws of the quic k-action drill chuck.

Turn the tool (drill) firmly.



Img.4-7: Quick action drill chuck

CAUTION!

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

4.10.2 Disassembly with drill drift - DH 26 GT | DH 28 GS

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

WARNING!

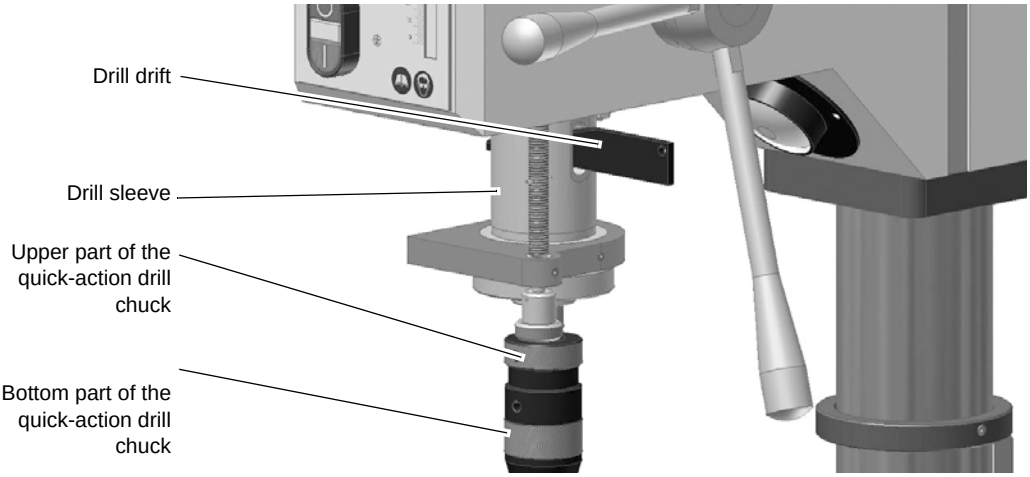
Only disassemble the drill chuck if the geared upright drill is disconnected from the electrical supply.

➜ Switch off the geared upright drill on the main 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. 4-8: Disassembly using the drill drift

4.10.3 Disassembly with integrated drill drift - DH 26 GT | DH 28 GS

➜ Move the spindle sleeve lever ② a bit downward until it is possible to turn the interlocking device for integrated drill drift ①. The spindle sleeve can thus be moved more upward.

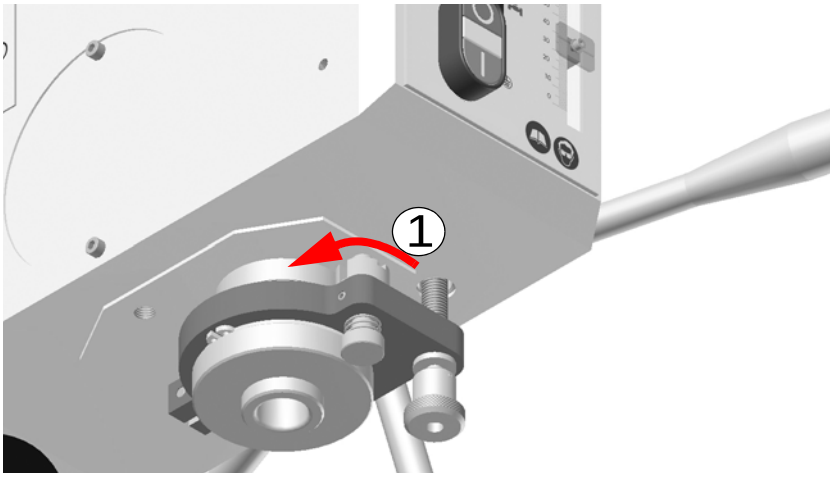
ATTENTION!

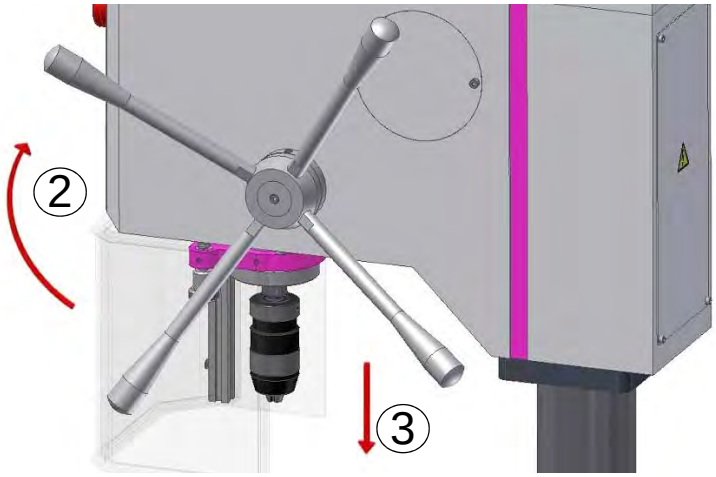
Hold the tool ③ or drill chuck tight.

With the below described procedure the taper mandrel is being loosened from the drilling spindle. The tool and/or the drill chuck will fall down.

➜ Press the spindle sleeve lever ② upward.

❍ The taper mandrel is pressed out of the drill spindle.





Img. 4-9: Disassembly with integrated drill drift

4.10.4 Assembly of drill chucks - DH 26 GT | DH 28 GS

The quick-action drill chuck is secured against turning over in the drill spindle by means of a form-locking connection.

A frictionally engaged connection keeps and centres the quick-action drill chuck with the taper mandrel in the drill spindle.

Img. 4-10: Taper mandrel

➜ Check or clean the conical seat in the drill spindle and on the taper mandrel of the tool or of the quick-action drill chuck.

➜ Press the taper mandrel into the drill spindle.

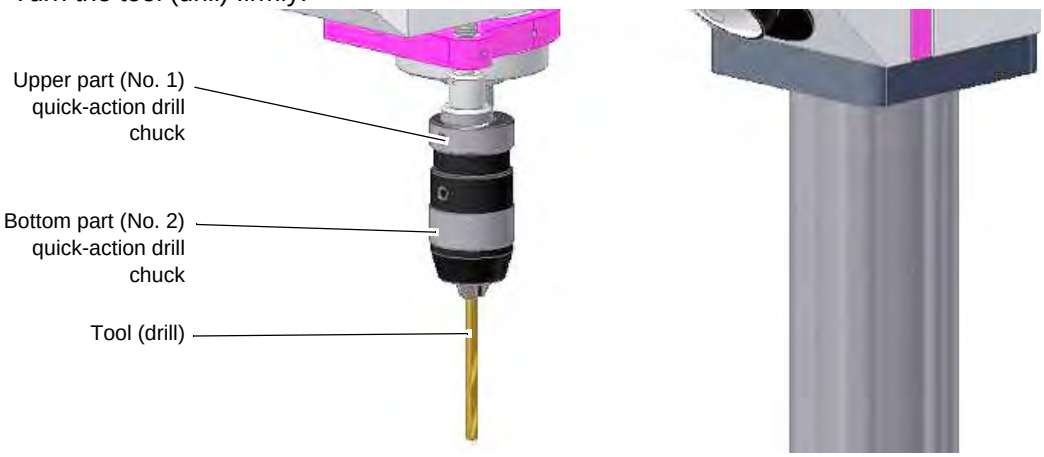
4.16 Disassembly, assembly of drill chucks and drill bits

4.16.1 Use the quick-action drill chuck

The drill chuck consists of two parts(1 and 2).

➜ Hold the upper part (No.1) of the drill chuck. With the bottom part of the drill chuck (No. 2) it is possible to tighten or loosen the jaws of the quick-action drill chuck.

➜ Turn the tool (drill) firmly.



Img.4-18: Quick action drill chuck

CAUTION!

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

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

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

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

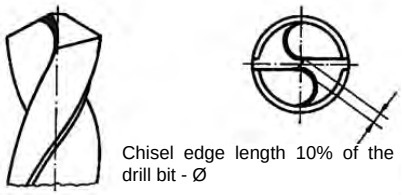
Set a speed on your drilling machine which is less than the determined speed.

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.

6 Maintenance

In this chapter you will find important information about

- Inspection
- Maintenance
- 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 carry out work on the machine if it has been unplugged from the mains 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 13

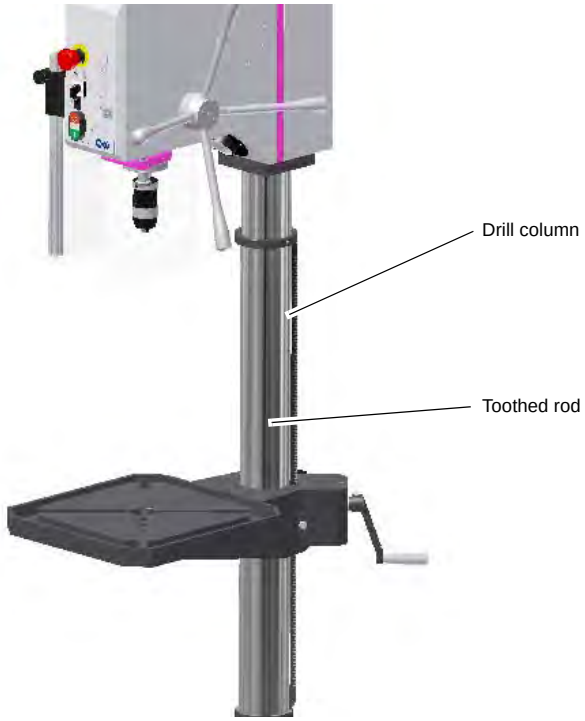
WARNING!

