OPERATING MANUAL & PARTS LIST

9680134/9680138
9680135/9680139

PALMGREN®

20″ Drilling Machine VS

Read carefully and follow all safety rules and operating instructions before first use of this product.

Table of contents

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 prod-uct 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, opera-tion 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 con-tact your specialised dealer or directly the company.

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
❍	listings

This part of the operating instructions

- ❍ explains the meaning and use of the warning notes included in these operating instructions,
- ❍ defines the intended use of the 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.

INFORMATION

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

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

1.2 Safety instructions (warning notes)

1.2.1 Classification of hazards

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

Symbol	Alarm expression	Definition / consequence
	**DANGER!**	Impending danger that will cause serious injury or death to people.
	WARNING!	A danger that can cause serious injury or death.
	CAUTION!	A danger or unsafe procedure that can cause personal injury or damage to property.
	**ATTENTION!**	Situation that could cause damage to the geared drill and product, as well as other types of damage. No risk of injury to persons.
	**Information**	Practical tips and other important or useful information and notes. No dangerous or harmful consequences for people or objects.

In case of specific dangers, we replace the pictogram with

general danger

with a warning of

injury to hands,

hazardous electrical voltage,

or

rotating parts.

1.2.2 Other pictograms

Warning: danger of slipping!

Warning: risk of stumbling!

Warning: hot surface!

Warning: biological hazard!

Warning: automatic start-up!

Warning: tilting danger!

Warning: suspended loads!

Caution, danger of explosive substances!

Switching on forbidden!

Do not climb onto the machine!

Read the operating instructions before commissioning!

Pull out the mains plug!

Wear protective glasses!

Wear protective gloves!

Wear safety shoes!

Wear a protective suit!

Use ear protection!

Only switch during standstill!

Protect the environment!

Contact address

1.3 Intended use

WARNING!

In the event of improper use 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

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

☞ "Technical specification“ on page 20

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 misuse

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

Any other use must be discussed with the manufacturer.

It is only 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 free of vibration.

ATTENTION!

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

WARNING!

Risk of injury caused by flying workpieces.

Clamp the workpiece in the machine vice. Make sure that the workpiece is firmly clamped in the machine vice and that the machine vice is firmly clamped onto the machine table.

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

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

➜ Sufficiently lubricate the machine.

➜ Set the bearing clearance and guides correctly.

Recommendations:

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

When drilling, make sure that

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

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

➜ if there is too much pressure, the drill will wear quickly and may even break or jam in the borehole. If the drill jams, immediately stop the main motor by pressing the emergency stop switch,

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

➜ generally always back the spindle out of the workpiece while it is still turning.

INFORMATION

The drilling machines with frequency converter for regulating the speed are built according to the standard EN 61800-3 class C2.

WARNING!

This machine is not intended for use in residential buildings, in which the power supply is provided via a public low voltage supply system. In these areas it may possibly be difficult to guarantee electromagnetic compatibility due to lead bound as well as emitted interferences.

Overview of the EMC categories:

Categorie C1

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

Categorie C2

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

Categorie C3

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

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

1.5 Possible dangers caused by the geared drill

The geared drill was built using state-of-the-art technology.

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

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

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

If the 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,
- and strictly follow these operating instructions.

In the event of improper use

- there may be a risk to personnel,
- there may be a risk to the machine and other material values,
- the correct function of the 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 operated with functional safety devices.

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

All additional devices installed by the operator must be equipped with the stipulated safety devices. This is your responsibility as the operator!

☞ **"Safety devices“ on page 14**

1.6 Qualification of personnel

1.6.1 Target group

This manual is addressed to

- operators,
- users and
- maintenance personnel.

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

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

Unclear responsibilities constitute a safety risk!

Always disconnect plug of the 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. The operator may only carry out tasks that exceed normal operation if this is stated in these instructions and the operating company has explicitly entrusted him with the task.

Qualified electrician

With professional training, knowledge and experience as well as knowledge of respective standards and regulations, qualified electricians are able to perform work on the electrical system and recognise and avoid any possible dangers.

Qualified electricians have been specially trained for the working environment, in which they are working and know the relevant standards and regulations.

Qualified personnel

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

Instructed person

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

1.6.2 Authorized persons

WARNING!

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

Only authorized personnel may operate the geared drill !

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

Obligations of the operating company

- train the personnel,

- instruct the personnel in regular intervals (at least once a year) on
  - all safety regulations relevant to the machine,
  - its operation and
  - generally accepted engineering standards.
- check the personnel‘s knowledge level,
- document the training/instruction,
- have attendance at the training/instruction confirmed by signature and
- check whether the personnel is working in a safety and risk-conscious manner and following the operating instructions.
- define and document the inspection deadlines for the machine in accordance with § 3 of the Factory Safety Act and perform an operational risk analysis in accordance with § 6 of the Work Safety Act.

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, the following actions must be taken in the order given:

➜ disconnect all poles,

➜ secure against restarting,

➜ check that there is no voltage.

1.7 Operator positions

The operator position is in front of the geared drill.

Img. 1-1: User positions

1.8 Safety measures during operation

CAUTION!

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

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

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

CAUTION!

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

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

1.9 Safety devices

Use the geared drill only with properly functioning safety devices.

Stop the geared drill immediately, if a safety device fails or is faulty or becomes ineffective.

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 deactivate a safety device in any other way, you are endangering yourself and other personnel working with the geared drill. The possible consequences are:

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

The geared drill features 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 guard is closed.

WARNING!

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

1.10 Safety check

Check the 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) and
- 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;

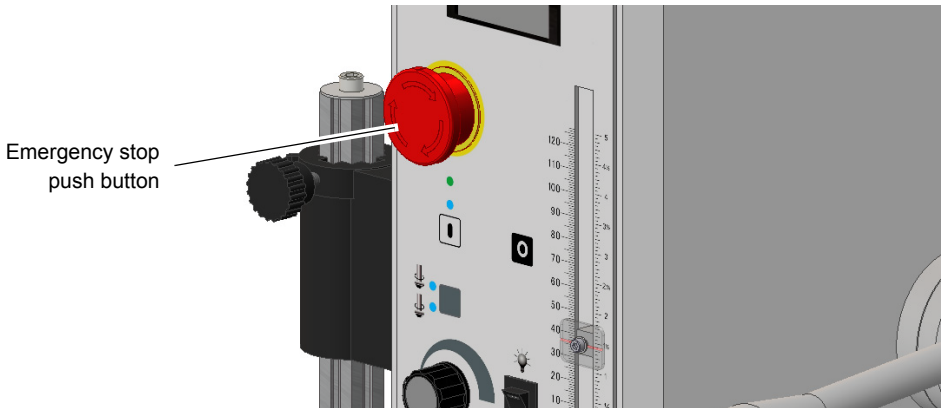
General check		
Equipment	**Check**	**OK**
Guards	Mounted, firmly bolted and not damaged	
Signs, Markers	Installed and legible	
Date:	**Checked by (signature):**	

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

1.11 EMERGENCY STOP push button

ATTENTION!

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



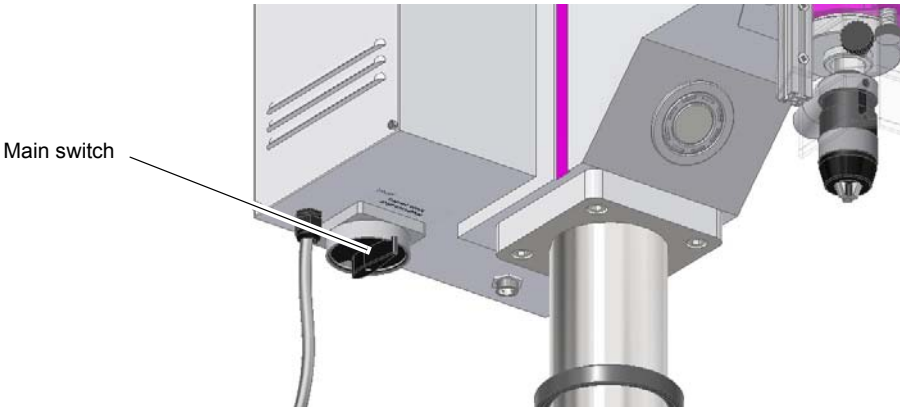
Img. 1-2: EMERGENCY-STOP

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

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.

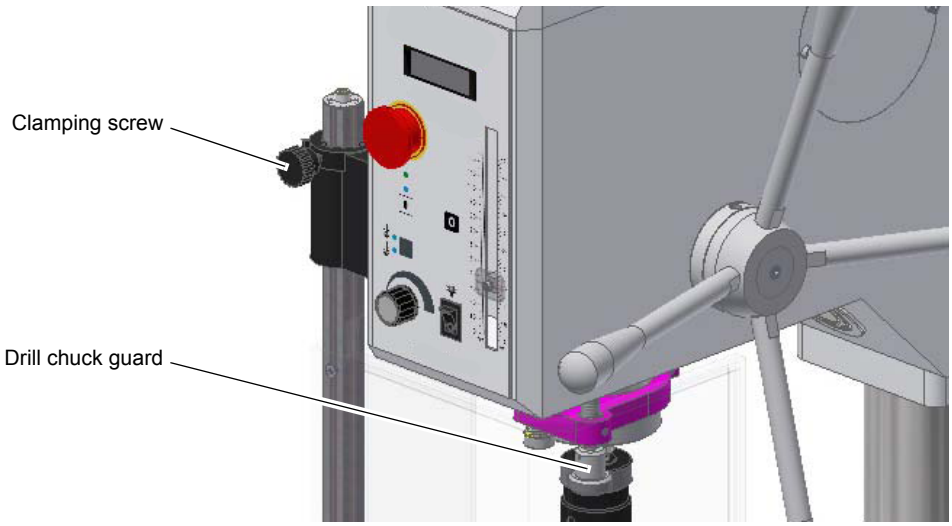
1.11.2 Drill chuck guard

Adjust the guard to the correct height before you start working.
To do so, slacken the clamping screw, set the required height and re-tighten the clamping screw.

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

INFORMATION

The machine cannot be started, if the drill chuck guard is not closed.



Img. 1-4: Drill chuck guard

1.12 Personal protective equipment

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

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

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

CAUTION!

Dirty or contaminated personnel protective equipment can cause illness.

Clean your personal protective equipment

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

Personal protective equipment for special works

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

Wear protective gloves when handling pieces with sharp edges.

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

1.13 Safety during operation

We provide information about the specific dangers when working with and on the geared drill in the descriptions for these types of work.

WARNING!

Before switching on the geared drill make sure that there are

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

Avoid any unsafe work methods:

- Make sure that your operation does not create a safety hazard.
- The rules specified in these operating instructions must be observed during assembly, operation, maintenance and repair.
- Do not work on the 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 applicable to your company.
- Inform the supervisor about all hazards or faults.
- Stay on the geared drill until the machine completely stopped moving.
- Use the specified personal protective equipment. Ensure you wear close-fitting clothing and, if necessary, a hairnet.
- Do not use protective gloves when drilling.

1.14 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 or their operational behavior. 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 all 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 applicable to your company.

Fasten the loads properly. Never walk under suspended loads!

1.15.1 Mechanical maintenance

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

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

Check if they are working properly!

1.16 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 Electronics

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.

The operating company 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 a timely man-ner.

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

The inspection prior to initial commissioning is not required if the operator receives confirma-tion from the manufacturer or installer that the electrical systems and operating equipment com-ply 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 § 3 of the Factory Safety Act and perform an operational risk analysis in accordance with § 6 of the Work Safety Act. Also use the inspection intervals in the maintenance section as reference values.

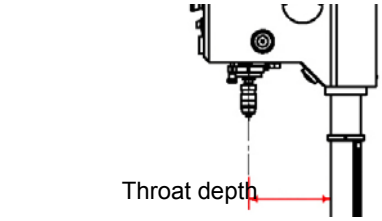
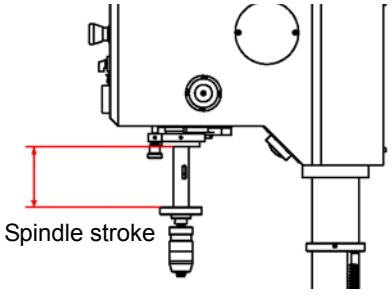
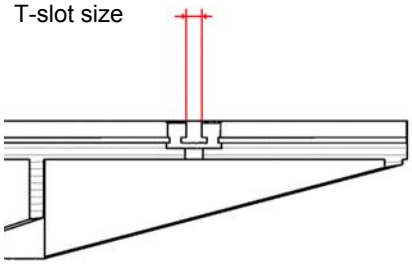
2 Technical specification

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

Explanation of abbreviations:

*GTV - Bench drilling machine with frequency converter for infinitely variable speed adjustment.

*GTS - Column drilling machine with frequency converter for infinitely variable speed adjustment.

	DH 26 GTV	**DH 28 GSV** (9680134/9680138)	**DH32 GSV** (9680135/9680139)
Electrical connection	230V ~50Hz (~60Hz) 1.5 kW	230V/60Hz/3PH or 460V/60Hz/3PH 1.5 kW	230V/60Hz/3PH or 460V/60Hz/3PH 2.2 kW
Drilling capacity in steel (S235JR) [mm]	24(0.94")	26(1")	30(1.18")
Continuous drilling capacity in steel (S235JR) [mm]	21(0.82")	23(0.9")	26(1")
	235mm(9.25")	260mm(10.24")	285mm(11.22")
	127mm(5")	127mm(5")	125mm(4.92")
Spindle seat	MT3	MT3	MT4
Table size Length x Width of the working surface	380 x 380mm	376 x 394mm	400 x 420mm
	14mm(0.55")	14mm(0.55")	14mm(0.55")
Distance spindle - table [mm]	450(17.72")	875(34.45")	820(32.28")
Maximum distance [mm] spindle - stand	610(24.02")	1285(50.59")	1270(50")

	DH 26 GTV	DH 28 GSV (9680134/9680138)	DH32 GSV (9680135/9680139)
Working surface stand [mm] Length x Width of the working surface	350 x 356		420 x 644
Rotatable drilling table	360°	360°	360°
Dimensions of the machine	☞ Seite 23	☞ Seite 24	☞ Seite 25
Required space	Keep a work area of at least one metre around the machine free for operation and maintenance.		
Total weight [kg]	158	175	304
Spindle speeds, infinitely variable drive [min^{-1}] Tolerance, deviation + - 8%	infinitely variable 45 - 165 150 - 550 250 - 925 870 - 3200	infinitely variable 45 - 165 150 - 550 250 - 925 870 - 3200	infinitely variable 50 - 160 160 - 530 280 - 920 900 - 3000
Number of stages in the entire speed range	4	4	4
Environmental conditions temperature	5 - 35 °C	5 - 35 °C	5 - 35 °C
Environmental conditions Relative humidity	25-80%	25-80%	25-80%
Operating material gear	Commercial Operating material		
Operating material Toothed rod and drill column	acid-free oil		
Coolant equipment	-	-	Water mixable, nebular arm, high flash point, nitrite content of the emulsion is less than 20 mg/l
	-	-	Filling quantity 6 litres

2.1 Emissions

CAUTION!

The user must wear noise protection and hearing protection.

The A-weighted sound pressure level L_{pA} is 84 to 88 dB.

The A-weighted sound power level L_{WA} is 97 to 100 dB.

INFORMATION

This numerical value was measured on a new machine under the operating conditions specified by the manufacturer. The noise behaviour of the machine might change depending on the age and wear of the machine.

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

INFORMATION

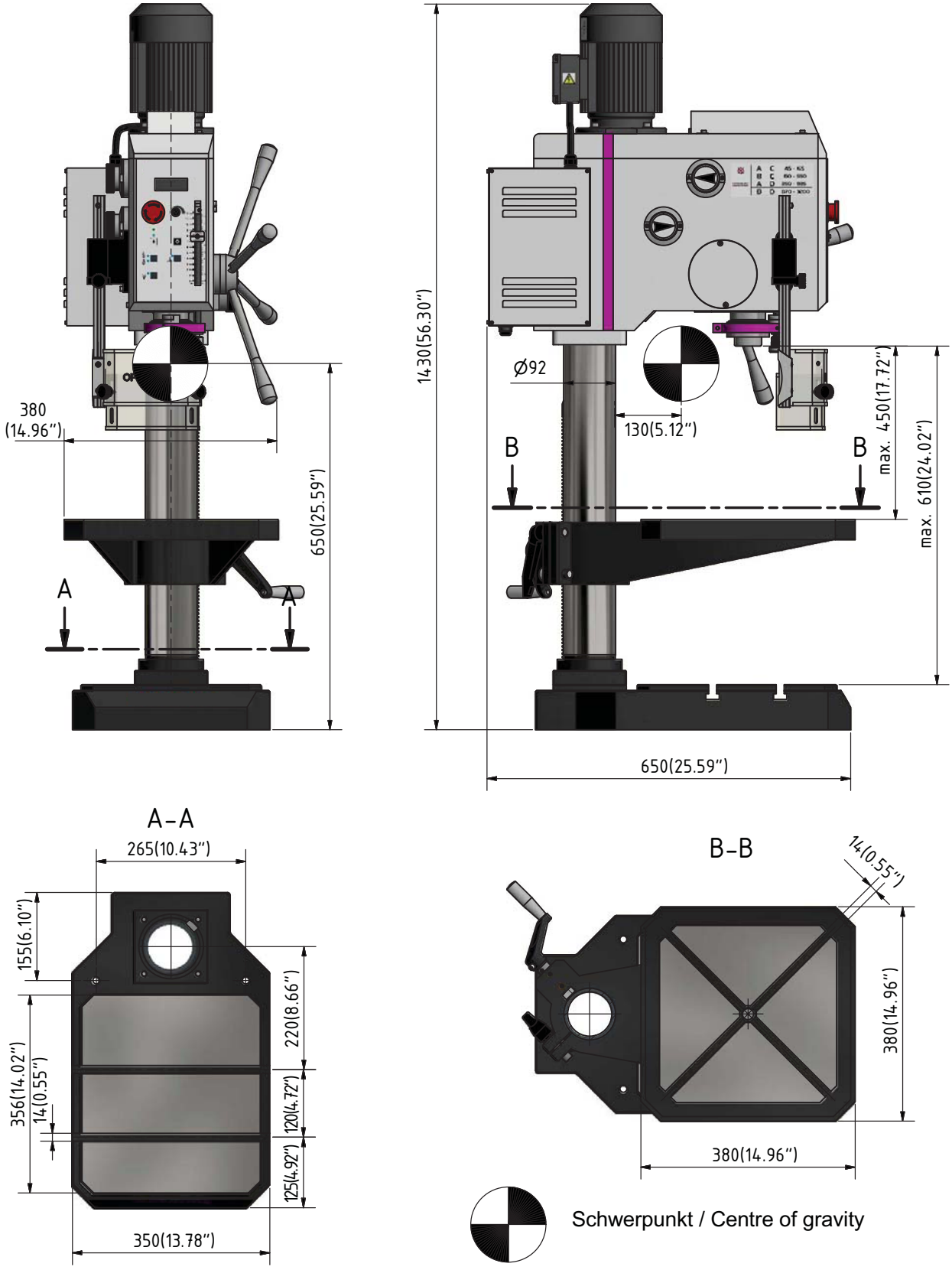
The following factors influence the actual degree of the noise exposure of the operator:

- **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.