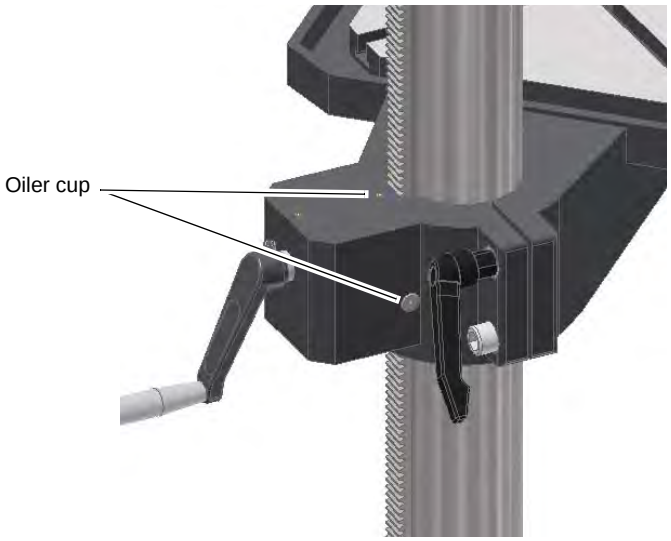
Before starting the machine you must be sure that

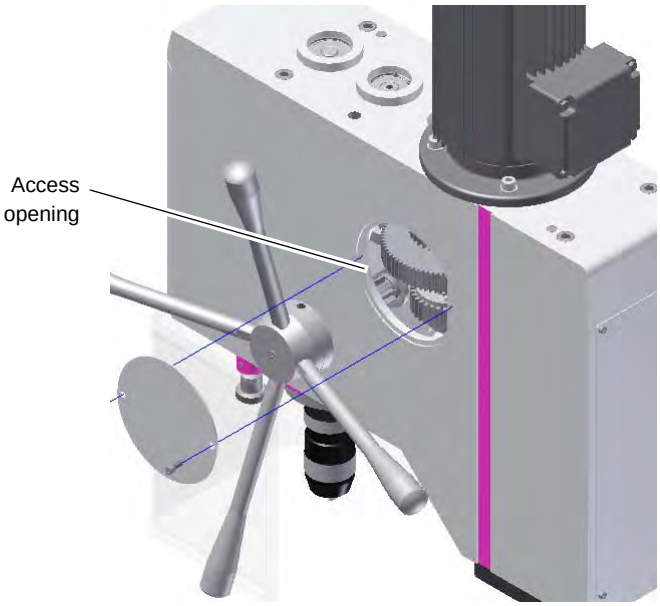
- **no dangers generated for persons,**
- **the machine is not damaged.**

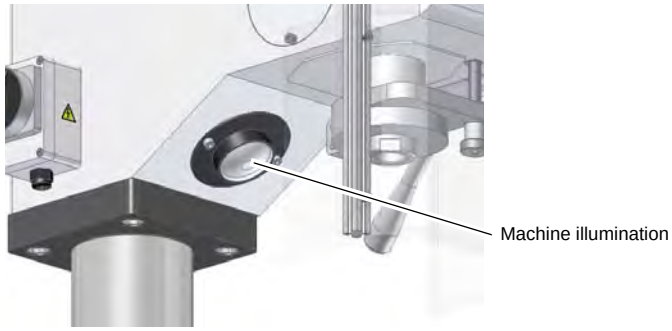
6.2 Inspection and maintenance

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	**Geared drill**	Examination for outside damages. ☞ "Safety check“ on page 13	
Every month	**Drill column and toothed rack**	**Oiling**	➜ Lubricate the drilling upright regularly with commercial oil, machine oil, engine oil. ➜ Lubricate the rack regularly with commercial grease (e.g. friction bearing grease).  Img.6-1: Drill column

Interval	Where?	What?	How?
every month	**Oiler cup**	**Oiling**	➜ Lubricate all oilers with machine oil, do not use grease guns or the like. ☞ "Operating material“ on page 20  Img.6-2: Oiler cup

Interval	Where?	What?	How?
As required	**Gear**	**Lubricate**	The gear is lubricated with the grease STABURAGS NBU 12. Depending on the usage the gear has to be lubricated in regular intervals. We recommend you to lubricate the gear every 3 months. ☞ "Operating material“ on page 20  Img.6-4: Gear opening DH 26 GT, DH 28 GS

Interval	Where?	What?	How?
based on operator's empirical values in accordance with German DGUV (BGV A3)	Electrical system	Electrical inspection	☞ "Obligations of the operating company“ on page 11 ☞ "Electrical system“ on page 18
As required	illumination	Replacing the light bulb	If the light bulb is defective: ➜ Disconnect the plug from the power supply. ➜ Unscrew the glass cover of the machine illumination. ➜ Unscrew the light bulb by turning it to the left and by slightly pressing the bulb into the socket (bayonet). ➜ Replace the light bulb. ➜ Screw the glass cover onto the machine illumination.  Img. 6-6: Machine illumination on DH 28 GS
As required	Spindle return spring	Readjusting	**ATTENTION!** **Parts may fly off at high speed. When disassembling the key housing, please make sure that the machine is only maintained and prepared by qualified staff.**

INFORMATION

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

6.3 Repair

6.3.1 Customer service technician

Repairs must be carried out only by qualified technical staff; and must follow the instructions and guidelines given in this manual. Should technical assistance be required, contact LDS Industries at 1-630-785-6437.

Company and C.H.HANSON are not liable for, nor do they guarantee against, damage or operating malfunctions resulting from alteration, abuse, lack of maintenance or this product's use for other than its intended purpose. Failure to read and follow this operating manual is not covered.

For repairs only use

- Proper and suitable tools,
- Parts purchased from company, or its authorized agent.

6.4 Cooling lubricants and tanks

CAUTION!

The cooling lubricant can cause diseases. Avoid direct contact with cooling lubricant or parts covered in cooling lubricant.

Cooling lubricant circuits and tanks for water-cooling lubricant mixtures must be completely emptied, cleaned and disinfected as needed, but at least once per year or every time the cooling lubricant is replaced.

If fine chips and other foreign matters are accumulated in the coolant tank, the machine can no longer be correctly supplied with coolant. Furthermore, the lifetime of the coolant pump is reduced.

When processing cast iron or similar materials generating fine chips, cleaning the coolant tank more often is recommended.

The cooling lubricant must be replaced, the cooling lubricant circuit and tank emptied, cleaned and disinfected if

- the pH value drops by more than 1 based on the value during initial filling. The maximum permissible pH value during initial filing is 9.3
- there is a perceivable change in the appearance, odour, floating oil or increase of the bacteria to more than 10/6/ml
- there is an increase in nitrite content to more than 20 ppm (mg/1) or nitrate content to more than 50 ppm (mg/1)
- there is an increase in the N-nitrosodiethanolamine (NDELA) to more than 5 ppm (mg/a)

CAUTION!

Comply with the manufacturer's specifications for mixture ratios, hazardous substances, e.g. system cleaners, including their permissible minimum use times.

CAUTION!

Since the cooling lubricant escapes under high pressure, pumping out the coolant by using the existing cooling lubricant pump via a pressure hose into a suitable tank is not recommended.

ENVIRONMENTAL PROTECTION

During work on the cooling lubricant equipment please make sure that

- **collector tanks are used with sufficient capacity for the amount of liquid to be collected.**
- **liquids and oils should not be spilled on the ground.**

Clean up any spilled liquid or oils immediately using proper oil-absorption methods and dispose of them in accordance with current statutory environmental regulations.

Collect leakages

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

Disposal

Never dump oil or other substances which are harmful to the environment into water inlets, rivers or channels. Used oils must be delivered to a collection centre. Consult your supervisor if you do not know where the collection centre is.