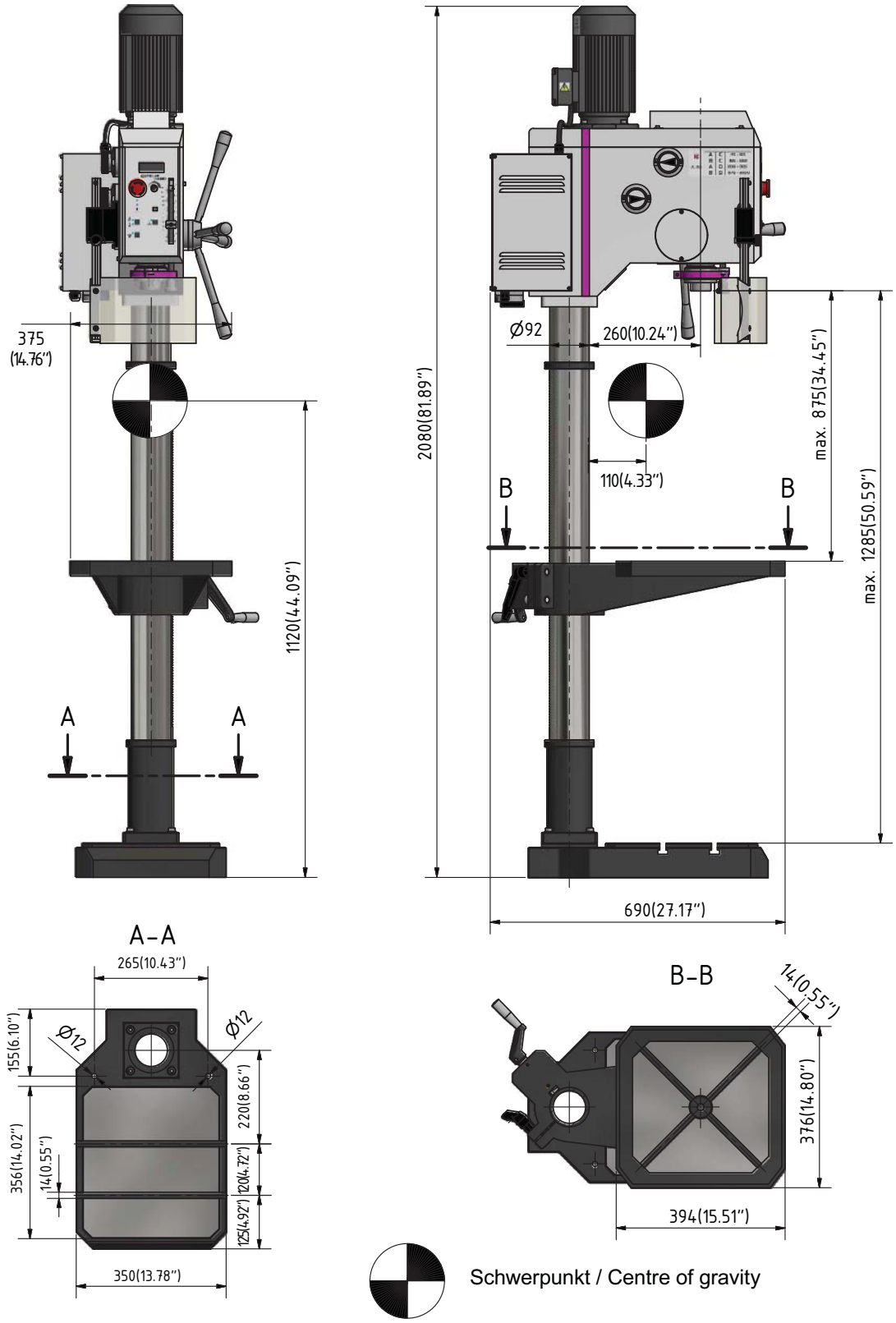
Furthermore, it is possible that the admissible exposure level might be different from country to country due to national regulations.
This information about the noise emission should, however, allow the operator of the machine to more easily evaluate the hazards and risks.

2.2 Dimensions DH26GTV(mm)



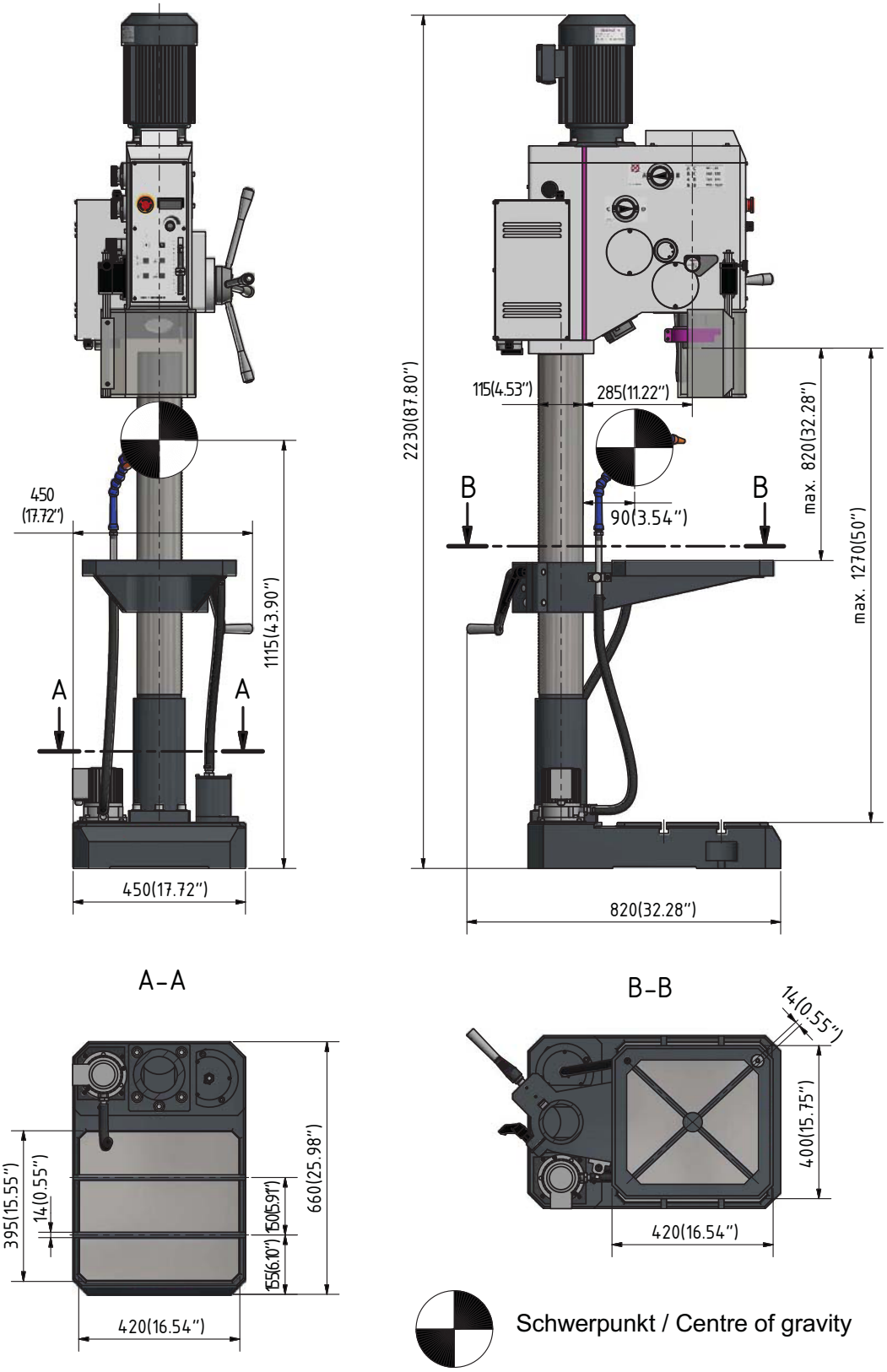
Img.2-1: Dimensions DH26 GTV

2.3 Dimensions DH28GSV(9680134/9680138)(mm)



Img.2-2: Dimensions DH28GSV(9680134/9680138)

2.4 Dimensions DH32GSV(9680135/9680139)(mm)



3 Assembly

3.1 Scope of delivery

When the machine is delivered, please check immediately that it has not been damaged during transport. Compare the scope of delivery with the attached packing list.

3.2 Transport

- Centres of gravity

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

- Prescribed transport 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-bearing capacity and that it is in perfect condition.

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

Fasten the loads carefully.

Never walk under suspended loads!

3.3 Set-up and assembly

3.3.1 Installation site requirements

Organize the working area around the geared drill according to the local safety regulations.

INFORMATION

In order to achieve high levels of functionality and machining accuracy, as well as a long service life of the machine, the set-up location should meet certain criteria.

The following points should be noted:

- The device must only be installed and operated in a dry and well-ventilated place.
- Avoid places close to machines which cause chips or dust.
- The installation site must be vibration-free, i.e. located away from presses, planing machines, etc.

- The ground must be suitable for the geared drill. Pay attention also to the load-bearing capacity and evenness of the floor.
- The substructure must be prepared in such a way as to ensure that, if any lubricant is used, it cannot penetrate the floor.
- Protruding parts - such as the dog, handles, etc. - must be secured, where necessary, by means of on-site measures so that persons are not endangered.
- Provide enough space for set-up and operating personnel and material transport.
- Also bear in mind accessibility for installation and maintenance works.
- Ensure adequate lighting is available (minimum value: 500 Lux, measured at the tool tip). In the event of a lower level of lighting, additional illumination must be provided, e.g. by means of a separate workplace light.

INFORMATION

The mains plug of the geared drill must be freely accessible.

3.3.2 Assembly

WARNING!

Danger of crushing and overturning.

The installation of the geared drill must be performed by at least 2 persons.

INFORMATION

The geared drill is delivered pre-assembled.

3.4 Installation

➜ Check that the geared drill foundation is horizontal with a spirit level.

➜ Check that the foundation has sufficient load-bearing capacity and rigidity. The total weight is: ☞ "Total weight [kg]“ on page 21

➜ Place the geared drill on the provided foundation.

➜ Fix the geared drill base to the substructure through the holes pre-drilled for this purpose.

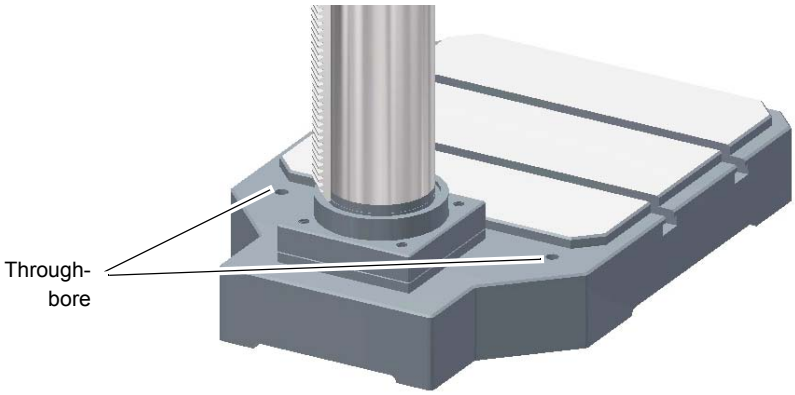
WARNING!

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 foundation must be level. Check that the geared drill foundation is horizontal with a spirit level.

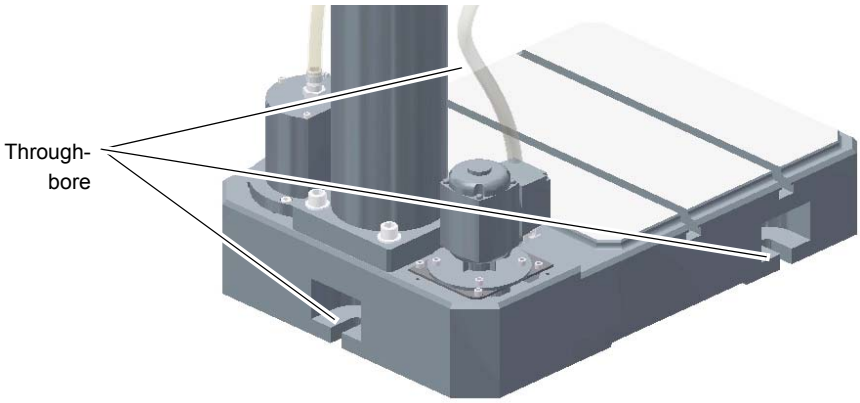
3.5 Fixing

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 ground. We recommend that you use shear connector cartridges or heavy-duty anchors.

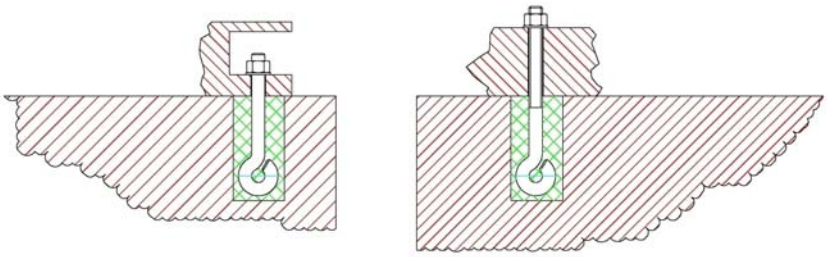
➜ Fix the foot of the geared drill to the ground with the holes pre-drilled for this purpose.



Img. 3-1: Marking of the fixing points of the DH 26 GTV, DH 28 GSV



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



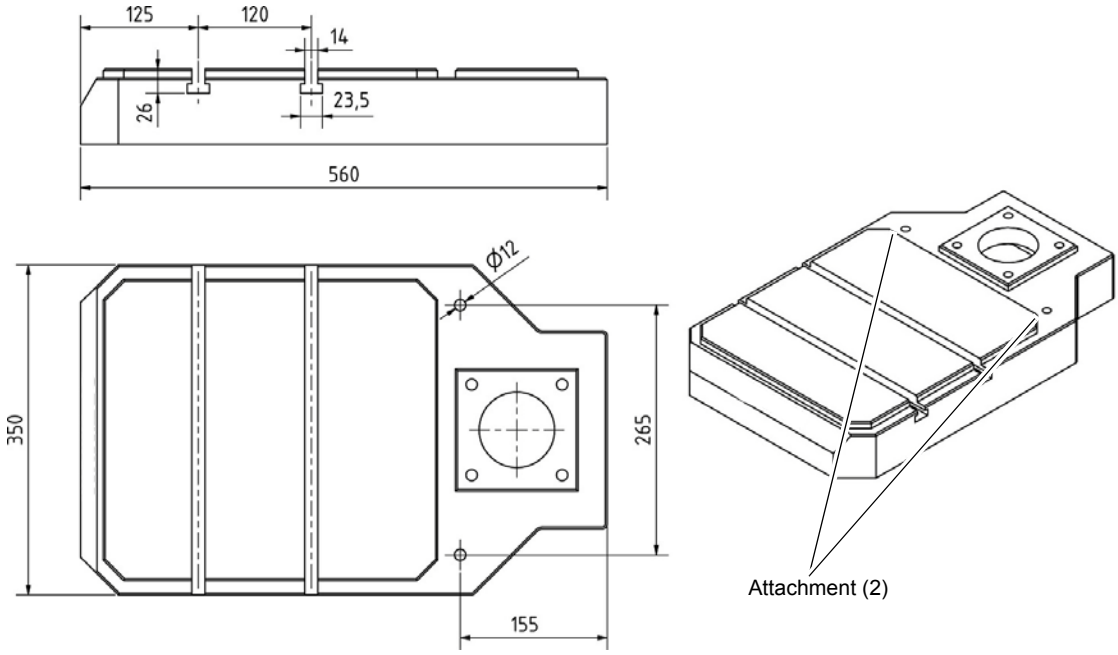
Img. 3-3: Example for the floor fixture DH 28 GSV and DH 32 GSV

ATTENTION!

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

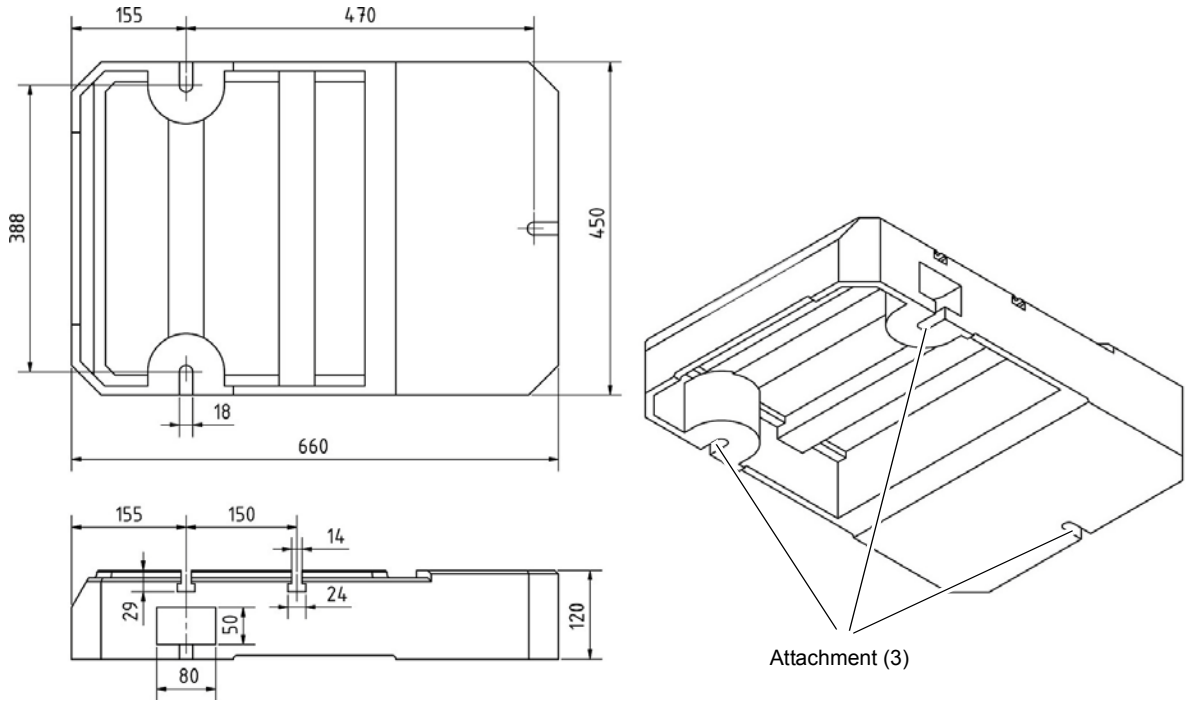
If the fixing screws are too tight in particular in connection with an uneven substructure it may result in a broken stand of the machine.