6.4.1 Inspection plan for water-mixed cooling lubricants

Company: No.: Date: used cooling lubricant			
size to be checked	Inspection methods	Inspection intervals	Procedure and comment
noticeable changes	Appearance, odour	daily	Find and rectify causes, e.g. skim off oil, check filter, ventilate cooling lubricant system
pH value	Laboratory techniques electrometric with pH meter (DIN 51369) Local measurement method: with pH paper (Special indicators with suitable measuring range)	weekly [1)]	if pH value decreases > 0.5 based on initial filing: Measures in accordance manufacturer's recommendations > 1.0 based on initial filing: Replace cooling lubricant, clean cooling lubricant circulation system
Usage concentration	Manual refractometer	weekly [1)]	Method results in incorrect values with tramp oil content
Base reserve	Acid titration in accordance with Manufacturer's recommendation	as required	Method is independent of tramp oil content
Nitrite content	Test sticks method or laboratory method	weekly [1)]	> 20 mg/L nitrite: Replace cooling lubricant or part or inhibiting additives; otherwise NDELA (N-nitrosodiethanolamine) in the cooling lubricant system and in the air must be determined > 5 mg/L NDELA in the cooling lubricant system: Replacement, clean and disinfect cooling lubricant circulation system, find nitrite source and, if possible, rectify.
Nitrate/nitrite content of the preparation water, if this is not removed from the public grid	Test sticks method or laboratory method	as required	Use water from the public grid if there is water from the pubic grid has > 50 mg/l nitrate: Inform the waterworks

[1)] The specified inspection intervals (frequency) are based on continuous operation. Other operational conditions can result in other inspection intervals; exceptions are possible in accordance with Sections 4.4 and 4.10 of the TGS 611.

Editor:

Signature:

7 Ersatzteile - Spare parts - DH 26 GT , DH 28 GS

7.1 Bohrkopf- Drilling head

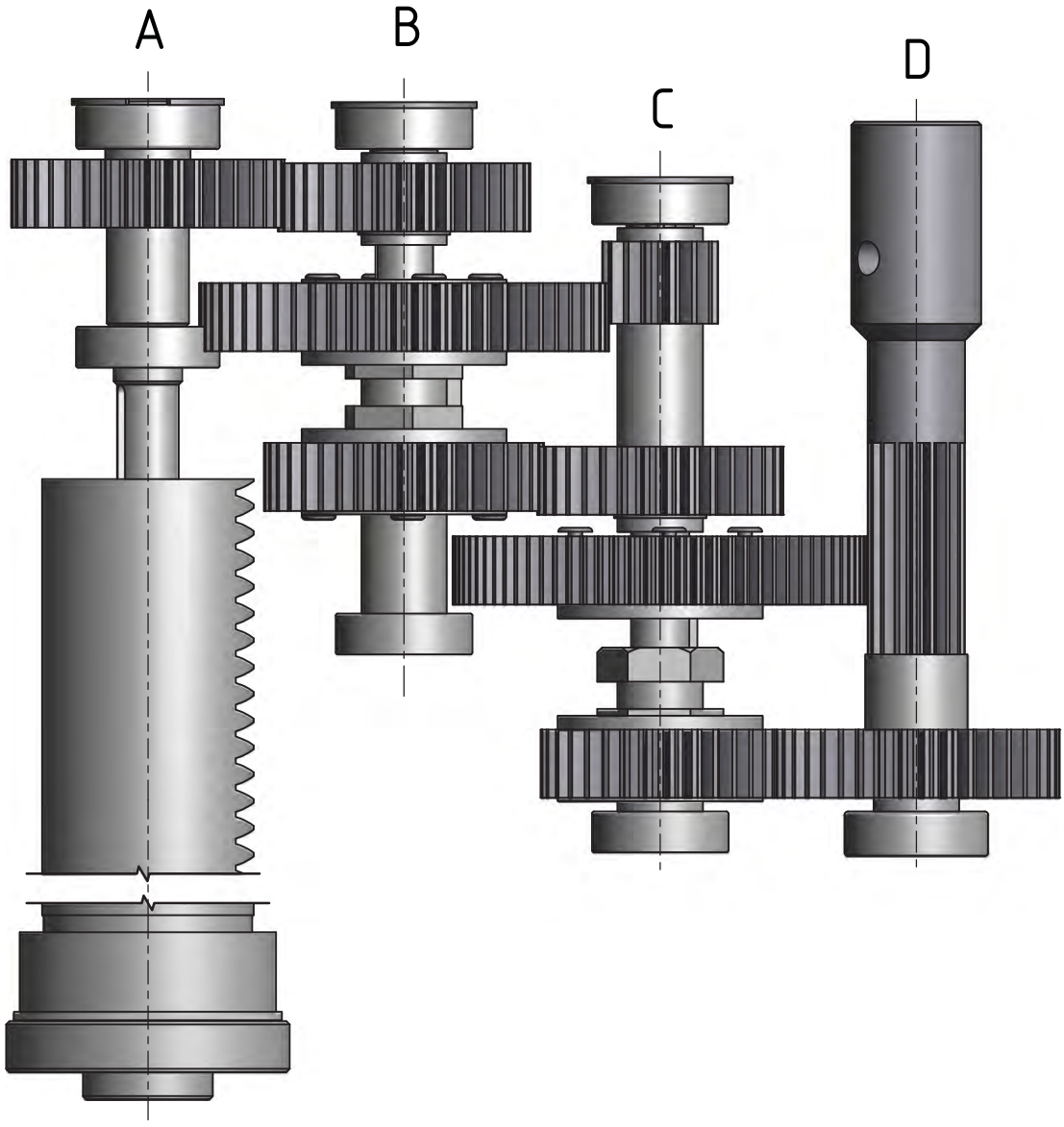


Abb. 7-1: Bohrkopf - Drilling head

7.2 Bohrkopf - Drilling head

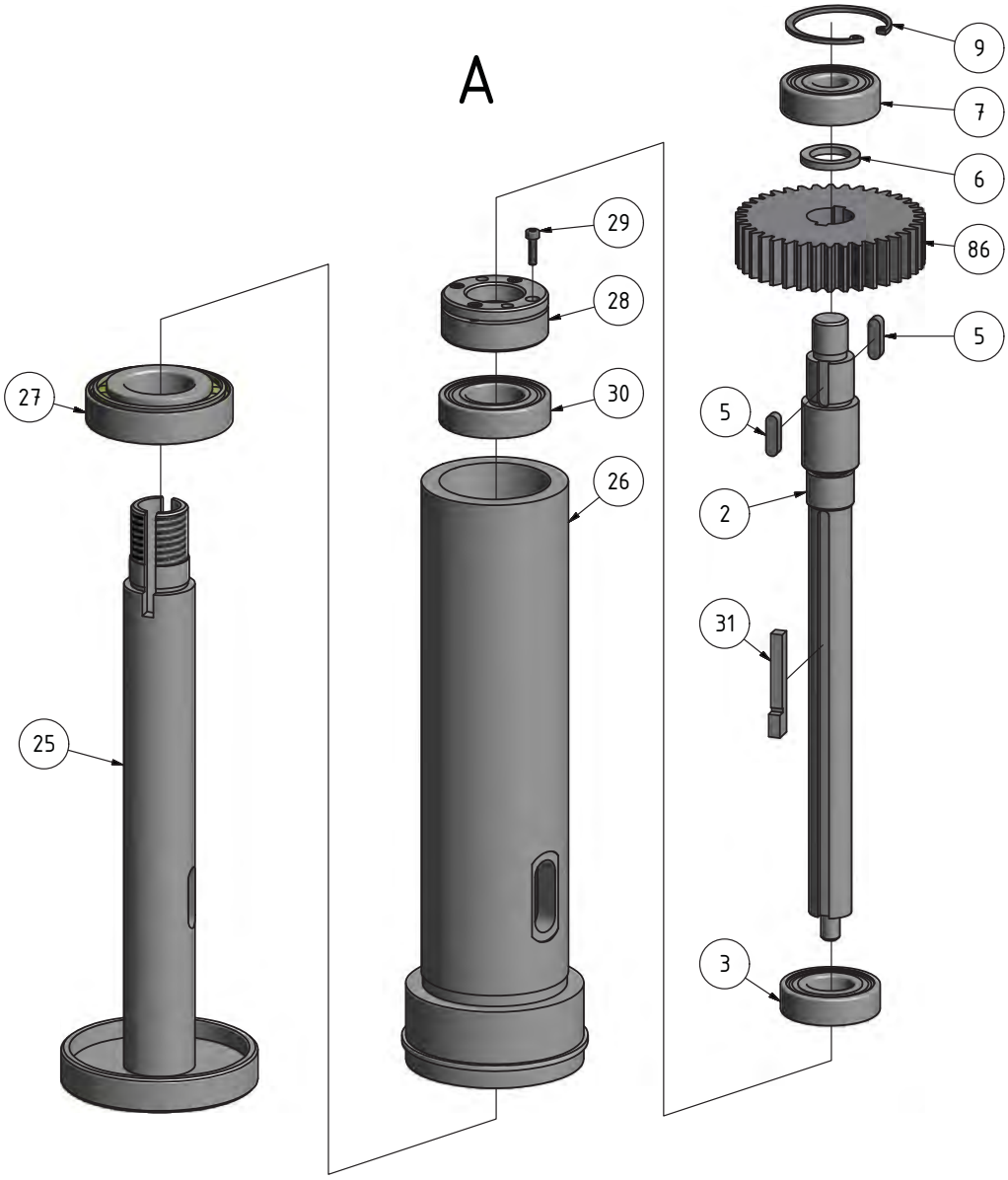


Abb. 7-2: Bohrkopf - Drilling head

7.3 Bohrkopf - Drilling head

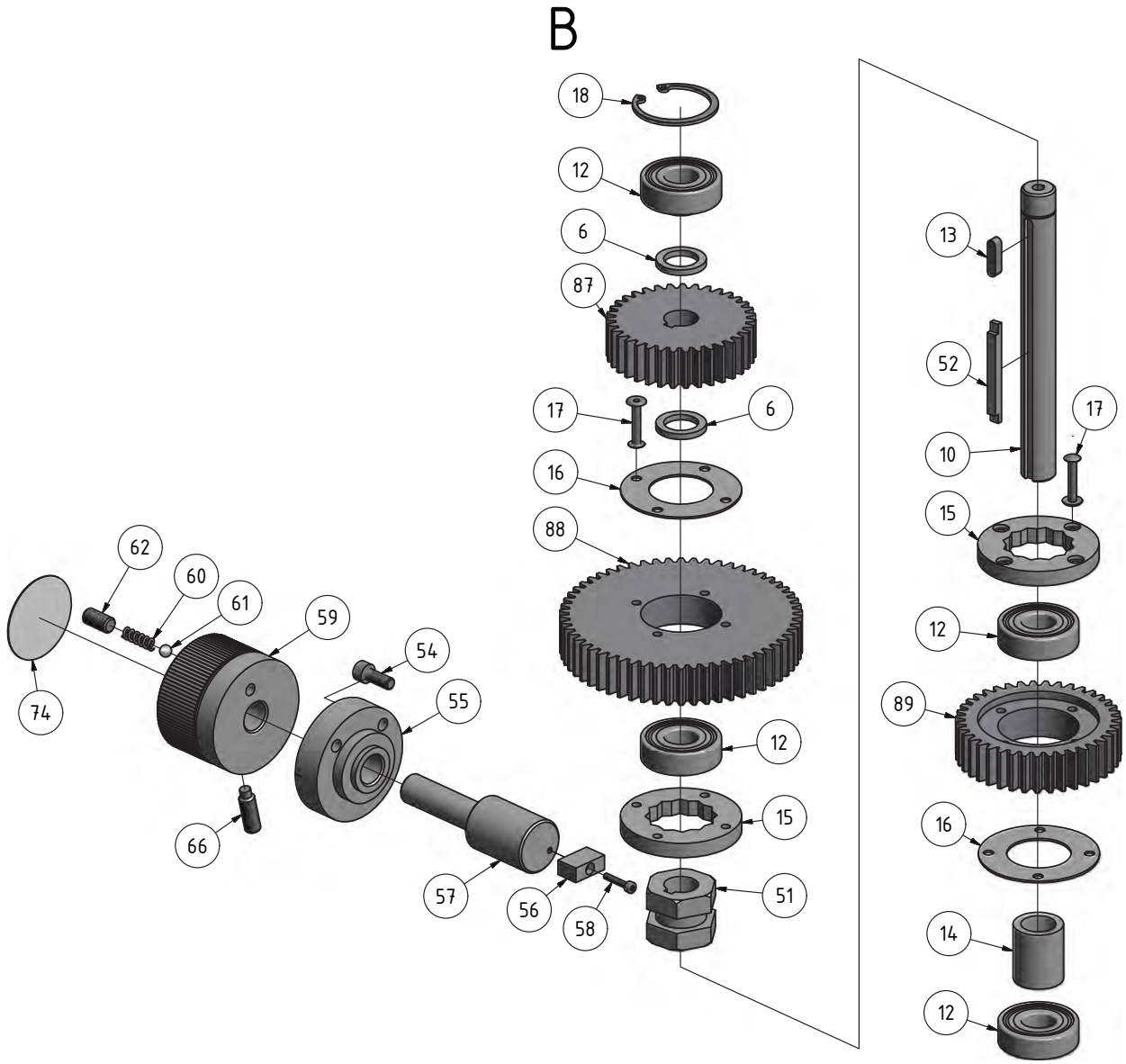


Abb. 7-3: Bohrkopf - Drilling head

7.4 Bohrkopf - Drilling head

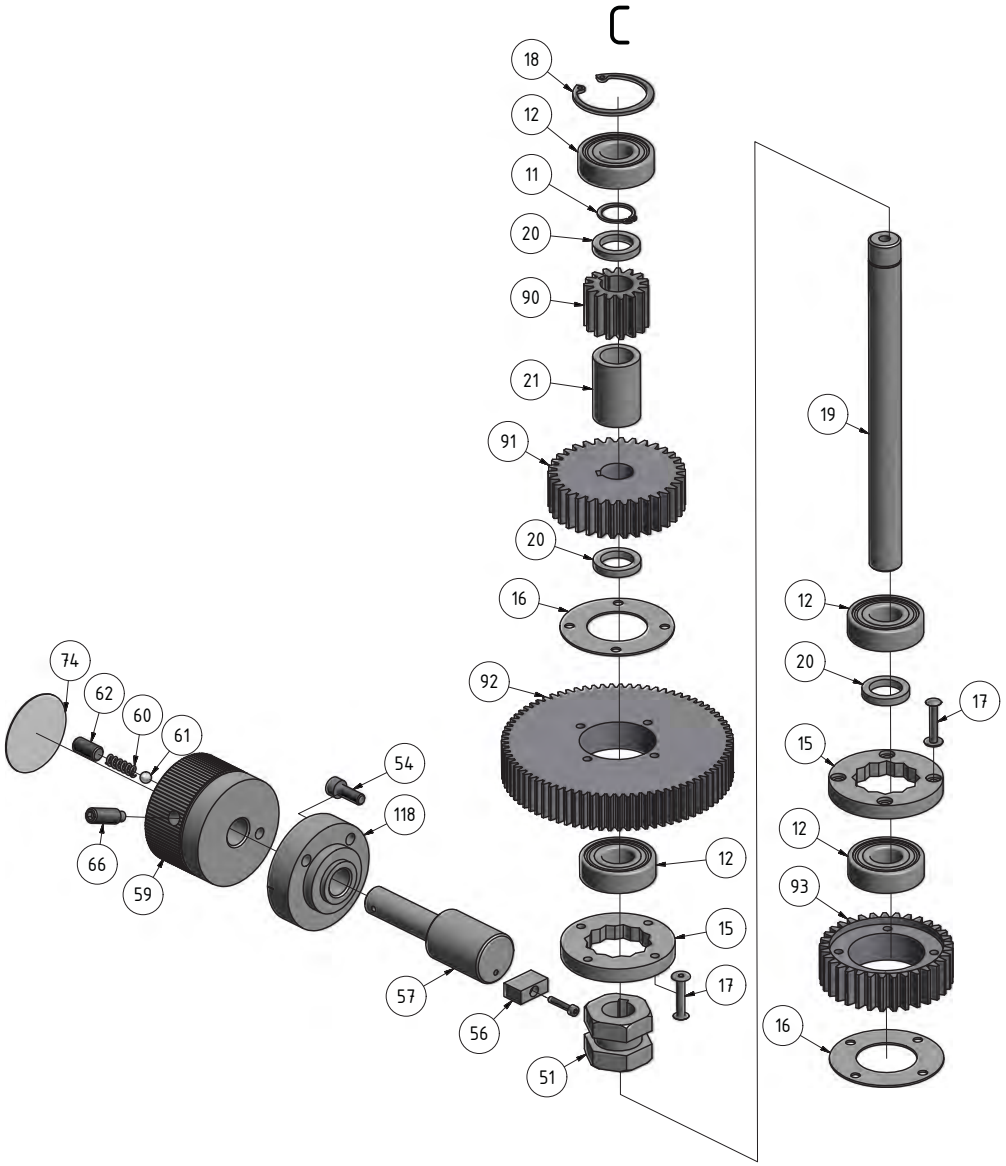


Abb. 7-4: Bohrkopf - Drilling head

7.5 Bohrkopf - Drilling head

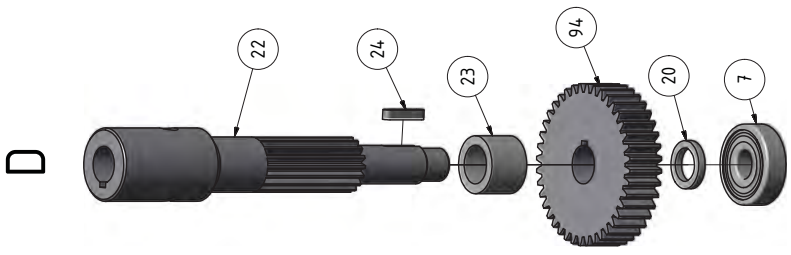


Abb. 7-5: Bohrkopf - Drilling head

7.6 Bohrkopf - Drilling head

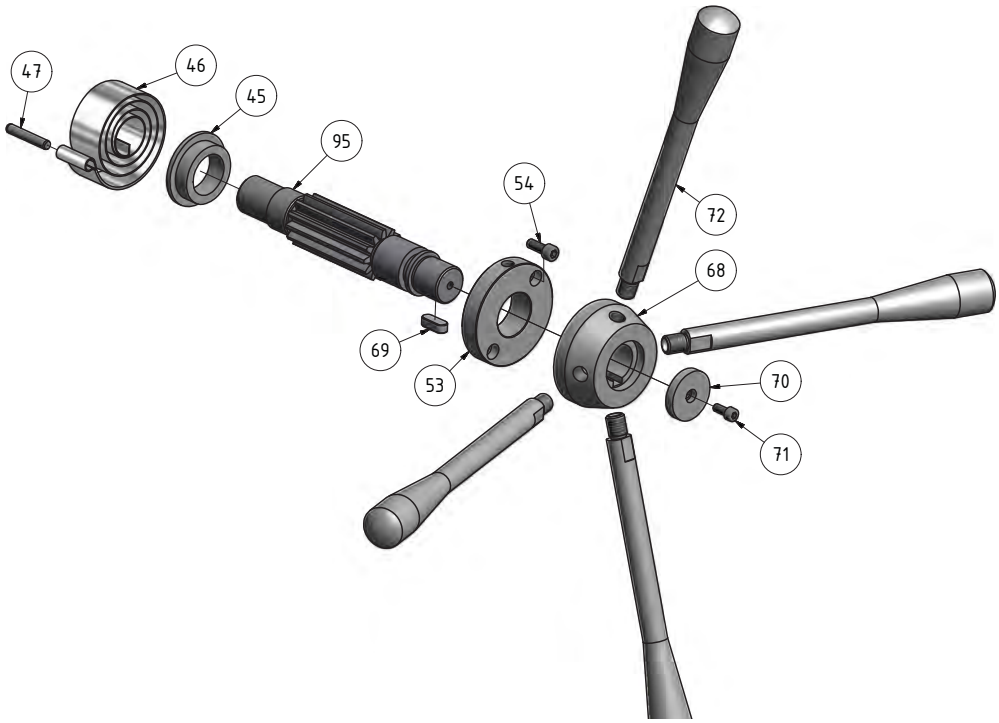


Abb. 7-6: Bohrkopf - Drilling head

7.7 Bohrkopf - Drilling head

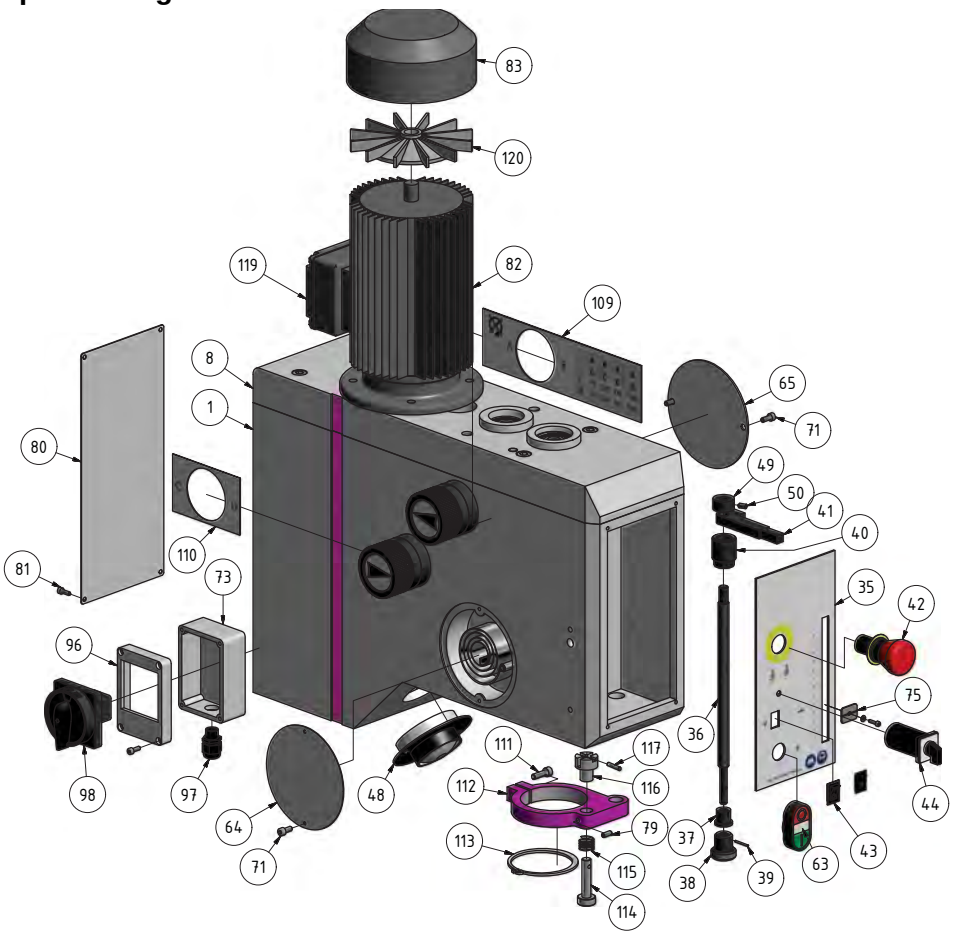


Abb. 7-7: Bohrkopf - Drilling head

7.8 Bohrfutterschutz - Drilling chuck protection

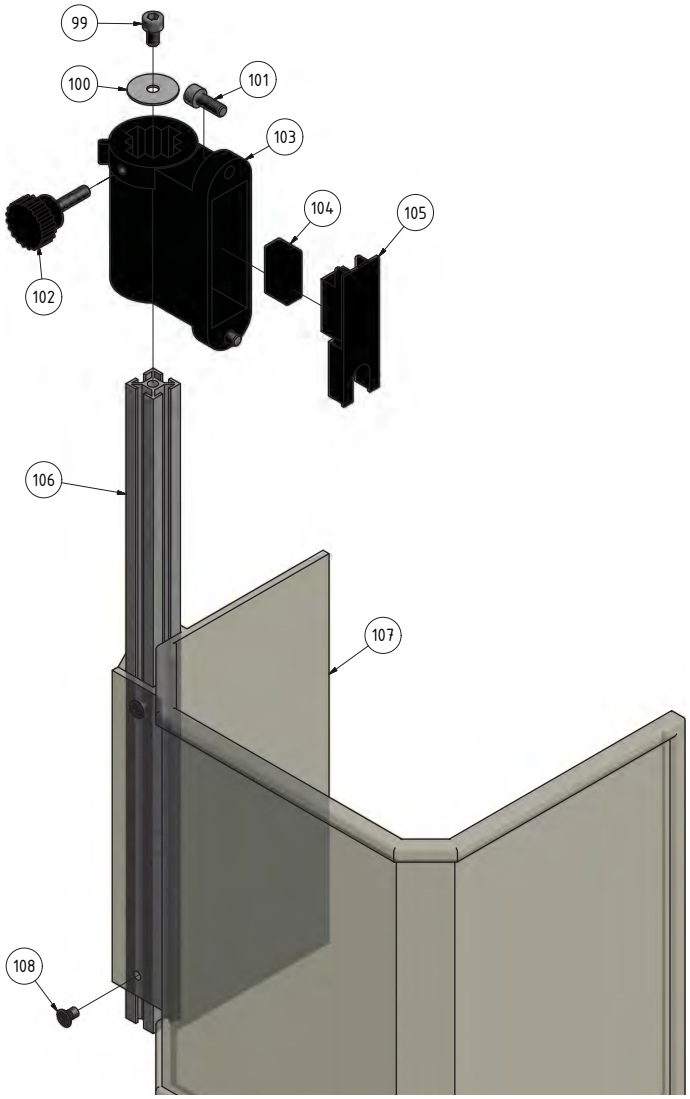


Abb. 7-8: Bohrfutterschutz- Drilling chuck protection

Teileliste Bohrkopf - Parts list drilling head - DH 26 GT | DH 28 GS						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GT	Artikelnummer Item no. DH28GS