3.5.1 Assembly drawing DH 26GTV │ DH 28GSV



Img. 3-4: Assembly drawing

3.5.2 Installation diagram DH32GSV(9680135/9680139)



Img. 3-5: Assembly drawing

3.6 First commissioning

ATTENTION!

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

WARNING!

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

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

There is a danger to persons and equipment, if the first commissioning of the geared drill is carried out by inexperienced personnel.

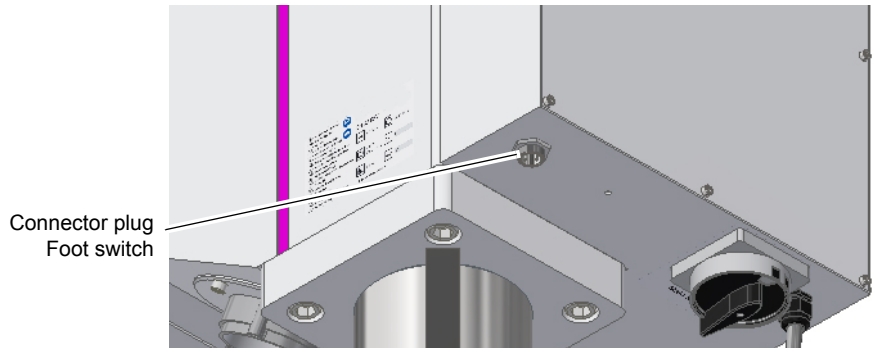
We do not accept any liability for damages caused by incorrectly performed commissioning.

☞ "Qualification of personnel“ on page 12

3.6.1 Connecting the optional foot switch

Floating contact for thread cutting.

The foot switch is used to reverse the direction of rotation for thread cutting.



Img. 3-6: Connector plug foot switch

➜ Connect the foot switch to the connector. Compare the PIN assignment of the connector in the cabinet.

INFORMATION

The connection cable has no polarity. The contact (2 wires) is designed as looped signal.

3.6.2 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.

3.7 Electrical connection

CAUTION!

Must only be worked on by a qualified electrician or person working under the instructions and supervision of a qualified electrician. Arrange the machine's connection cable in such a way that it will not cause a tripping hazard.

Ensure that all 3 phases (L1, L2, L3) and the ground wire are connected correctly.

The neutral conductor (N) of its power supply is not connected.

400V three - phase connection, correct direction of rotation, observe phase sequence!

If necessary, two phase connectors at the three phase current switch or at the connection in the control cabinet must be exchanged. The guarantee will become null and void if the machine is connected incorrectly.

Please check that the type of current, voltage and protection fuse correspond to the values specified. A protective earth ground wire connection must be available.

- Main Fuse 16A.
- Observe the notes on the connection for machines with frequency converters.

3.7.1 Regulated drives in connection with residual current devices

Speed-controlled drives are one of the standard equipment in machine and plant construction and perform various tasks. Compared to a simple motor, the electronic rectifiers or converters require some special features for the necessary safety measures for electrical safety. Depending on the application, the use of a fault current protection device, differential current monitoring or insulation monitoring can make more sense.

For electrical safety, DIN VDE 0100-410 (VDE 0100 part 410): 1997-01 "Erection of heavy current installations up to 1000V" is a basic standard. It describes both, the admissible net forms and the necessary protective measures against dangerous body currents. Based on this standard DIN EN 50178 (VDE 0160): 1998-04 "Equipping of heavy current systems with electronic equipment" specifies the protective measures to be applied to controlled drives in more detail. It calls for: "In the case of electronic equipment, the protection of persons against dangerous body currents must be carried out in such a way that a single fault does not cause any danger."

Regulated drives with residual current devices

The TN-S system is the most common network form for the operation of controlled drives. This is done, among other things, for EMV reasons and to avoid vagabonding currents. In accordance with DIN VDE 0100-410 (VDE 0100-410): 1997-01, fault current protective devices (ELCB) can be used as a protective measure against dangerous body currents. According to DIN VDE 0100-482 (VDE 0100 part 482): 2003-06 "Electrical installations of buildings", cables and wiring systems in fire-endangered plants must be protected by ELCBs with a rated differential current of 300 mA. According to IEC 60755, ELCBs differ in the type of fault currents they can detect. In conjunction with electronic devices currents with DC components may occur.

3.7.2 Protection from Dangerous Shock Currents, use of ELCBs

To achieve increased safety in all installation systems, and in power supply ranges for which the installation provisions stipulate or recommend the ELCB devices.

Measure for “Protection from Dangerous Shock Currents”, as regulated in DIN VDE 0100 Part 410. All measures are to be mentioned:

- Protection from indirect contact – as protection against fault by shutting down in the event of inadmissibly high contact voltage by short circuit shock on the operating resource.
- Protection from direct contact – as additional protection by shutting down in the event of contact with a live conductor. Dangerous shock currents are shut down within the shortest possible time, if the rated fault current of the circuit breaker is 30 mA, for a personal protection system 10 mA.
- Fire prevention – Prevention of the origination of electrically-ignited fires if the rated fault current of the circuit breaker is 300 mA. Operating premises at risk of fire to VdS 2033: 2002-02 300 mA.

3.7.3 Current in the protective earth conductor - Leakage current

With EMC filters in frequency converters, the leakage current is always greater than 3.5 mA due to physics. Some types of frequency converters also achieve a leakage current of up to 300mA.

Therefore, a fixed earth connection is required and the minimum cross section of the protective earthing conductor must conform to local safety regulations for devices with high leakage current. This is achieved by providing a permanent fixed earthing connection with two independent conductors, each having a cross section the same as the power supply cord or greater.

Preferably, machines with frequency converters are therefore to be permanently connected to a terminal box, otherwise an additional fixed earth connection is required, which is not routed over the plug, and must correspond to at least the cross-section of the cable in the plug.

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

To avoid an operating fault, you need an AC/DC-sensitive ELCB. Be absolutely sure which leakage current security is necessary for dangerous body currents, as regulated in DIN VDE 0100 part 410, at your mains connection.

3.7.4 When the ELCB triggers

- Pulse current - sensitive ELCB type A
  ELCB type A independent of rated voltage, for triggering when changing fault currents and pulsing DC fault currents.

- AC/DC - sensitive ELCB type B
  ELCBs of series type B also accept the detection of smooth AC fault currents as well as the detection of fault current shapes of type A; they are therefore suitable for all the circuits mentioned. ELCBs of this series therefore detect all types of fault current according to the triggering characteristic B, i.e. both smooth DC fault currents and also all AC fault currents of all frequencies and mixed frequencies up to 1 MHz are detected and switched off reliably in the event of a fault.

- Alternating current - sensitive ELCBs of type AC (only alternating current) are unsuitable for frequency converters. Alternating current - sensitive ELCBs of type AC are not customarily used and are no longer permitted in Germany.

Type B must be used with 3-phase converters.

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

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.
- Follow the operating instructions.
- All safety devices are installed and activated.

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

Notify the person responsible immediately of any modification.

☞ "Safety during operation“ on page 18

A frictionally engaged connection keeps and centres the drill chuck or the drill 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 52

INFORMATION

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

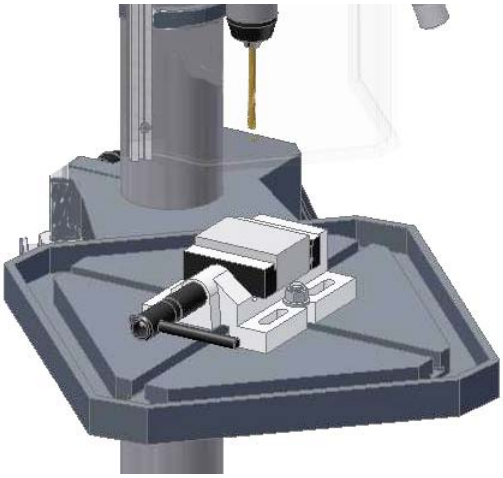
A cooling or lubricating agent should be used when drilling.

For stainless materials (e.g. VA – or NIRO steel sheets) do not centre, as this will result in the material compacting and the drill bit rapidly becoming blunt.

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 inflexibly and stably (vice, screw clamp).



Img.4-1: seats for slot nuts

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

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

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

4.3 During work

The spindle sleeve feed is done via the star grip. 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 grip.

Do not release the star grip 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 spindlesleeve.

INFORMATION

The smaller the bit the more easily it may break.

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

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

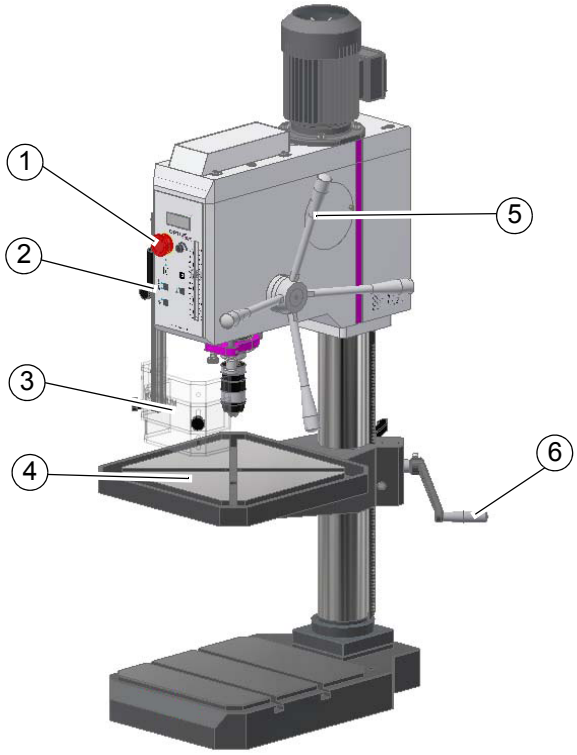
Use a water-soluble and non-pollutant emulsion as a cooling agent.This can be acquired from authorised distributors.

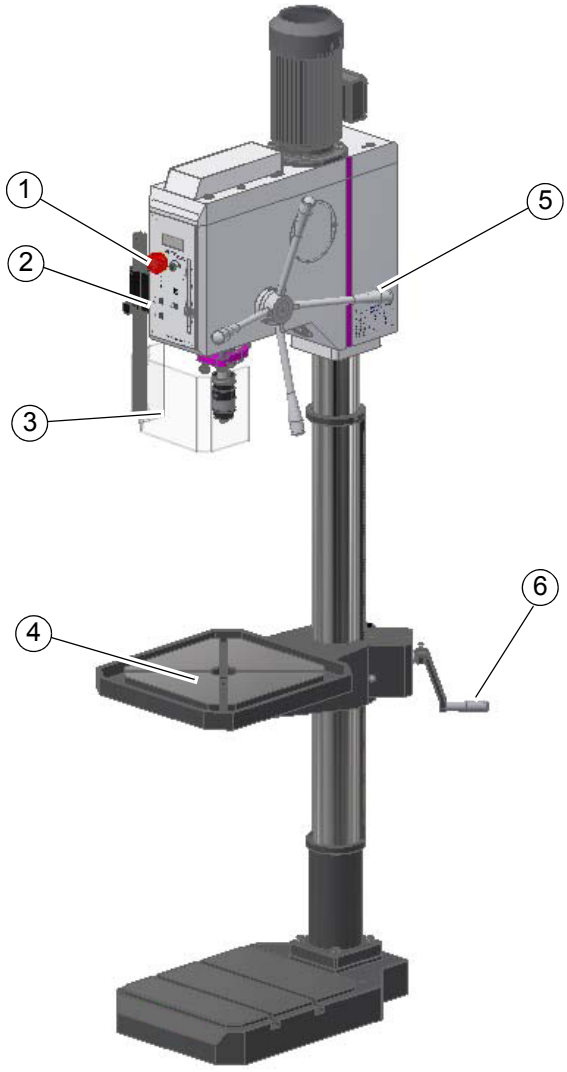
Make sure that the cooling agent is being collected.

Respect the environment when disposing of lubricants and coolants.

Follow the manufacturer’s disposal instructions.

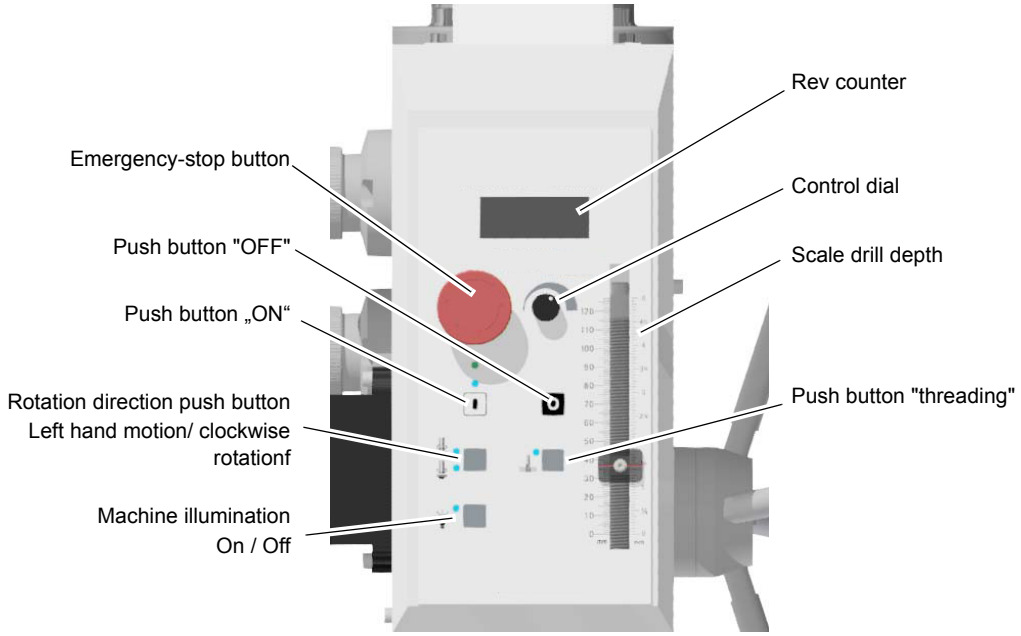
4.5 Control and indicating elements DH26GTV | DH28GSV(9680134/9680138)





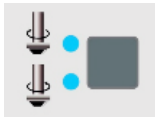
Pos.	Designation	Item	Designation
1	EMERGENCY STOP push button	2	Control panel
3	Drill chuck guard	4	Drilling table
5	Lever for spindle sleeve feed	6	Table height adjustment

4.6 Control panel DH26GTV and DH28GSV(9680134/9680138)



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

Rotational direction



The direction of rotation can be selected by using the push button. The LED indicates the selected direction of rotation.

Push button ON

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

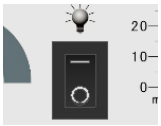
Push button OFF

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

Control dial

Using the control dial, the speed is adjusted infinitely variable.

Machine illumination ON / OFF



Switches the backlight on or off.

Main switch

Interrupts or connects the power supply.

4.6.1 Drill depth stop

Use the drilling depth stop when drilling several holes of the same depth.

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

Img. 4-3: Drill depth stop

4.7 Switching the machine on

INFORMATION

The machine cannot be started, if the drill chuck guard is not closed.

➜ Switch on the master switch.

➜ Close drill chuck guard

☞ "Control and indicating elements DH26GTV | DH28GSV(9680134/9680138)“ on page 36

➜ Select the gear stage ☞ "Speed table - DH26GTV | DH28GSV(9680134/9680138)“ on page 39

➜ Actuate the push button "ON".

The spindle begins to rotate in a clockwise direction.

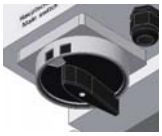
If required, the direction of rotation can now changed to left-hand motion.

4.8 Switching off the machine

CAUTION!

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

➜ Actuate the push button "OFF".



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

4.8.1 Gear selector switch - DH26GTV | DH28GSV(9680134/9680138)

Th[illegible] Speed table

Img.4-4: Gear selector switch

4.8.2 Speed table - DH26GTV | DH28GSV(9680134/9680138)

A	C	45 - 165
B	C	150 - 550
A	D	250 - 925
B	D	870 - 3200

Img.4-5: Speed table DH26GTV | DH28GSV(9680134/9680138)

INFORMATION

Observe the speed table on the drilling head when selecting the range of speed.

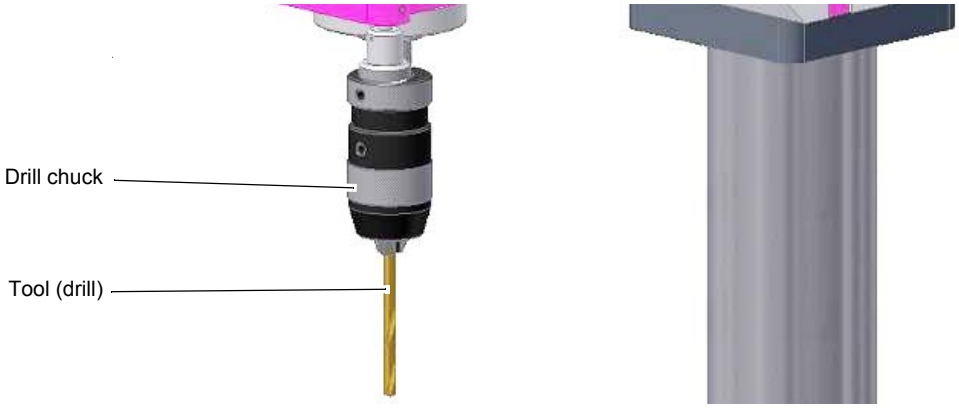
ATTENTION!