1	Gehäuse	Housing	1		03034220101	03034230101
2	Welle	Shaft	1		03034220102	03034230102
3	Kugellager	Ball bearing	1	6004-2Z	0406004.2R	0406004.2R
4	Zahnrad	Gear	1		03034220104	03034230104
5	Passfeder	Fitting key	2	DIN 6885 - A 5 x 5 x 18		
6	Ring	Ring	3		03034220106	03034230106
7	Kugellager	Ball bearing	2	6302-2Z	0406302.2R	0406302.2R
8	Platte	Plate	1		03034220108	03034230108
9	Sicherungsring	Retaining ring	1	DIN 472 - 42x1,75		
10	Welle	Shaft	1		03034220110	03034230110
11	Sicherungsring	Retaining ring	2	DIN 471 - 17x1		
12	Kugellager	Ball bearing	8	6203-2Z	0406203,2R	0406203,2R
13	Passfeder	Fitting key	1	DIN 6885 - A 5 x 5 x 20		
14	Buchse	Bushing	1		03034220114	03034230114
15	Ring	Ring	4		03034220115	03034230115
16	Ring	Ring	4		03034220116	03034230116
17	Niet	Rivet	16	GB 873 4 x 28 x 23,4		
18	Sicherungsring	Retaining ring	2	DIN 472 - 40 x 1,75		
19	Welle	Shaft	1		03034220119	03034230119
20	Ring	Ring	4		03034220120	03034230120
21	Buchse	Bushing	1		03034220121	03034230121