Wait until the drilling spindle has come to a complete halt before changing the speed with the gear selector switch.

A change of the gear ratio during operation can lead to the destruction of the gearbox.

4.9 Disassembly, assembly of drill chucks and drill bits DH26GTV I DH28GSV(9680134/9680138)

4.9.1 Use of the drill chuck



Img.4-6: Drill chuck

CAUTION!

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

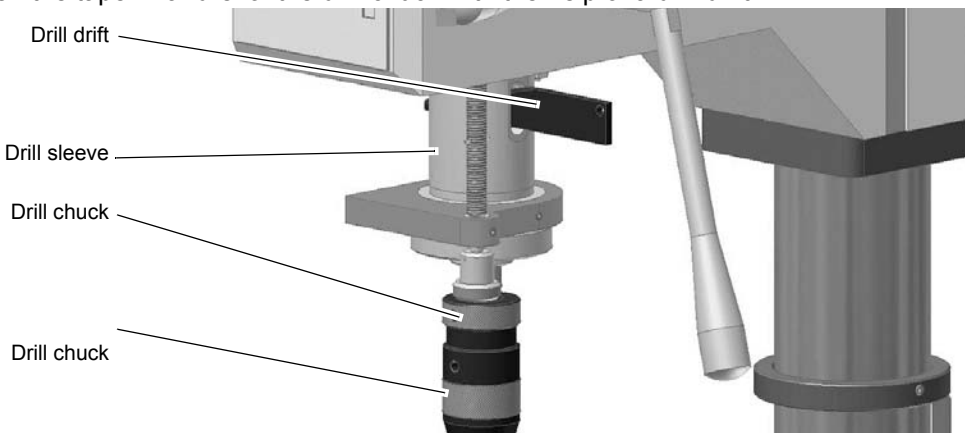
4.9.2 Disassembly with drill drift

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.4-7: Disassembly with drill drift

4.9.3 Disassembly with integrated drill drift

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

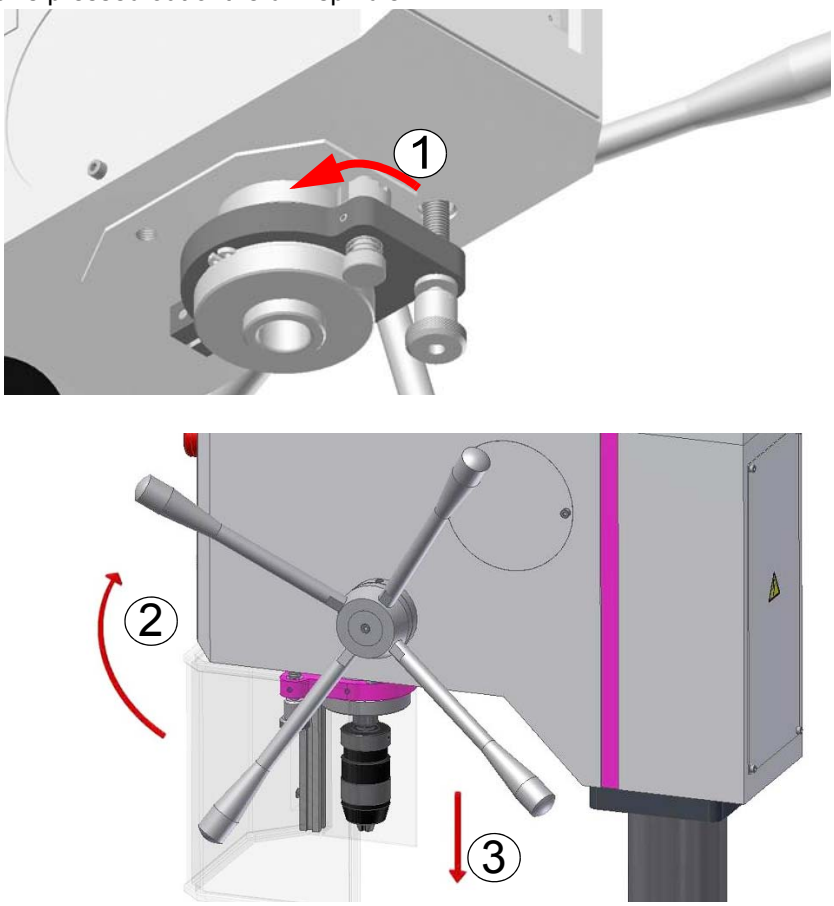
ATTENTION!

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.

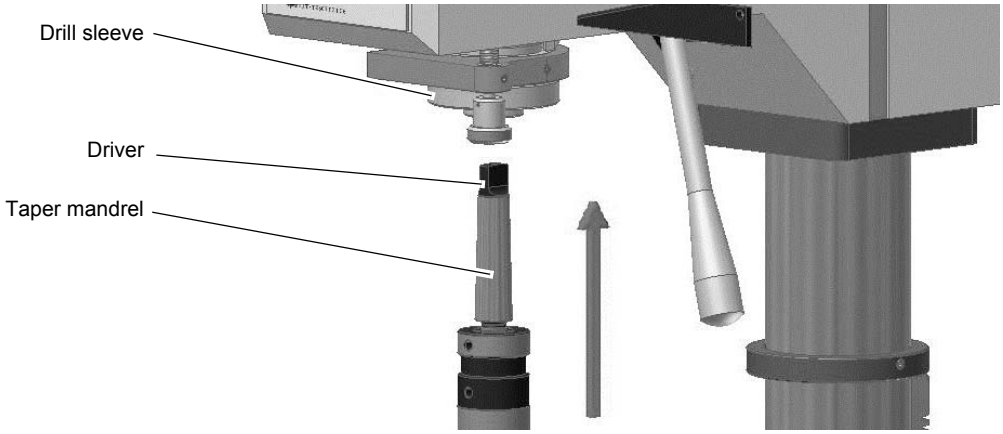


Img.4-8: Disassembly with integrated drill drift

4.9.4 Fitting the drill chuck

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

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



Img.4-9: Taper mandrel

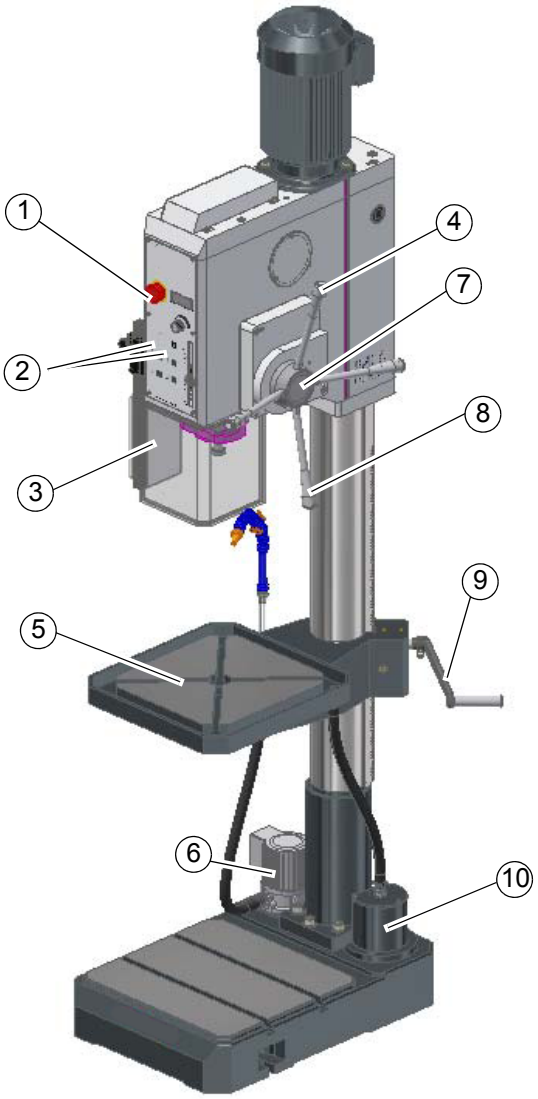
➜ Check or clean the conical seat in the drill spindle and on the taper mandrel of the tool or of drill chuck.

➜ Press the taper mandrel into the drill spindle.

4.10 Foot switch - Rotation reversal

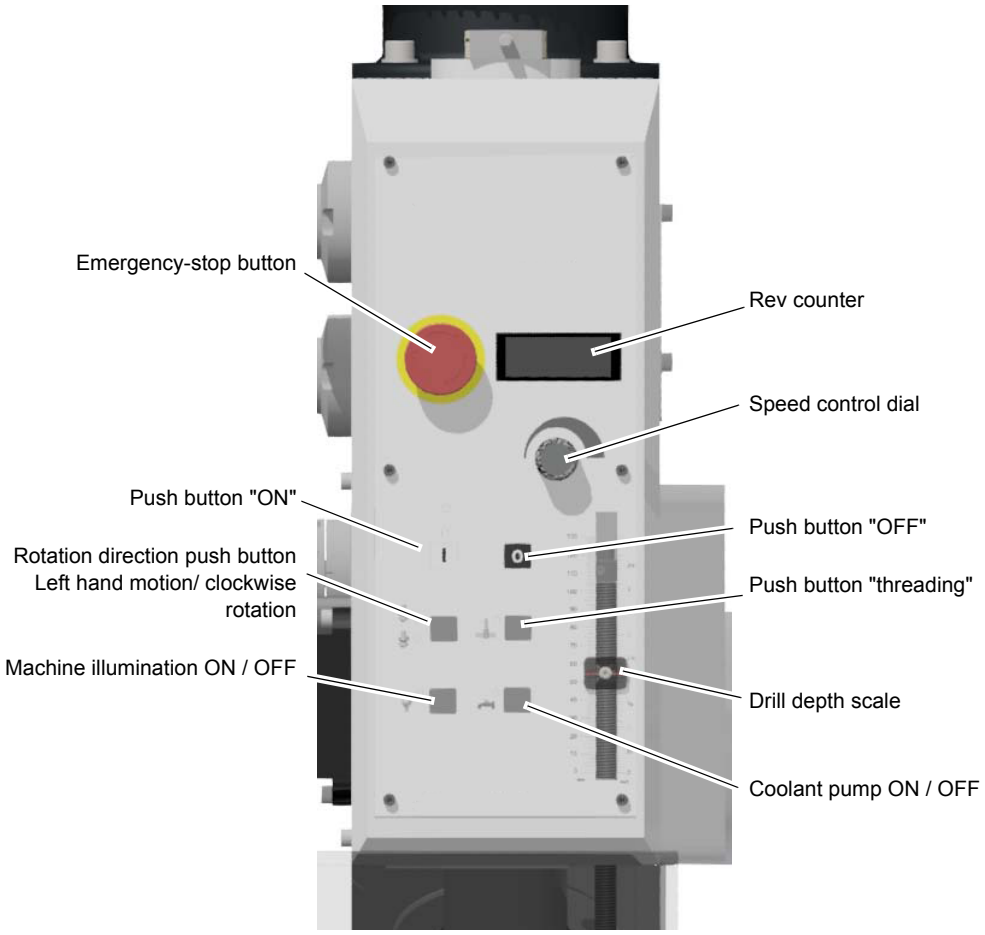
➜ Use the optional foot switch for a reversal of direction for thread cutting.
☞ "Connecting the optional foot switch“ on page 30

4.11 Control and indicating elements DH32GSV(9680135/9680139)



Pos.	Designation	Item	Designation
1	Emergency-stop button	2	Push button ON / OFF
3	Drill chuck guard	4	Push button in lever for spindle sleeve feed
5	Drilling table	6	Coolant pump
7	Magnetic coupling for feed	8	Lever for spindle sleeve feed
9	Table height adjustment	10	Chip filter
11	Infinitely variable speed adjustment		

4.12 Control panel DH 32 GSV



Img.4-10: Operating elements on the control panel - version 1.1

Push button "threading"

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

Rotation direction push button

With start-up the spindle starts the rotation in a clockwise direction. A changing to "left-hand motion" (counter-clockwise) is only possible with rotating spindle.

☞ "Speed table - DH 32 GSV“ on page 47

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.

Speed control dial

Infinitely variable speed adjustment.

Operation control light

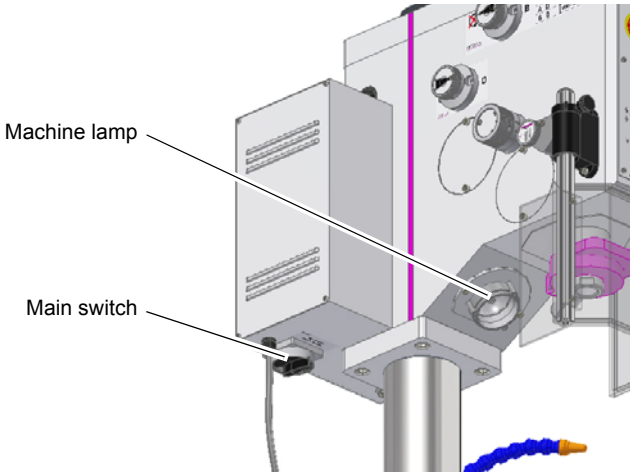
The control lamp for operation on operating panel must flash up.

Coolant pump ON / OFF

Switches the backlight on or off.

Machine illumination ON / OFF

Switches the backlight on or off.



Img.4-11: Machine lamp

Main switch

Interrupts or connects the power supply.

4.12.1 Drill depth stop - DH 32 GSV

Use the drilling depth stop when drilling several holes of the same depth.

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

Img.4-12: Drill depth stop

4.13 Switching on the machine - DH 32 GSV

INFORMATION

The machine cannot be started, if the drill chuck guard is not closed.

➜ Switch on the master switch.

➜ Close drill chuck guard

➜ Select the gear stage ☞ "Speed table - DH 32 GSV“ on page 47.

➜ Actuate the push button "ON".
The spindle begins to rotate in a clockwise direction.
If required, the direction of rotation can now changed to left-hand motion.

4.14 Switching off the machine - DH 32 GSV

CAUTION!

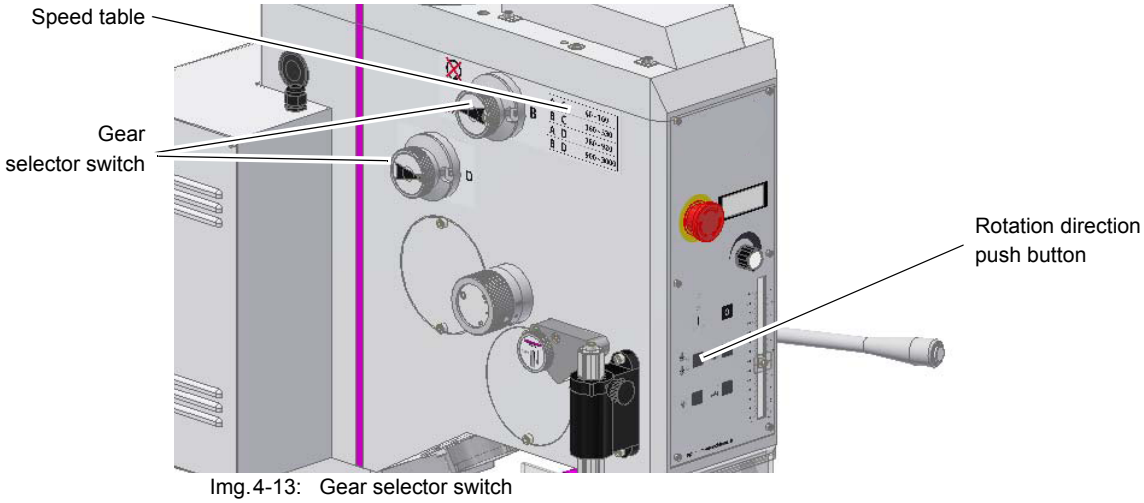
Only press the emergency-stop button in a genuine emergency. You should not use the emergency-stop button to stop the machine during normal operation.

➜ Actuate the push button "OFF".

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

4.14.1 Gear selector switch - DH 32 GSV

The speed is selected by means of the gear selector switches. You obtain a total of 4 speed ranges in connection with the infinitely speed setting.



Img.4-13: Gear selector switch

4.14.2 Speed table - DH 32 GSV

A C	40 - 160
B C	160 - 530
A D	280 - 920
B D	900 - 3000

Img.4-14: Speed table DH 32 GSV

INFORMATION

Observe the speed table on the drilling head when selecting the range of speed.

ATTENTION!

Wait until the drilling spindle has come to a complete halt before changing the speed with the gear selector switch.

A change of the gear ratio during operation can lead to the destruction of the gearbox.

4.15 Spindle sleeve feed

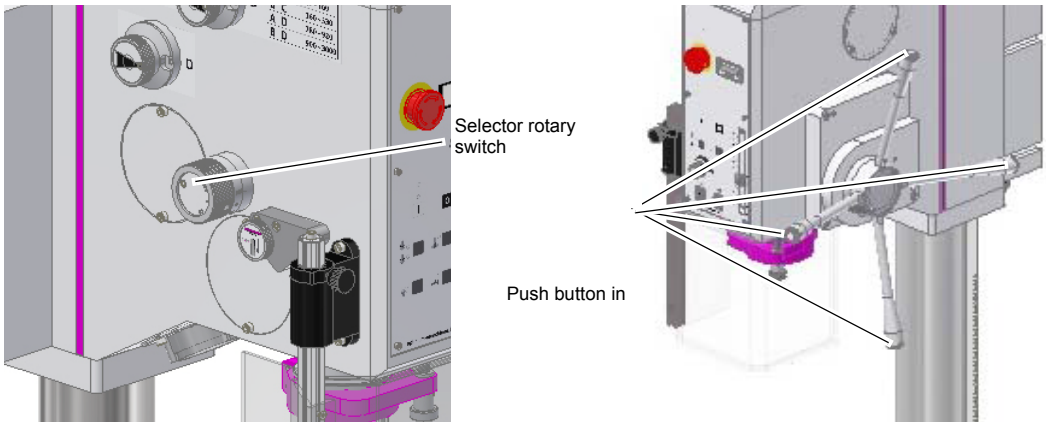
The spindle sleeve feed is performed manually by actuating the spindle sleeve lever or automatically.

4.15.1 Manual spindle sleeve feed

Move the sleeve downward by means of the spindle sleeve lever. The sleeve is returned to its initial position by means of the spring force.

4.15.2 Automatic spindle sleeve feed

The feed is activated by pressing the push buttons in the spindle sleeve lever. The feed is performed by an electromagnetic coupling. The feed is switched off by the drilling depth stop or by pressing the push button in the spindle sleeve lever again.



Img.4-15: Automatic spindle sleeve feed

➜ Select the speed of the spindle sleeve feed actuating the selector rotary switch:

- 0.10 mm / Spindle revolution (up to Ø 30 mm)
- 0.05 mm / Spindle revolution (up to Ø 36 mm)

INFORMATION

The higher the pre-set speed the more rapid is the feed speed on the sleeve. Adjust the correct speed depending on the used material and on the drill diameter.

➜ Adjust the drill depth stop ☞ "Drill depth stop - DH 32 GSV“ on page 45.

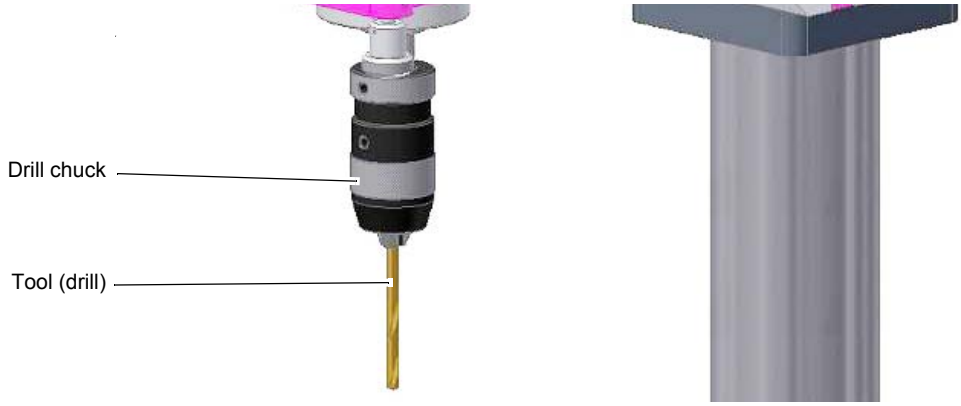
➜ Press the push button in the spindle sleeve lever. The electromagnetic spindle sleeve feed is activated.

❍ As soon as the preset drilling depth in the drilling depth stop is attained the micro switch de-activatesthe drill feed. The drilling sleeve returns to the top position by spring force.

4.16 Disassembly, assembly of drill chucks and drill bits

4.16.1 Use of the drill chuck

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

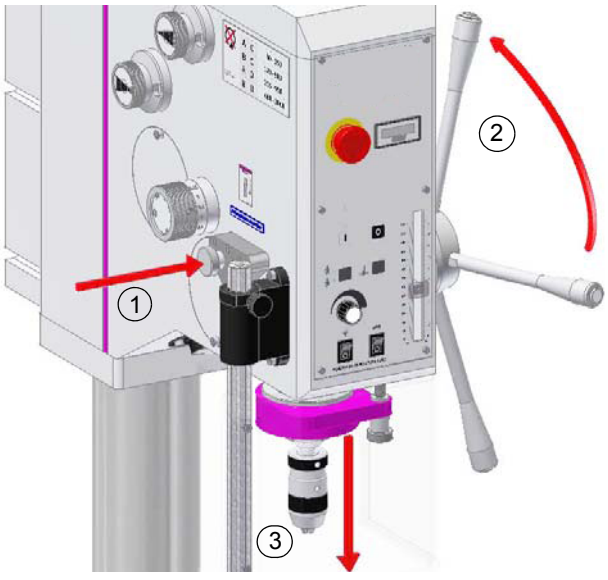


Img.4-16:Drill chuck

CAUTION!

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

4.16.2 Disassembly with integrated drill drift



Img.4-17: Removal

ATTENTION!

The tool and/or the drill chuck will fall down. Hold the tool ③ or the drill chuck while drifting it out.

ATTENTION!

Do not try to expel the tool when it is in the intermediate position. This might cause damages of the integrated drill drift or of the feed handle.

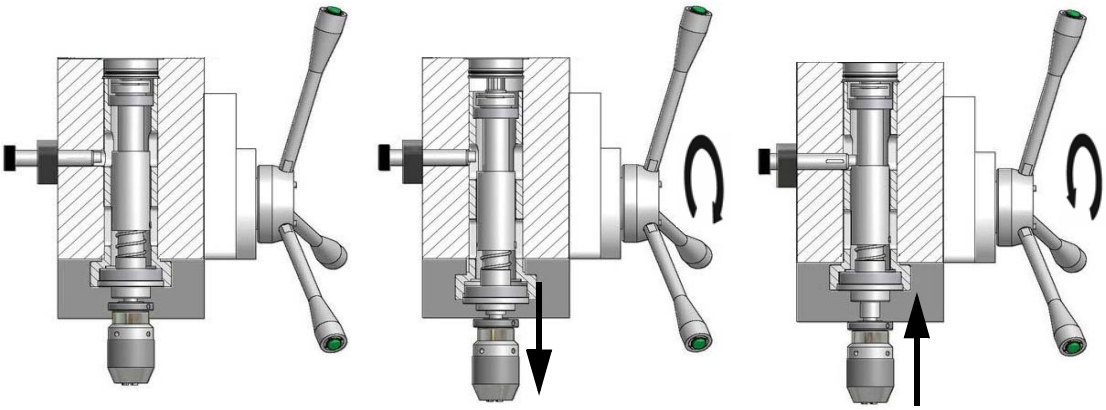
With the below described procedure the taper mandrel is being loosened from the drilling spindle.

➜ Move the sleeve as far down until the locking pin ① can be moved (Img. 4-10 (b) intermediate position).

➜ Move the locking pin ① so far, until the locking pin engages completely (Img. 4-10 (c) expulsion position).

➜ Press the sleeve lever ② with a fast and powerful movement upwards.

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



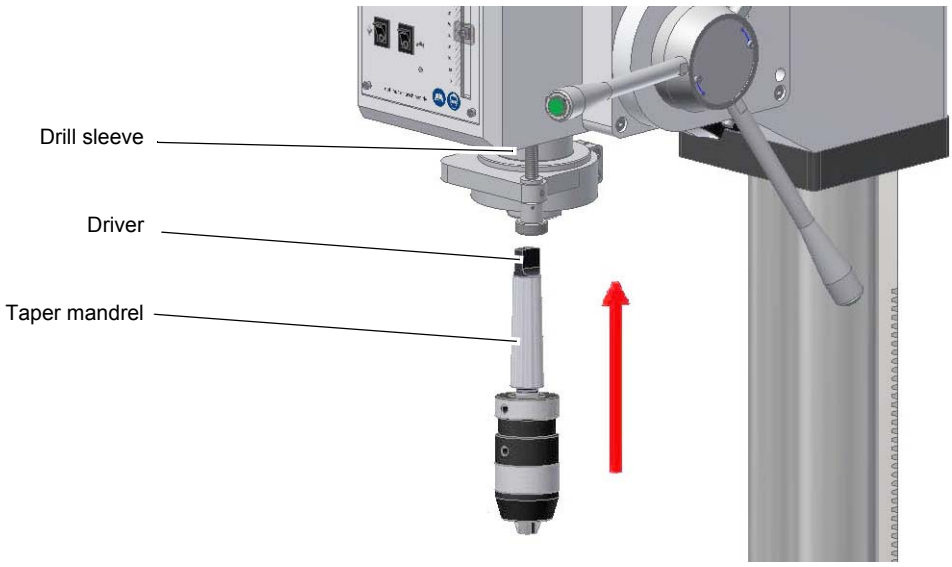
a) home position b) intermediate position c) expulsion position

Img. 4-18: Functional diagram of the drill drift (sectional view)

4.16.3 Fitting the drill chuck

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

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

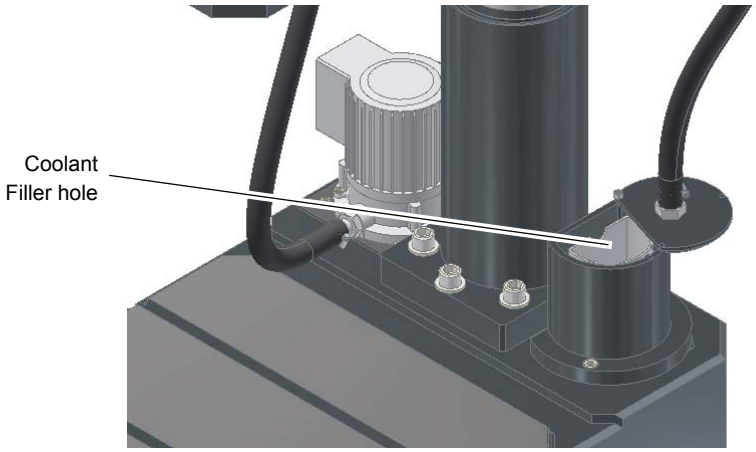


Img.4-19: Taper mandrel

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

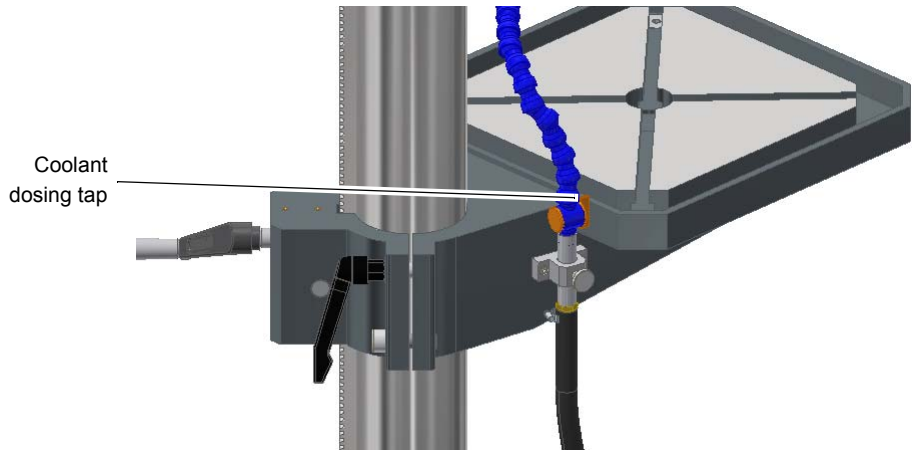
➜ Press the taper mandrel into the drill spindle.

4.17 Coolant equipment



Img.4-20: Filler hole

Filling quantity ☞ "Coolant equipment“ on page 21



Img.4-21: Coolant shut-off tap and doser

➜ Adjust the flow using the shut-off and dosing tap.

ATTENTION!

Destruction of the pump due dry running.

The pump is lubricated by the cooling agent. Do not operate the pump without coolant. Clean the collection container of the chip filter in regular intervals.

WARNING!

Ejection and overflowing of coolants and lubricants. Make sure you do not get the cooling lubricants on the floor. Spilled on the floor cooling agents must be removed immediately.

Regularly clean the coolant tank.

CAUTION!

The cooling lubricant needs to be checked at least weekly, including during downtimes, with regard to its concentration, ph-value, bacteria and fungal decay.

☞ **"Cooling lubricants and tanks“ on page 62**

6.4.1 “Inspection plan for water-mixed cooling lubricants“ on page 63

Please note the VKIS - VSI - IGM substance list for coolant lubricants as per DIN 51385 for metal working.

4.18 Footswitch - Rotation reversal

Use the optional foot switch for a reversal of direction for thread cutting.

☞ "Connecting the optional foot switch“ on page 30

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

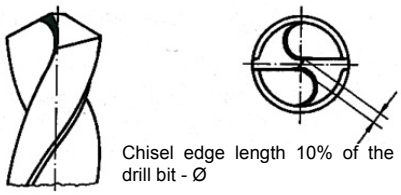
Set a speed on your drilling machine which is less than the determined speed.

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 and
- Repair.

ATTENTION!

Properly performed regular maintenance is an essential prerequisite for

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

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

ENVIRONMENTAL PROTECTION

During work on the spindle head, please make sure that

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

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

Collect leakages

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

Disposal

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

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

6.1 Safety

WARNING!

The consequences of incorrect maintenance and repair work may include:

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

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

6.1.1 Preparation

WARNING!

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

Attach a warning sign which secures against unauthorized switching on.

6.1.2 Restarting

Before restarting, run a safety check.

☞ "Safety check“ on page 15

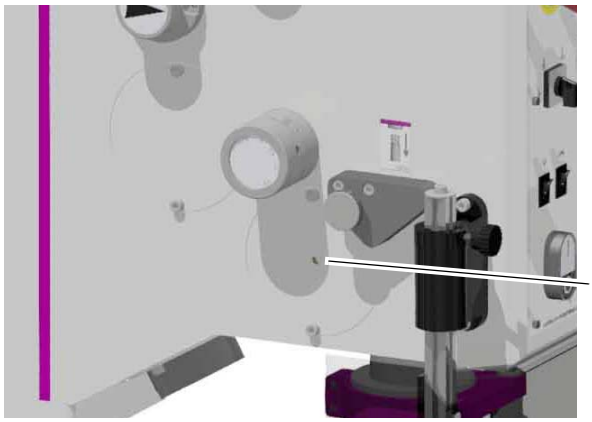
WARNING!

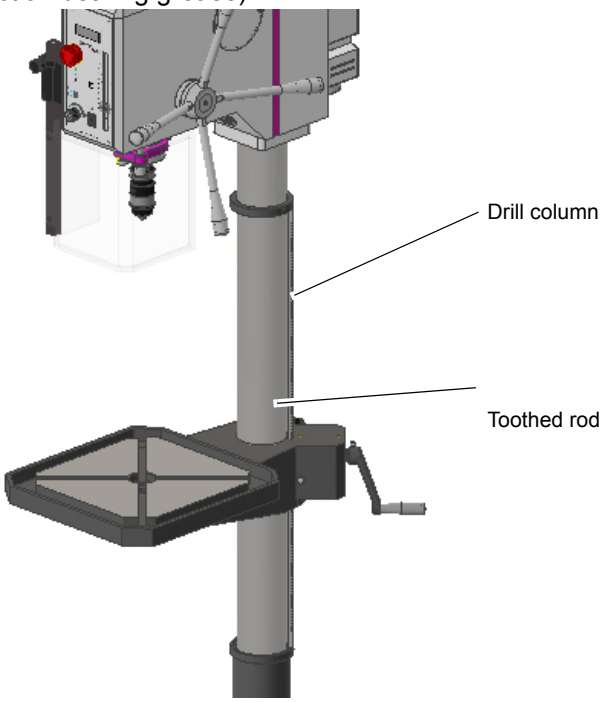
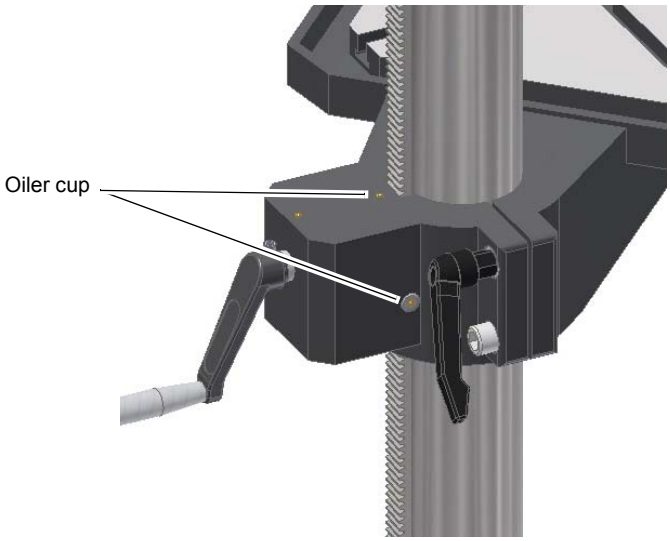
Before starting the machine you must be sure that

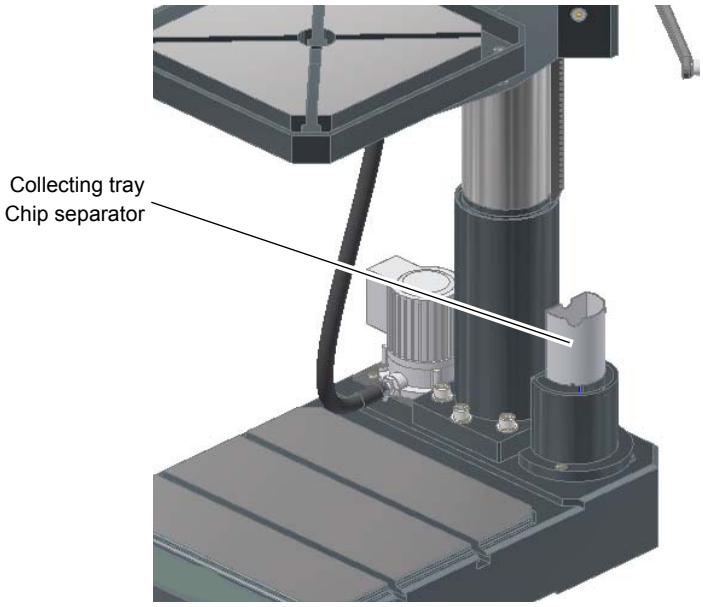
- ❍ **no dangers generated for persons,**
- ❍ **the machine is not damaged.**

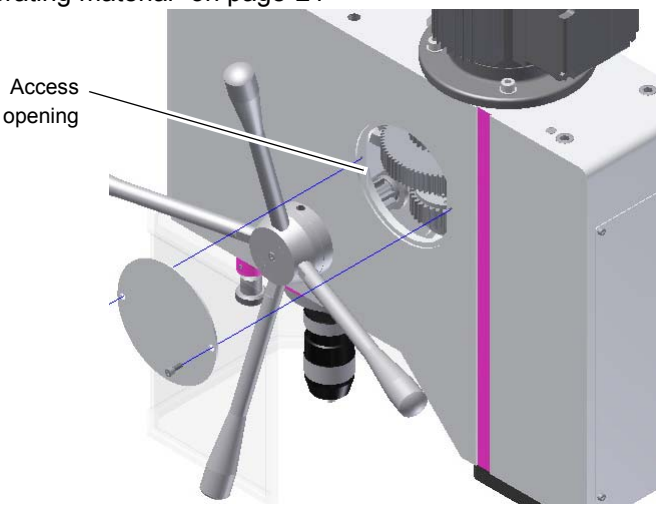
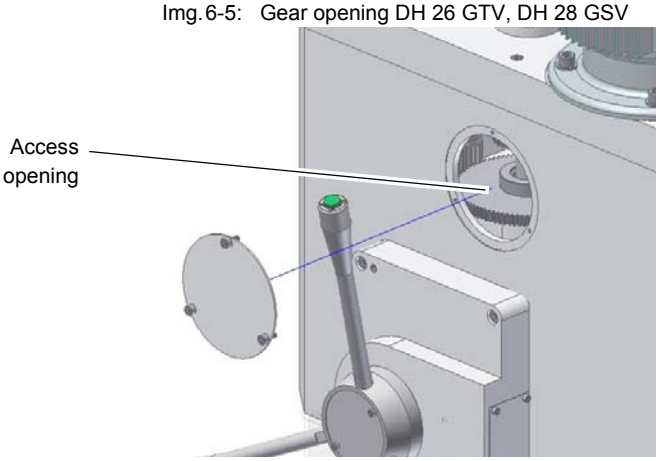
6.2 Inspection and maintenance

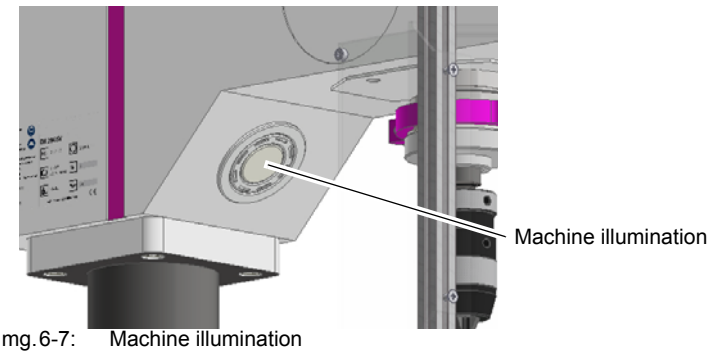
The type and level of wear depends to a large extent on the individual usage and operating conditions. Any indicated intervals therefore are only valid for the corresponding approved conditions.