Teileliste Bohrkopf - Parts list drilling head - DH 26 GT | DH 28 GS						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GT	Artikelnummer Item no. DH28GS
22	Zahnrad	Gear	1		03034220122	03034230122
23	Buchse	Bushing	1		03034220123	03034230123
24	Passfeder	Fitting key	2	DIN 6885 - A 5 x 5 x 25		
25	Bohrspindel	Drilling spindle	1		03034220125	03034230125
26	Pinole	Sleeve	1		03034220126	03034230126
27	Kegelrollenlager	Taper roller bearing	1	30206 J2_Q	04030206	04030206
28	Klemmmutter	Clamping nut	1		03034220128	03034230128
29	Innensechskantschraube	Socket head screw	5	ISO 4762 - M3 x 12		
30	Kugellager	Ball bearing	1	6005-2RSH	0406005.2R	0406005.2R
31	Passfeder	Fitting key	1		03034220131	03034230131
35	Frontlabel	Front label	1		03034220135	03034230135
36	Stange	Rod	1		03034220136	03034230136
37	Buchse	Bushing	1		03034220137	03034230137
38	Buchse	Bushing	1		03034220138	03034230138
39	Zylinderstift	Cylindrical pin	1		03034220139	03034230139
40	Buchse	Bushing	1		03034220140	03034230140
41	Hebel	Lever	1		03034220141	03034230141
42	Not-Aus-Schalter	Emergency stop button	1		03034220142	03034230142
43	Licht/ Kühlpumpeschalter	Light/Coolant pump switch	1		03034220143	03034230143
44	Funktionsschalter	Functional switch	1		03034220144	03034230144
45	Buchse	Bushing	1		03034220145	03034230145
46	Spiralfeder	Spring	1		0302130333	0302130333
47	Zylinderstift	Cylindrical pin	1	ISO 2338 - 6 h8 x 35		
48	Lampe	Lamp	1		03034220148	03034230148
49	Buchse	Bushing	1		03034220149	03034230149
50	Gewindestift	Grub screw	1		03034220150	03034230150
51	Buchse	Bushing	2		03034220151	03034230151
52	Passfeder	Fitting key	2		03034220152	03034230152
53	Aufnahme	Collet	1		03034220153	03034230153
54	Innensechskantschraube	Socket head screw	6	ISO 4762 - M6 x 16		
55	Aufnahme	Collet	1	Kennzeichnung A & B	03034220155	03034230155
56	Klotz	Block	2		03034220156	03034230156
57	Welle	Shaft	2		03034220157	03034230157
58	Innensechskantschraube	Socket head screw	2	ISO 4762 - M3 x 16		
59	Schaltknopf	Control knob	2		03034220159	03034230159
60	Feder	Spring	2		03034220160	03034230160
61	Stahlkugel	Steel ball	2		03034220161	03034230161
62	Innensechskantschraube	Socket head screw	2	GB 77-85 - M8 x 16		
63	Ein-Aus-Schalter	On-Off switch	1		03034220163	03034230163
64	Abdeckung	Cover	1		03034220164	03034230164
65	Abdeckung	Cover	1		03034220165	03034230165
66	Gewindestift	Grub screw	2	GB 79-85 - M8 x 25		
67			1		03034220167	03034230167
68	Aufnahme	Collet	1		03034220168	03034230168
69	Passfeder	Fitting key	1	GB_1096-97_8x18		
70	Scheibe	Washer	1		03034220170	03034230170
71	Innensechskantschraube	Socket head screw	5	ISO 4762 - M5 x 12		
72	Hebel	Lever	4		03034220172	03034230172
73	Schaltkasten	Switch box	1		03020245241	03034230173
74	Zeiger	Indicator	2		03034220174	03034230174
75	Anzeige	Indicator	1		03034220175	03034230175
76	Scheibe	Washer	1	DIN 125 - A 3,2		
77	Innensechskantschraube	Socket head screw	4	ISO 4762 - M10 x 45		
78	Zylinderstift	Cylindrical pin	2	ISO 2338 - 10 h8 x 45		
79	Gewindestift	Grub screw	4	ISO 4026 - M5 x 12		
80	Abdeckung	Cover	1		03034220180	03034230180
81	Innensechskantschraube	Socket head screw	4	ISO 4762 - M4 x 12		
82	Motor	Motor	1		03034220182	03034230182
83	Motordeckel	Motor cover	1		03034220183	03034230183
84	Innensechskantschraube	Socket head screw	4	ISO 4762 - M8 x 20		
85	Scheibe	Washer	4	DIN 125 - A 8,4		
86	Zahnrad	Gear	1		03034220186	03034230186
87	Zahnrad	Gear	1		03034220187	03034230187
88	Zahnrad	Gear	1		03034220188	03034230188
89	Zahnrad	Gear	1		03034220189	03034230189
90	Zahnrad	Gear	1		03034220190	03034230190
91	Zahnrad	Gear	1		03034220191	03034230191
92	Zahnrad	Gear	1		03034220192	03034230192
93	Zahnrad	Gear	1		03034220193	03034230193

Teileliste Bohrkopf - Parts list drilling head - DH 26 GT | DH 28 GS						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GT	Artikelnummer Item no. DH28GS
94	Zahnrad	Gear	1		03034220194	03034230194
95	Zahnrad	Gear	1		03034220195	03034230195
96	Abdeckung	Cover	1		03020245240	03034230196
97	Buchse	Bushing	1		03034220197	03034230197
98	Hauptschalter	Main switch	1		03034220198	03034230198
99	Innensechskantschraube	Socket head screw	1		03034220199	03034230199
100	Scheibe	Washer	1		030342201100	030342301100
101	Innensechskantschraube	Socket head screw	1		030342201101	030342301101
102	Rändelschraube	Knurled screw	1		030342201102	030342301102
103	Halterung	Fixture	1		030342201103	030342301103
104	Mikroschalter	Microswitch	1		030342201104	030342301104
105	Platte	Plate	1		030342201105	030342301105
106	Alu- Profil	Aluminium profile	1		030342201106	030342301106
107	Bohrfutterschutz	Drill chuck protection	1		030342201107	030342301107
108	Schraube	Screw	1		030342201108	030342301108
109	Bohrtabelle	Drilling chart	1		030342201109	030342301109
110	Label Schaltstellung	Label switch position	1		030342201110	030342301110
111	Innensechskantschraube	Socket head screw	1	ISO 4762 - M6x16		
112	Aufnahme	Collet	1		030342201112	030342301112
113	Sicherungsring	Retaining ring	1	DIN 471/72x2,5		
114	Bolzen	Bolt	1		030342201114	030342301114
115	Feder	Spring	1		030342201115	030342301115
116	Aufnahme	Collet	1		030342201116	030342301116
117	Zylinderstift	Cylindrical pin	1	4x20		
118	Aufnahme	Collet	1	Kennzeichnung C&D	030342201118	030342301118
119	Klemmkasten	Terminal block	1		030342201119	030342301119
120	Lüfter	Fan	1		030342201120	