Interval	Where?	What?	How?
Start of shift After each maintenance or repair work	**Geared drill**	Examination for outside damages. ☞ "Safety check“ on page 15	
Weekly	**Oiler DH32GSV(9680135/9680139)**	**Oiling**	➜ Oil the plain bearing points of the shaft with the oiler cup.  Img.6-1: Oiler cup drill head

Interval	Where?	What?	How?
Every month	**Drill column and toothed rack**	**Oiling**	➜ Lubricate the drill column regularly with commercial oil, machine oil, engine oil. ➜ Lubricate the toothed rod regularly with commercial grease (e.g. friction bearing grease).  Img.6-2: Drill column
Every month	**Oiler cup**	**Oiling**	➜ Lubricate all oiler cups with machine oil, do not use grease guns or the like. ☞ "Operating material“ on page 21  Img.6-3: Oiler cup

Interval	Where?	What?	How?
Every month	**Chip separator DH 32 GS I D H32 GSV**	**Cleaning**	The chip separator prevents the reflux of chips in the coolant tank. Clean the chip separator regularly. Impurities in the cooling lubricant cause blockages and reducing the life of the cooling lubricant pump. Replace the cooling agent regularly, depending on usage. ➜ To do so, unscrew the chip container and remove the chips or other soiling. ➜ Empty and clean the chip separator.  Img.6-4: Chip separator DH 32 GSV

Interval	Where?	What?	How?
according to demand.	**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 21  Img.6-5: Gear opening DH 26 GTV, DH 28 GSV  Img. 6-6: Gear opening DH32GS I DH32GSV(9680135/9680139)
at least annually	**Cooling lubricant system DH32GS I DH32GSV(9680135/9680139)**	**Replacing Cleaning Disinfect**	☞ "Cooling lubricants and tanks“ on page 62 ☞ "Inspection plan for water-mixed cooling lubricants“ on page 63

Interval	Where?	What?	How?
based on operator's empirical values in accordance with German DGUV (BGV A3)	**Electronics**	**Electrical inspection**	☞ "Obligations of the operating company“ on page 12 ☞ "Electronics“ on page 19
according to demand.	**Illumination**	**Replacing the light bulb**	If the light bulb is defective: ➜ Unplug the power cord. ➜ 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.6-7: Machine illumination
according to demand.	**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 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 cool-ing 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.

Limit values

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 bacte-
  ria 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 col-**
  lected.
- **liquids and oils should not be spilled on the ground.**

Clean up any spilled liquid or oils immediately using proper oil-absorption methods and dis-pose 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, riv-ers or channels. Used oils must be delivered to a collection centre. Consult your supervisor if you do not know where the collection centre is.

6.3.1 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:

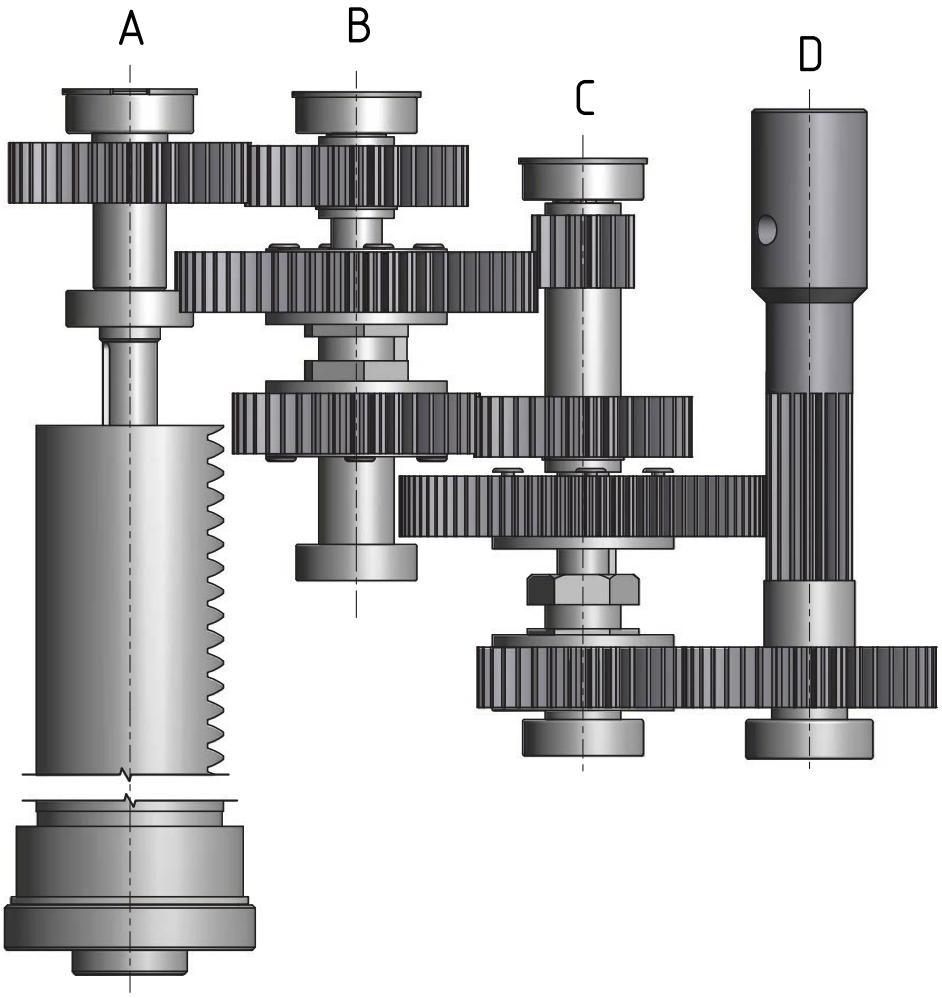
7 Ersatzteile - Spare parts - DH26GTV | DH28GSV(9680134/9680138)

7.1 Elektrische Ersatzteile - Electrical spare parts

7.2 Schaltplan - Wiring diagram

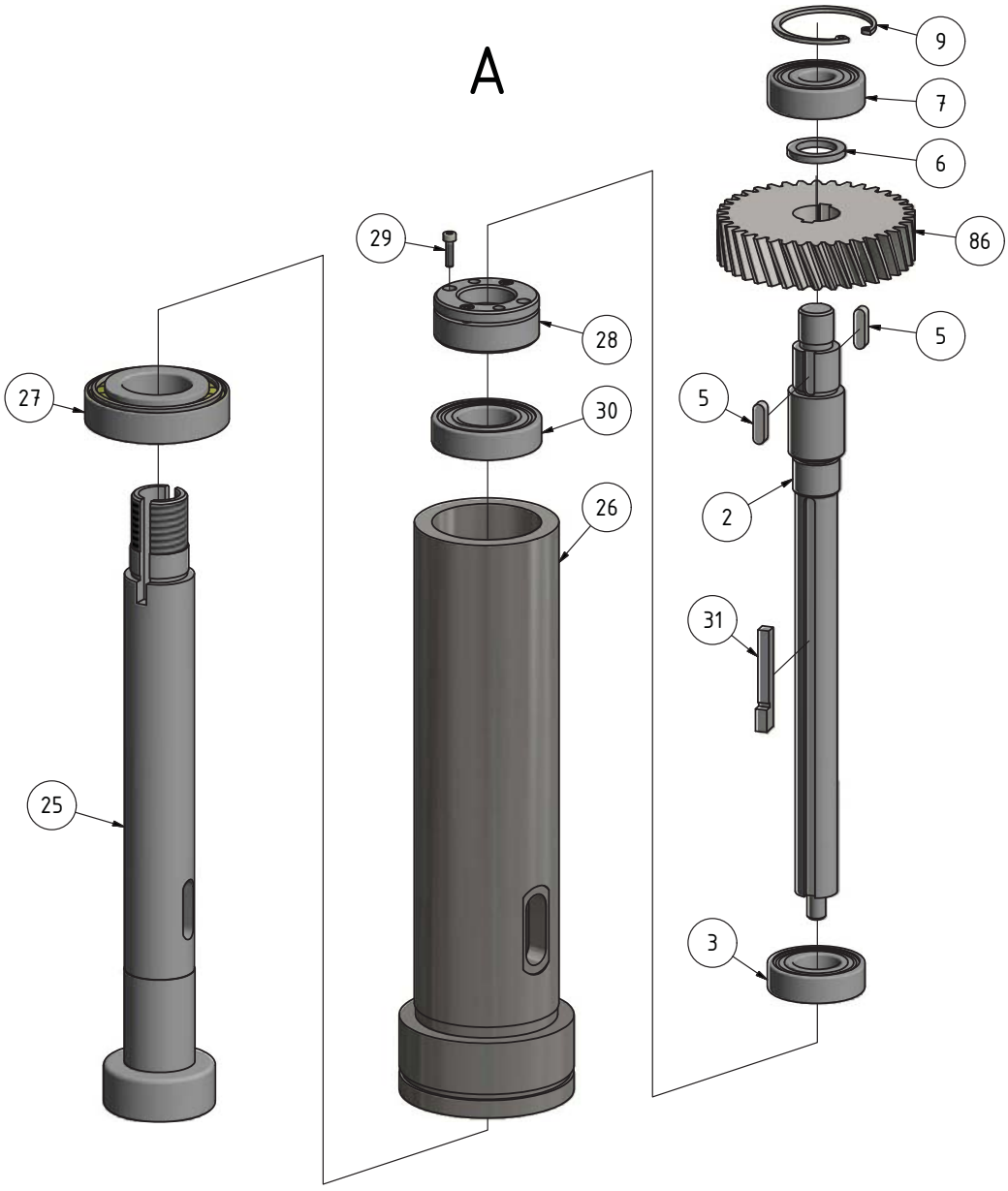
Der aktuelle Schaltplan mit Ersatzteilliste befindet sich im Schaltschrank der Maschine.
The current circuit diagram and spare parts list is located in the control cabinet of the machine.

7.3 Bohrkopf- Drilling head



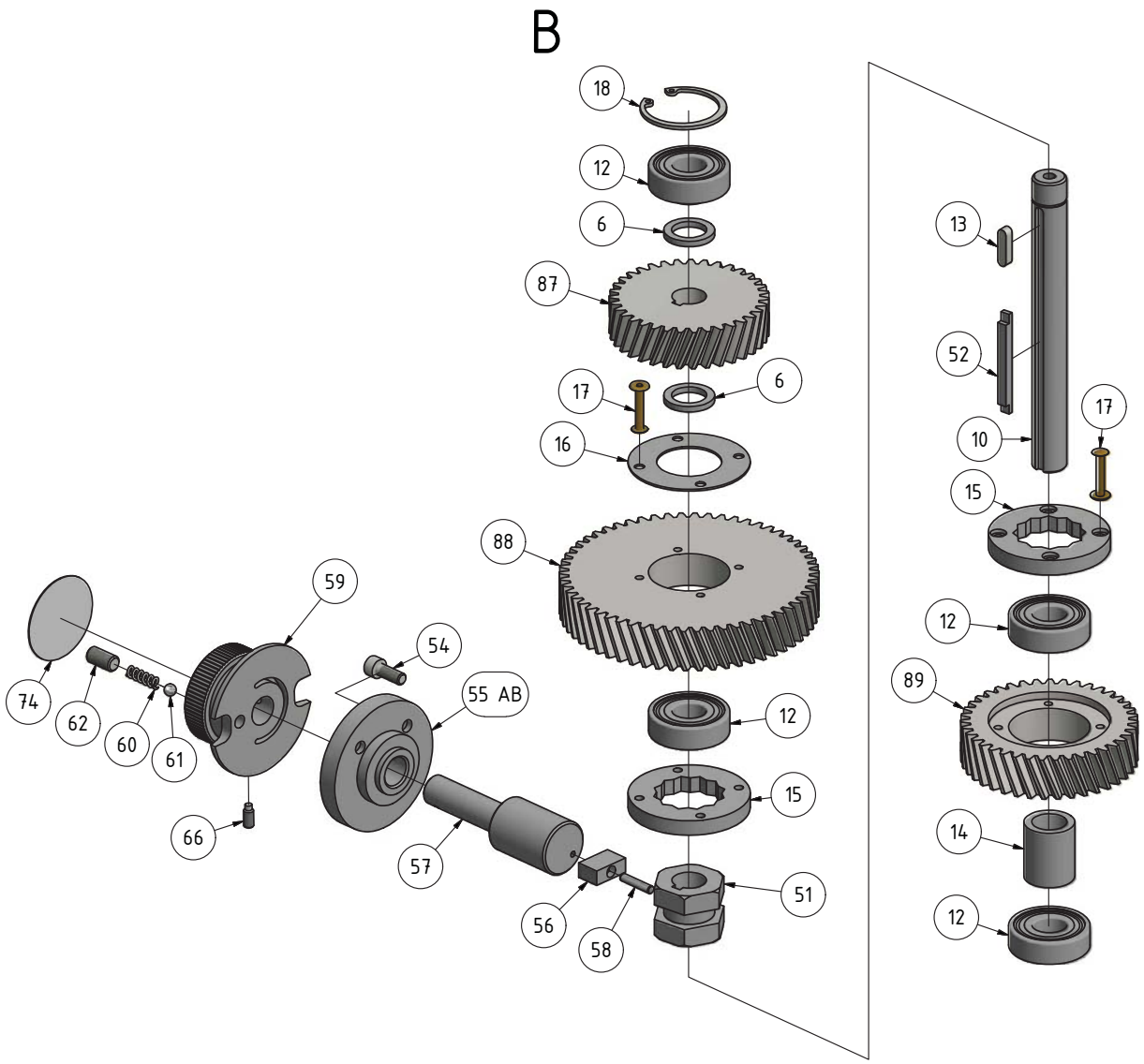
7-1: Bohrkopf - Drilling head

7.4 Bohrkopf - Drilling head



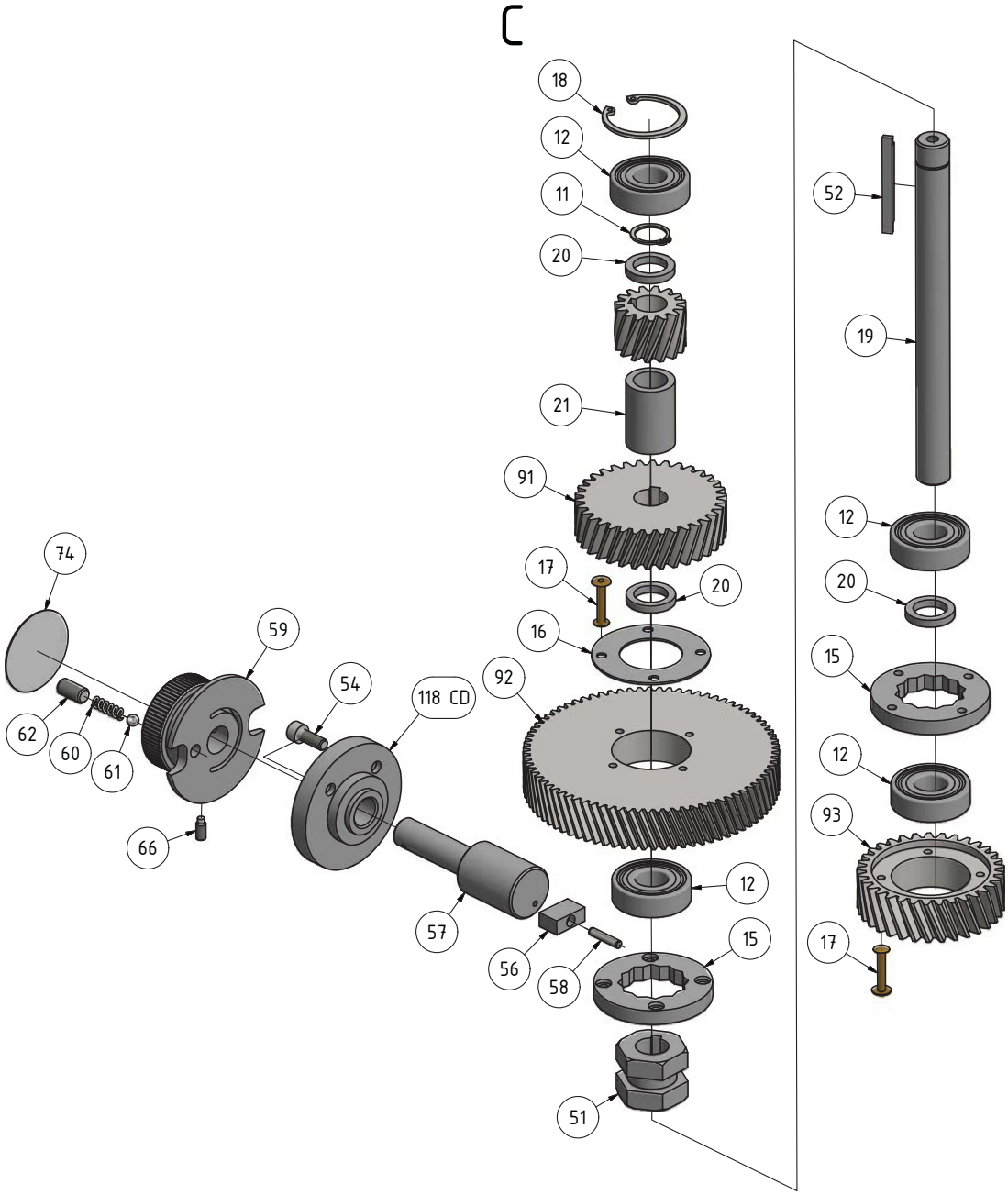
7-2: Bohrkopf - Drilling head

7.5 Bohrkopf - Drilling head



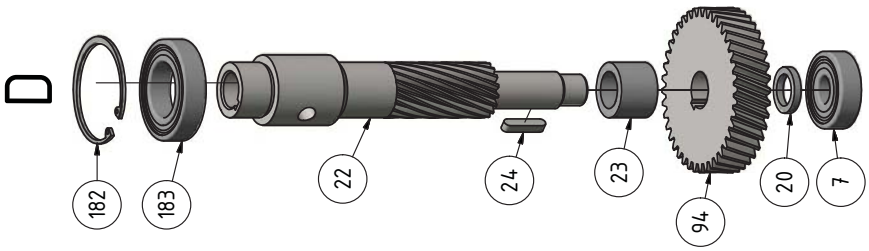
7-3: Bohrkopf - Drilling head

7.6 Bohrkopf - Drilling head



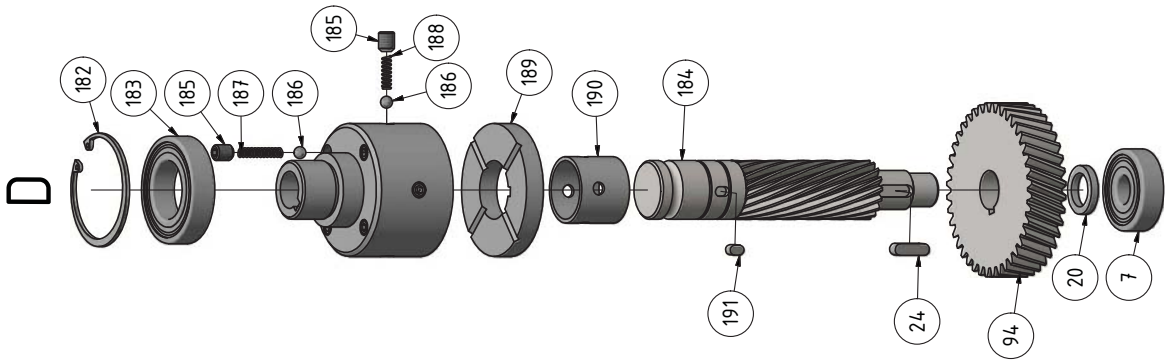
7-4: Bohrkopf - Drilling head

7.7 Bohrkopf - Drilling head, Version 1.0



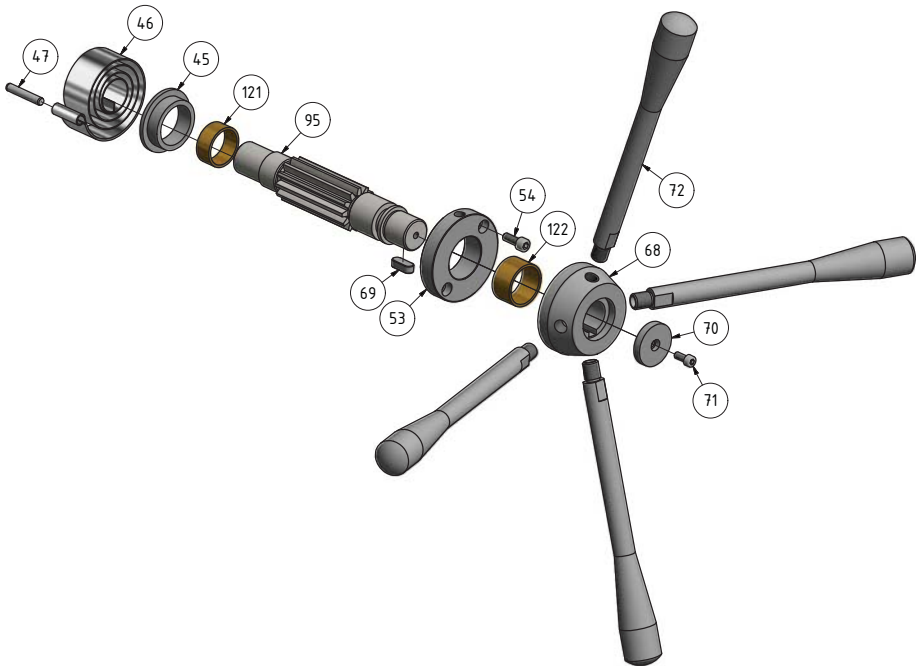
7-5: Bohrkopf - Drilling head

7.8 Bohrkopf - Drilling head, Version 2.0



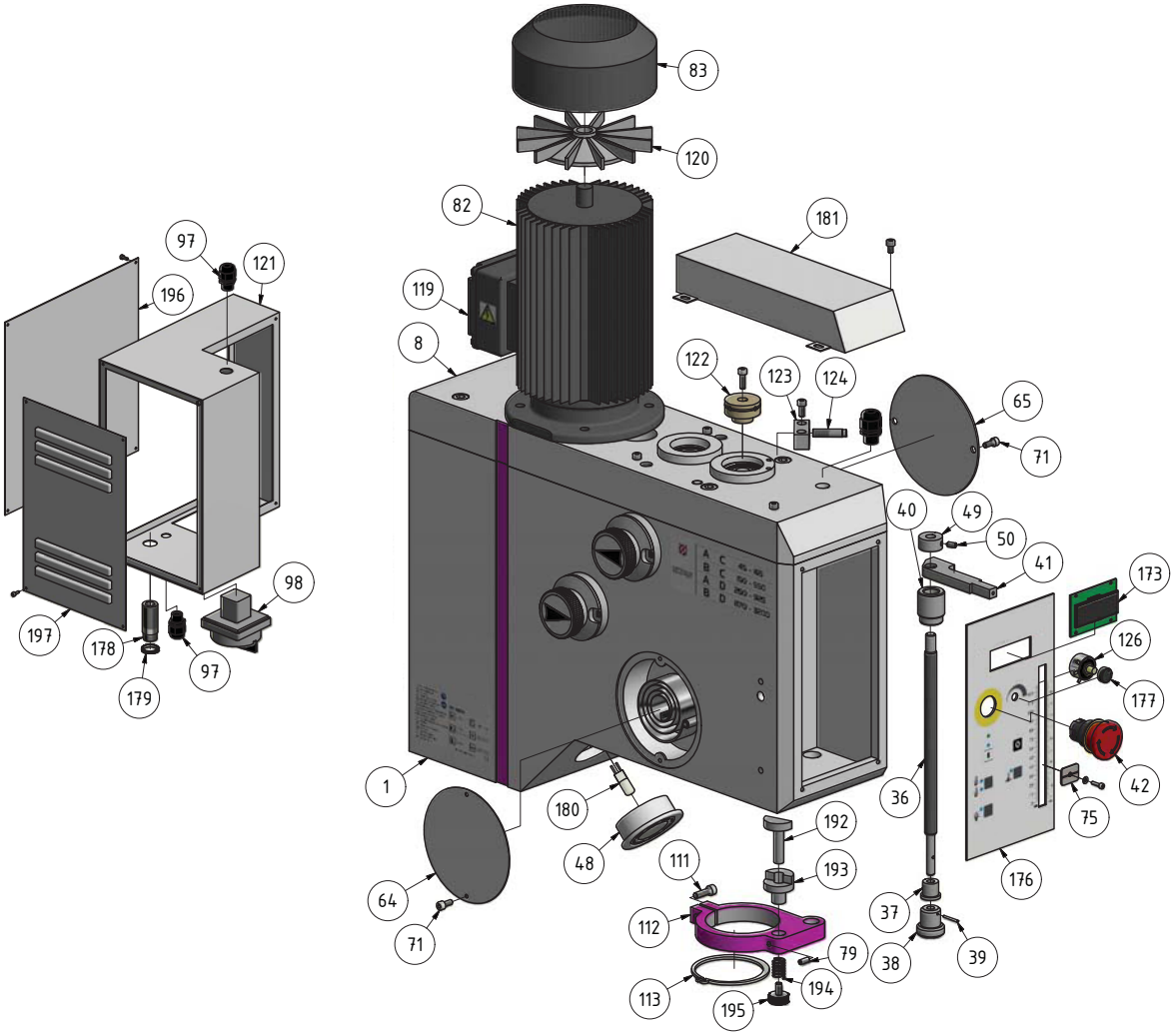
7-6: Bohrkopf - Drilling head

7.9 Bohrkopf - Drilling head



7-7: Bohrkopf - Drilling head

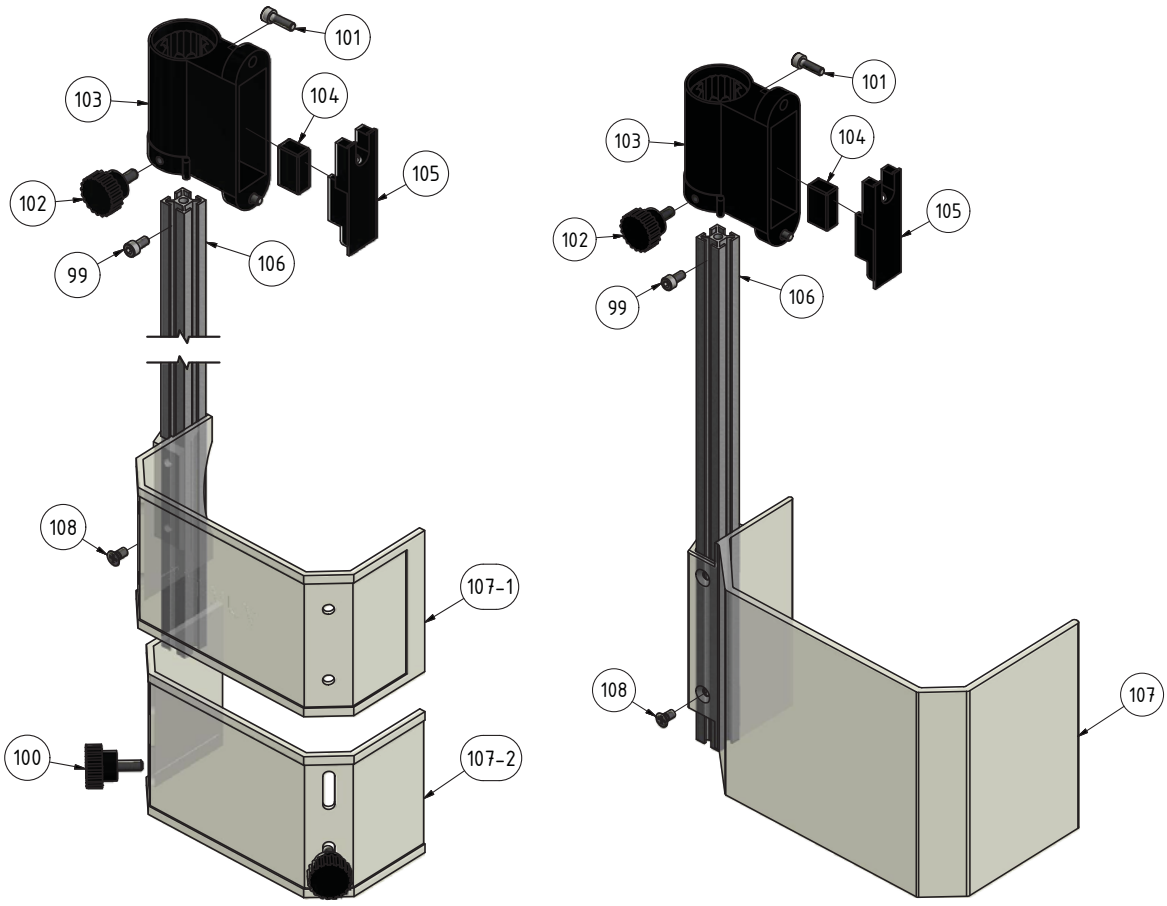
7.10 Bohrkopf - Drilling head - DH26GTV | DH28GSV(9680134/9680138)



7-8: Bohrkopf - Drilling head

7.11 Bohrfutterschutz - Drilling chuck protection

DH26GTV **DH28GSV(9680134/9680138)**



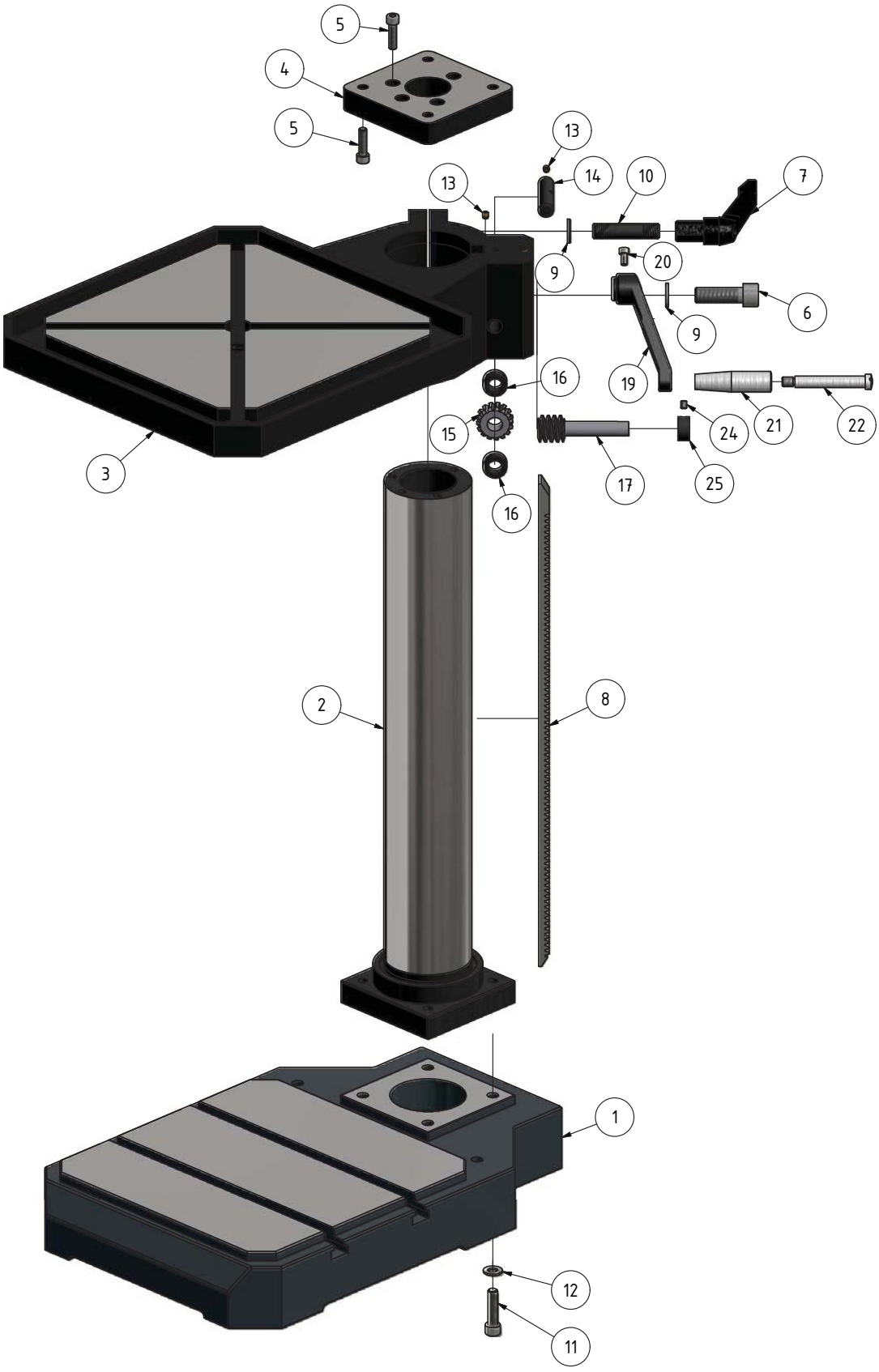
7-9: Bohrfutterschutz- Drilling chuck protection

Teileliste Bohrkopf - Parts list drilling head - DH26GTV | DH28GSV(9680134/9680138)						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GTV	Artikelnummer Item no. DH28GSV (9680134/9680138)
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 - DH26GTV | DH28GSV(9680134/9680138)						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GTV	Artikelnummer Item no. DH28GSV (9680134/9680138)
22	Zahnwelle	Gear shaft	1		03034220122	
				ab/from 06.2018 /M2/Z13	030342201221	
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	Bedienpanel	Control panel	1		0303422535	0303423535
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-Halt Schalter	Emergency stop button	1		03034220142	03034230142
43	Licht/ Kühlpumpeschalter	Light/Coolant pump switch	1		03034220143	03034230143
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		
64	Abdeckung	Cover	1		03034220164	03034230164
65	Abdeckung	Cover	1		03034220165	03034230165
66	Gewindestift	Grub screw	2	GB 79-85 - M8 x 25		
67						
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
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		
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	M2/28Z	03034220186	
87	Zahnrad	Gear	1	M2/35Z	03034220187	
88	Zahnrad	Gear	1	M2/58Z	03034220188	
89	Zahnrad	Gear	1	M2/39Z	03034220189	
90	Zahnrad	Gear	1	M2/11Z	03034220190	
91	Zahnrad	Gear	1	M2/34Z	03034220191	
92	Zahnrad	Gear	1	M1,5/79Z	03034220192	
				ab/from 06/2018 M2/60Z	030342201921	
93	Zahnrad	Gear	1	M2/33Z	03034220193	
94	Zahnrad	Gear	1	M2/40Z	03034220194	
95	Zahnwelle	Gear wheel	1		03034220195	