7.9 Bohrtisch - Drilling table - DH 26 GT

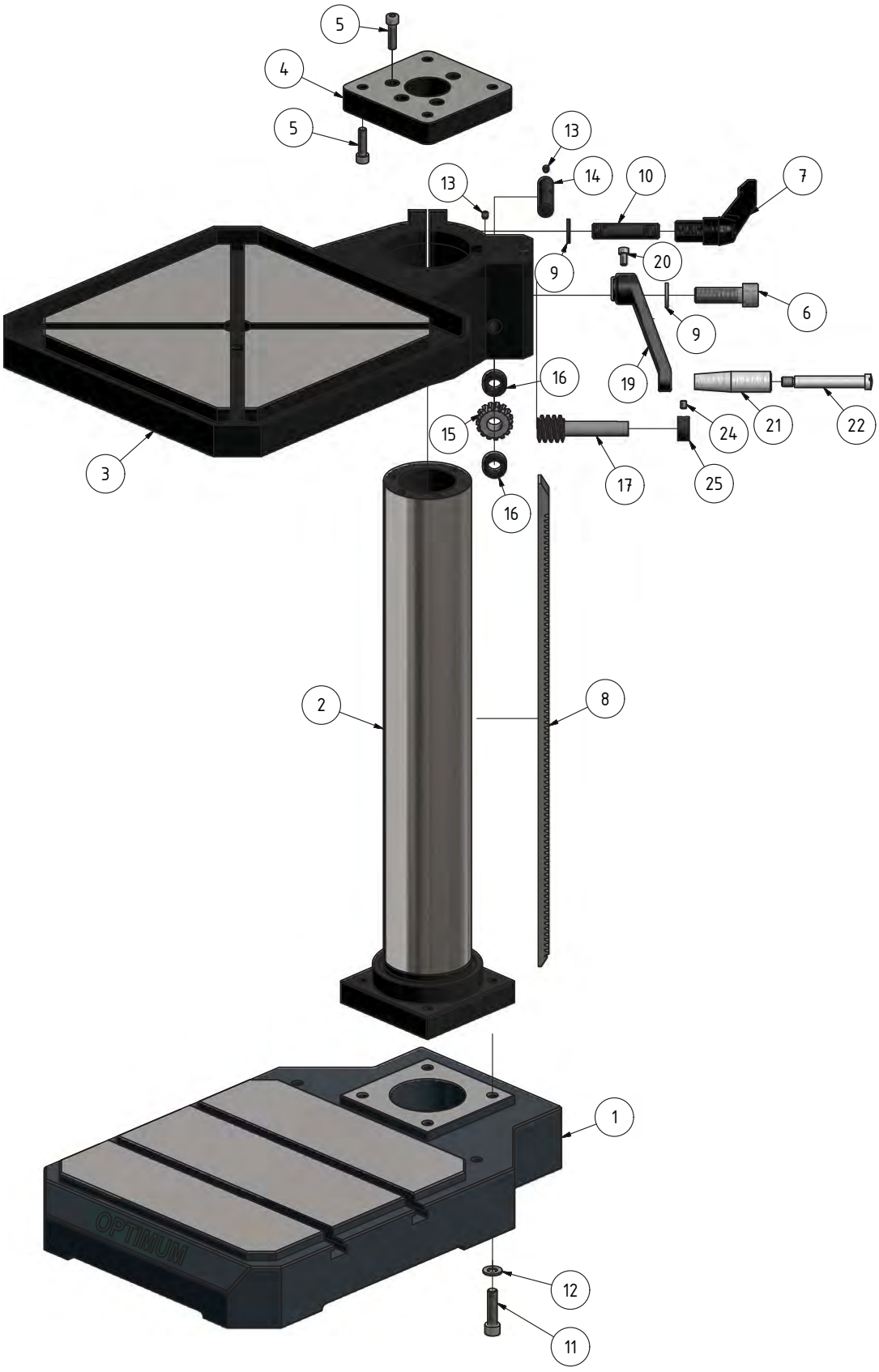


Abb. 7-9: Bohrtisch - Drilling table - DH 26 GT

7.10 Bohrtisch - Drilling table - DH 28 GS

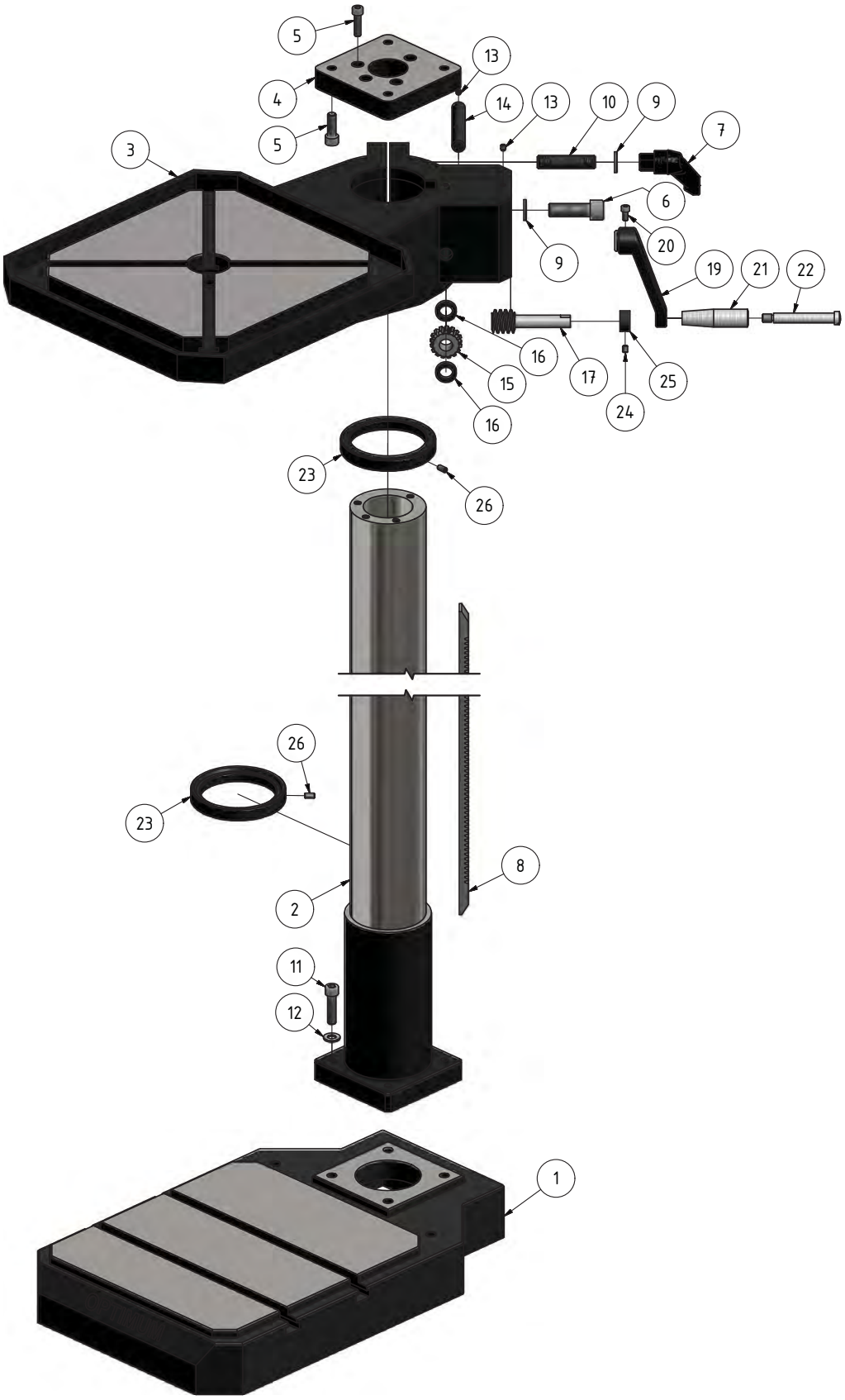


Abb. 7-10: Bohrtisch - Drilling table - DH 28 GS

Teileliste Bohrtisch - Parts list drilling table - DH 26 GT | DH 28 GS						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH 26 GT	Artikelnummer Item no. DH 28 GS
1	Maschinenfuss	Mounting foot	1		03034220201	03034230201
2	Säule	Column	1		03034220202	03034230202
3	Bohrtisch	Drilling table	1		03034220203	03034230203
4	Platte	Plate	1		0302028371	
5	Innensechskantschraube	Socket head screw	8	ISO 4762 - M8 x 30	03034220205	
6	Innensechskantschraube	Socket head screw	1	ISO 4762 - M16 x 50	03034220206	
7	Klemmhebel	Clamping lever	1		0302028375	
8	Zahnstange	Gear rack	1		03034220208	030202833
9	Scheibe	Washer	1	DIN125-A17	03034220209	
10	Bolzen	Bolt	1		03034220210	
11	Innensechskantschraube	Socket head screw	4	ISO 4762 - M10 x 40	03034220211	
12	Scheibe	Washer	4	DIN 125 - A 10.5	03034220212	
13	Schmiernippel	Lubrication cup	4	JB-T7940/6mm	0340105	
14	Welle	Shaft	1		03034220214	
15	Schneckenrad	Worm gear	1		030202414	
16	Abstandsring	Spacer	1		0302024113	
17	Schnecke	Worm	1		030202415	
19	Kurbel	Crank	1		0302024116	
20	Innensechskantschraube	Socket head screw	5	ISO 4762 - M6 x 12	03034220220	
21	Griff	Grip	1		0302014115	
22	Griffschraube	Grip screw	1		0302024114	
23	Säulenring	Column ring	2		03034230230	
24	Gewindestift	Grub screw	1	M6x8		
25	Distanzhülse	Sleeve	1		0302024183	
26	Gewindestift	Grub screw	6	M8x10		

7.11 Schaltplan - Wiring diagram - DH 28 GS | DH 26 GT

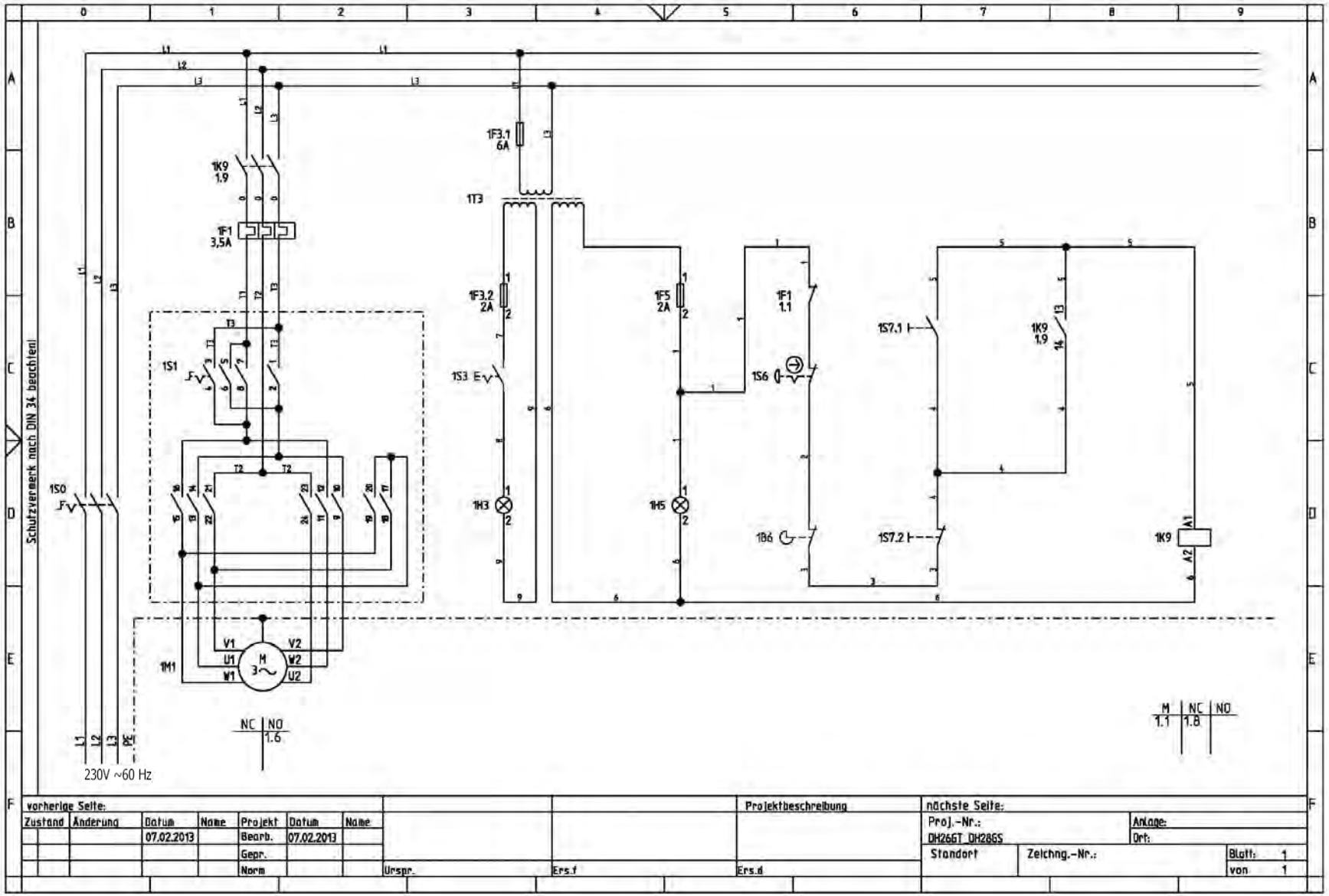


Abb.7-11: Schaltplan - Wiring diagram

Teileliste elektrische Komponente - Spare part electrical component - DH 28 GS | DH 26 GT				
Pos.	Bezeichnung	Description	Grösse Size	Artikelnummer Item no.
1B6	Sicherheitschalter Bohrfutterschutz	Drill chuck safety switch	HY50-3	030342301B6
1F1	Motorschutzschalter	Motor safety switch	3UA5940-1H 5-8A	33226811F10
1F3.1	Sicherung	Fuse	6A	030342301F4.1
1F3.2	Sicherung	Fuse	2A	030342301F5
1F5	Sicherung	Fuse	2A	
1H5	Maschinenlampe	Machine lamp	L12103-11SYG	030342301H5
1H3	Betriebsleuchte	Work light	20W	030342301H3
1K9	Schütz Antriebsmotor	Drive motor contactor	CKDCEH12105	030342301K9
1M1	Antriebsmotor	Drive motor	YD90-4/2 135	33226811M10
1S0	Hauptschalter	Main switch	LW8GS	030342301S0
1S1	Funktionsschalter	Function switch	CA4D-32FLX05EF	030342301S1
1S4	Schalter Maschinenlicht	Machine light switch	HY17-XX	030342301S4
1S6	Not-Aus-Schalter	Emergency stop button	GB-T14048.5	030342301S6
1S7.1	Taster Ein	Button On	LA103-115YG	030342301S7.1
1S7.2	Taster Aus	Button Off	LA103-11SYIR	030342301S7.2
1S9	Schalter Kühlmittelpumpe	Coolant pump switch	HYS713-17	030342301S9
1T4	Transformator	Transformer	230V/24V&12V	030342301T4

9 Malfunctions

Malfunction	Cause/ possible effects	Solution
Motor is hot	• Wrong electrical connection of 400 V machines	• ☞ "Power supply“ on page 31
Noise during work.	• Spindle is too little lubricated • Tool is blunt or wrongly clamped • Gear is too little lubricated	• Lubricate spindle (only possible when disassembled) • Use new tool and check tension (fixed setting of the bit, drill chuck and taper mandril) • Lubricate gear Img.6-4: “Gear opening DH 26 GT, DH 28 GS“ on page 66
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	• Drill deformed • Worn out spindle bearings • 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 • Positioning the follower in the drill spindle is not considered	• Clean surfaces well • Keep surfaces free of grease Img.4-7: “Quick action drill chuck“ on page 39
Motor does not start	• Motor is wrongly connected • Defective fuse • Drill chuck protection not closed	• Have it checked by authorised personnel • Close drill chuck protection
Motor is overheating and there is no power	• Motor overloaded • Too low mains voltage • Motor is wrongly connected	• Reduce feed rate Disconnect immediately and have it checked by authorized personnel • Have it checked by authorised personnel
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	• Check spindle return spring, replace it, if necessary

Malfunction	Cause/ possible effects	Solution
The drilling spindle cannot be moved downwards.	• Swivel integrated drill drift in • Drill depth adjustment no released	• Swivel integrated drill drift out • 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
Working spindle rattling on rough piece surfaces	• Excessive slack in bearing • Working spindle moves up and down • Clamping chuck is loose • Tool is blunt • Workpiece is loose	• Reduce bearing clearance or replace bearing • Readjust bearing clearance (fixed bearing) • Check, re-tighten. • Sharpen or replace tool • Clamp the workpiece firmly.

10 Appendix

10.1 Copyright

10.2 Terminology/Glossary

Term	Explanation
Drill drift	Tool to release the bit or the drill chuck from the drill spindle
Drill chuck	Drill bit adapter
Drill head	Upper part of the geared 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	C one 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.
W orkpiece	part to be drilled, part to be machined.
Tool	Milling cutter, drill bit, countersink, etc.

10.4 Liability claims for defects / warranty

Beside the legal liability claims for defects of the customer towards the seller, the manufacturer of the product, company does not grant any further warranties unless they are listed below or were promised in the framework of a sin-gle contractual provision.

- The processing of the liability claims or of the warranty is performed as chosen by company 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 company.
- 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 over-straining of the machine.
  - Any defects arising by one's own fault due to faulty operations or if the operating manual is disregarded.
  - Inattentive or incorrect handling and use of improper equipment
  - 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 company 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 obli-gation to compensate. Such services do neither delay nor interrupt the warranty period.
- Place of jurisdiction for legal disputes between 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 con-tract.

10.5 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 20

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

- Maximum stacking height

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

Consult company if the machine and accessories are stored for more than three months or are stored under different environmental conditions than those spec-ified here .

10.6 Note regarding disposal / options to reuse:

Please dispose of your machine in an environmentally friendly way, not by disposing of the waste not in the environment, but by acting in a professional way.

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

10.6.1 Decommissioning

CAUTION!

Used devices need to be decommissioned in a professional way in order to avoid later misuses and endangerment of the environment or persons.

- **Disconnect the plug from the power supply.**
- **Cut the connection cable.**
- **Remove all environmentally hazardous operating fluids from the used device.**
- **If applicable remove batteries and accumulators.**
- **Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.**
- **Dispose of machine components and operating fluids using the intended disposal methods.**

10.6.2 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 thewaste 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.

10.6.3 Disposing of the old device

INFORMATION

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

Please note that the electrical devices 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.

10.6.4 Disposal of electrical and electronic components

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

The machine is composed of electrical and electronic components and must not be disposed of as household waste. According to the European Directive 2002/96/EC 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.

10.6.5 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 mixe d up since it is only possible to reuse used oils without pre-treatment, if 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.

10.7 Disposal via municipal collection

Disposal of used electrical and electronic components
(Applicable in the countries of the European Union and other European countries with a sepa - rate collecting system for those devices).

The sign on the product or on its packing indi cates 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 constitu tes a risk to the environment and public health. Recycling of material will help re duce the consumption of raw mate rials. For further information about the recycling of this product, please cons ult your District Office, the municipal waste col - lection station or the shop where you have bought the product.

10.8 RoHS, 2002/95/EC

The symbol on the product or on its packing i ndicates that this product complies with the Euro - pean directive 2002/95/EC.

10.9 Product follow-up

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

We would be grateful if you coul d send us the fo llowing information:

- Modified settings
- Any experiences with the geared drill whic h might be important for other users
- Recurring failures

C.H.HANSON
2000 North Aurora Rd.
Naperville, IL 60563
Call 800-827-3398

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