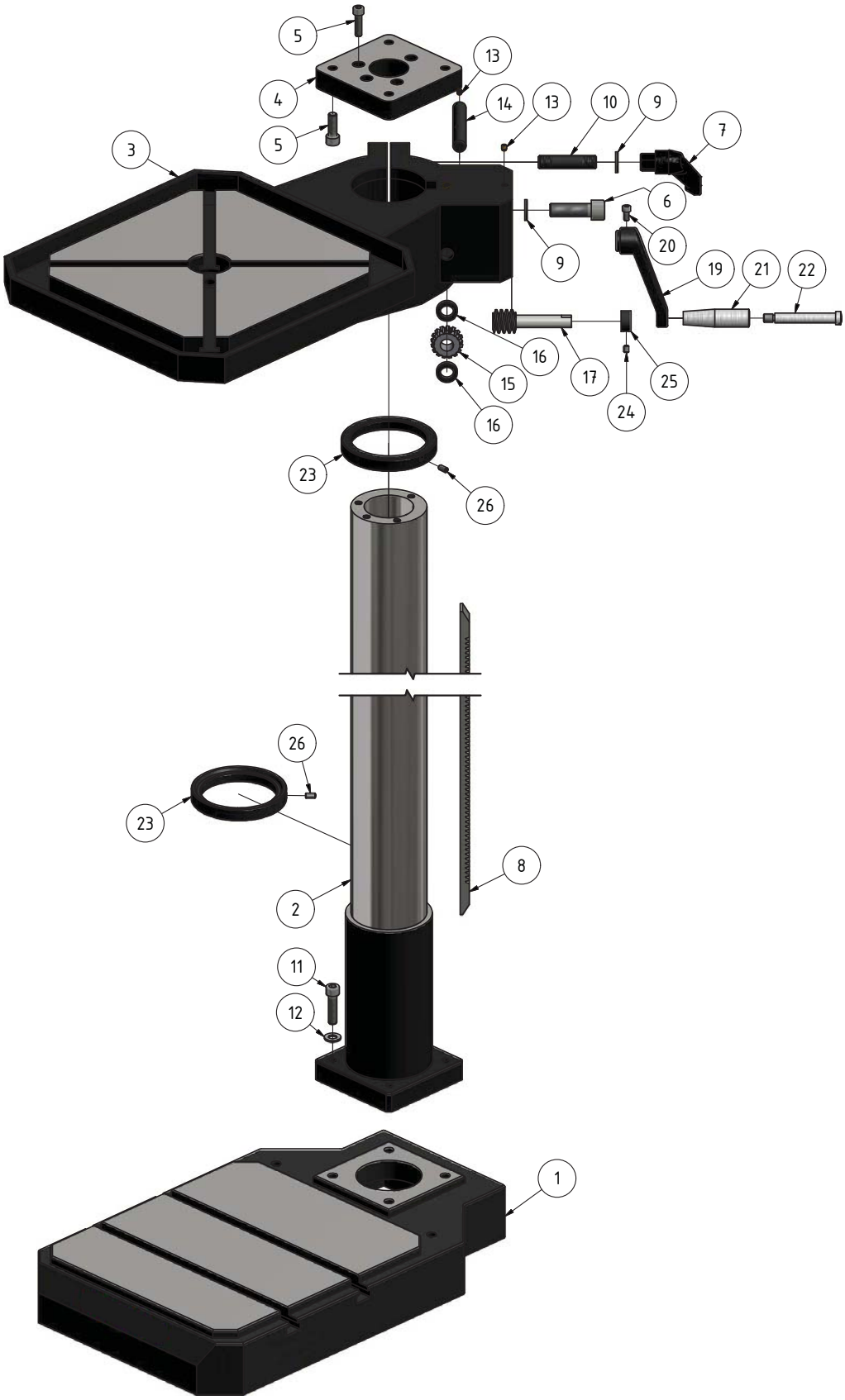
Teileliste Bohrkopf - Parts list drilling head - DH26GTV | DH28GSV(9680134/9680138)						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH26GTV	Artikelnummer Item no. DH28GSV (9680134/9680138)
97	Buchse	Bushing	1		03034220197	03034230197
98	Hauptschalter	Main switch	1		03034220198	03034230198
99	Innensechskantschraube	Socket head screw	1		03034220199	
100	Rändelschraube	Knurled screw	2		030342201100	
101	Innensechskantschraube	Socket head screw	1		030342201101	
102	Rändelschraube	Knurled screw	1		030342201102	
103	Halterung	Fixture	1		030342201103	
104	Mikroschalter	Microswitch	1		030342201104	
105	Platte	Plate	1		030342201105	
106	Alu- Profil	Aluminium profile	1		030342201106	030342301106
107	Bohrfutterschutz	Drill chuck protection	1			030342301107
107-1	Bohrfutterschutz 1	Drill chuck protection 1			0303422011071	0303423011071
107-2	Bohrfutterschutz 2	Drill chuck protection 2			0303422011072	0303423011072
108	Schraube	Screw	1			
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	
121	Schaltkasten	Switch box	1		030342201121	030342301121
122	Signalscheibe	Signal washer	1		03034225122	
123	Halter	Holder	1		03034225123	
124	Drehzahlsensor	Rotation speed sensor	1		03034225124	
125	Drehknopf	Rotary knob	1		03034225125	
126	Potentiometer	Potentiometer	1		03034225126	
173	Drehzahlanzeige	Rotation speed indicator	1		03034245173	
174	Gleitlager	Plain bearing	1	28x32x13	03021303254	
175	Gleitlager	Plain bearing	1	30x34x18	03021303255	
176	Bedienpanel	Control panel	1		03034225176	03034235176
177	Einstellknopf	Ajust knob	1		03034225177	
178	Anschlussstecker	Connecting plug	1		03034225178	
179	Klemmmutter	Clamping nut	1		03034225179	
180	Glühlampe	Lamp	1	12V/20W	0342002	
181	Abdeckung	Cover	1		03034225181	03034235181
182	Sicherungsring	Retaining ring	1	DIN472-55		
183	Kugellager	Ball bearing	1	6006	0406006R	
184	Welle	Shaft	1		03034220184	
185	Gewindestift	Grub screw	8	M8x10		
186	Stahlkugel	Steel ball	8	6	03034220186	
187	Feder	Spring	8	0,8x5x25	03034220187	
188	Feder	Spring	8	0,8x5x16	03034220188	
189	Scheibe	Washer	1		03034220189	
190	Hülse	Sleeve	1		03034220190	
191	Passfeder	Fitting key	1	5x5x10		
192	Welle	Shaft	1		03034220192	
193	Buchse	Bushing	1		03034220193	
194	Feder	Spring	1		03034220194	
195	Schraube	Screw	1		03034220195	
196	Abdeckung	Cover	1		03034225196	03034235196
197	Abdeckung	Cover	1		03034225197	03034235197

7.12 Bohrtisch - Drilling table - DH26GTV



7-10: Bohrtisch - Drilling table - DH 26 GT

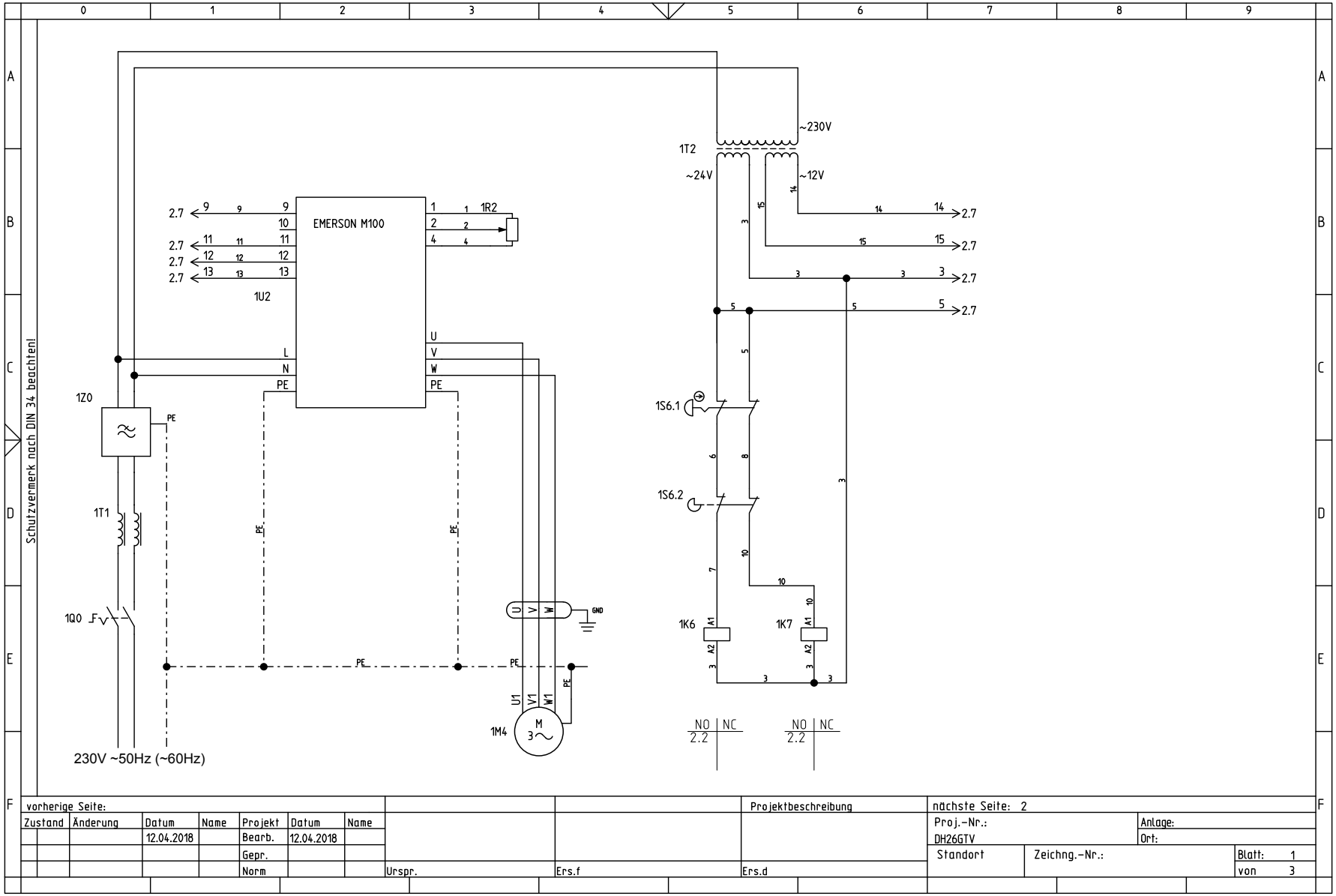
7.13 Bohrtisch - Drilling table - DH28GSV(9680134/9680138)



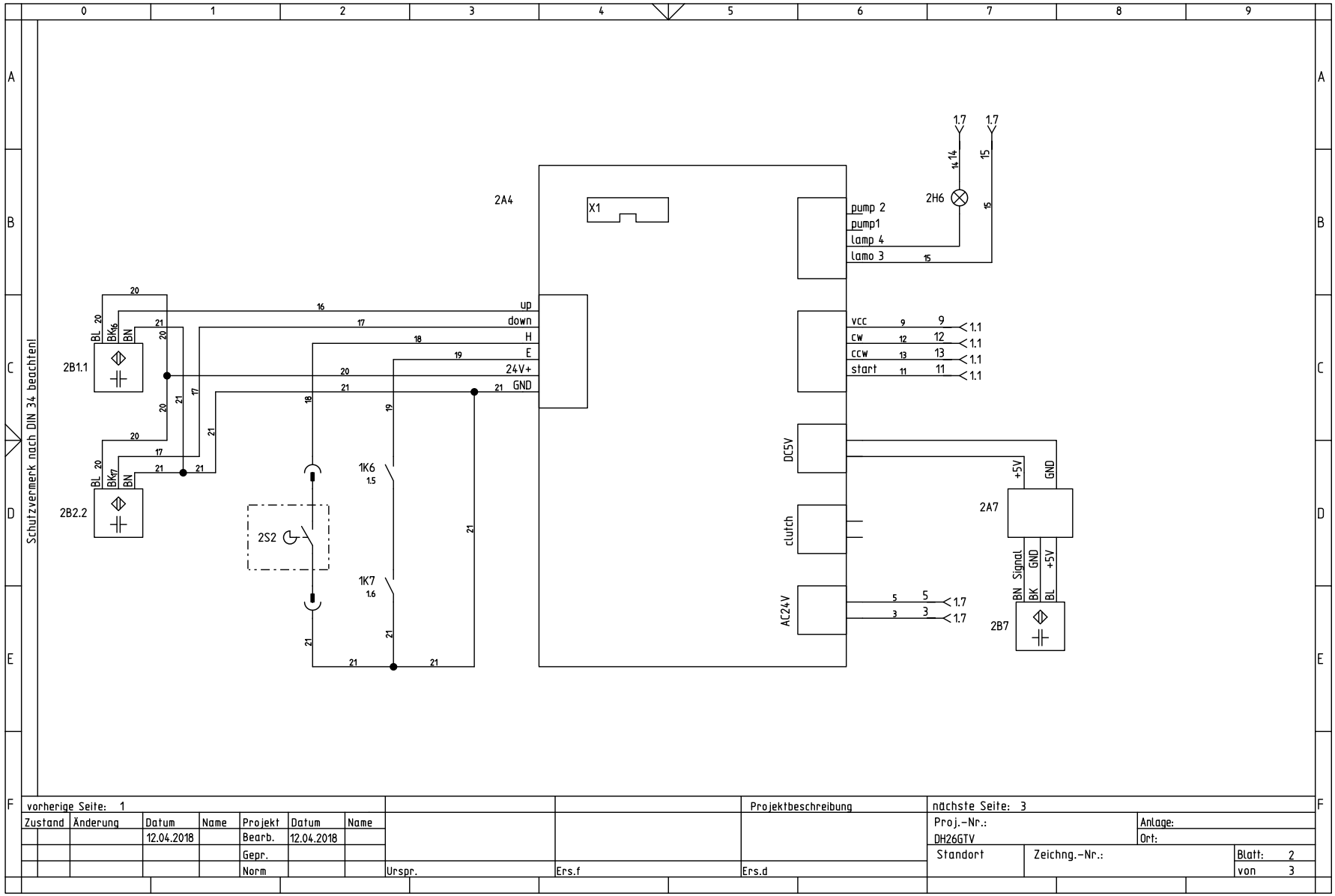
7-11: Bohrtisch - Drilling table - DH 28 GSV

Teileliste Bohrtisch - Parts list drilling table - DH26GTV | DH28GSV(9680134/9680138)						
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no. DH 26 GTV	Artikelnummer Item no. DH 28 GSV (9680134/9680138)
1	Maschinenfuss	Mounting foot	1		03034220201	03034230201
				ab/from 06.2018	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		

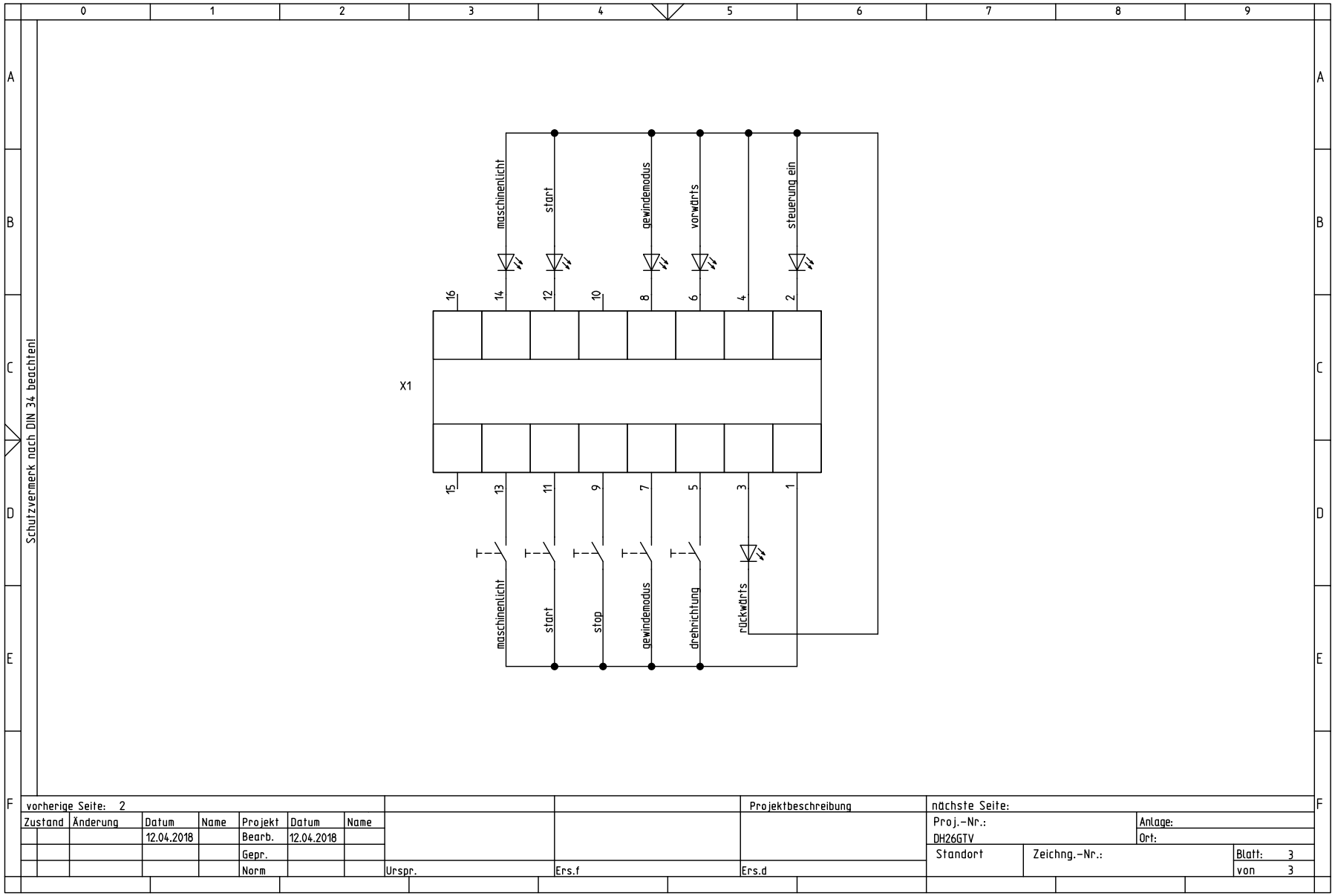
7.14 Schaltplan - Wiring diagram - DH26GTV - 1-3



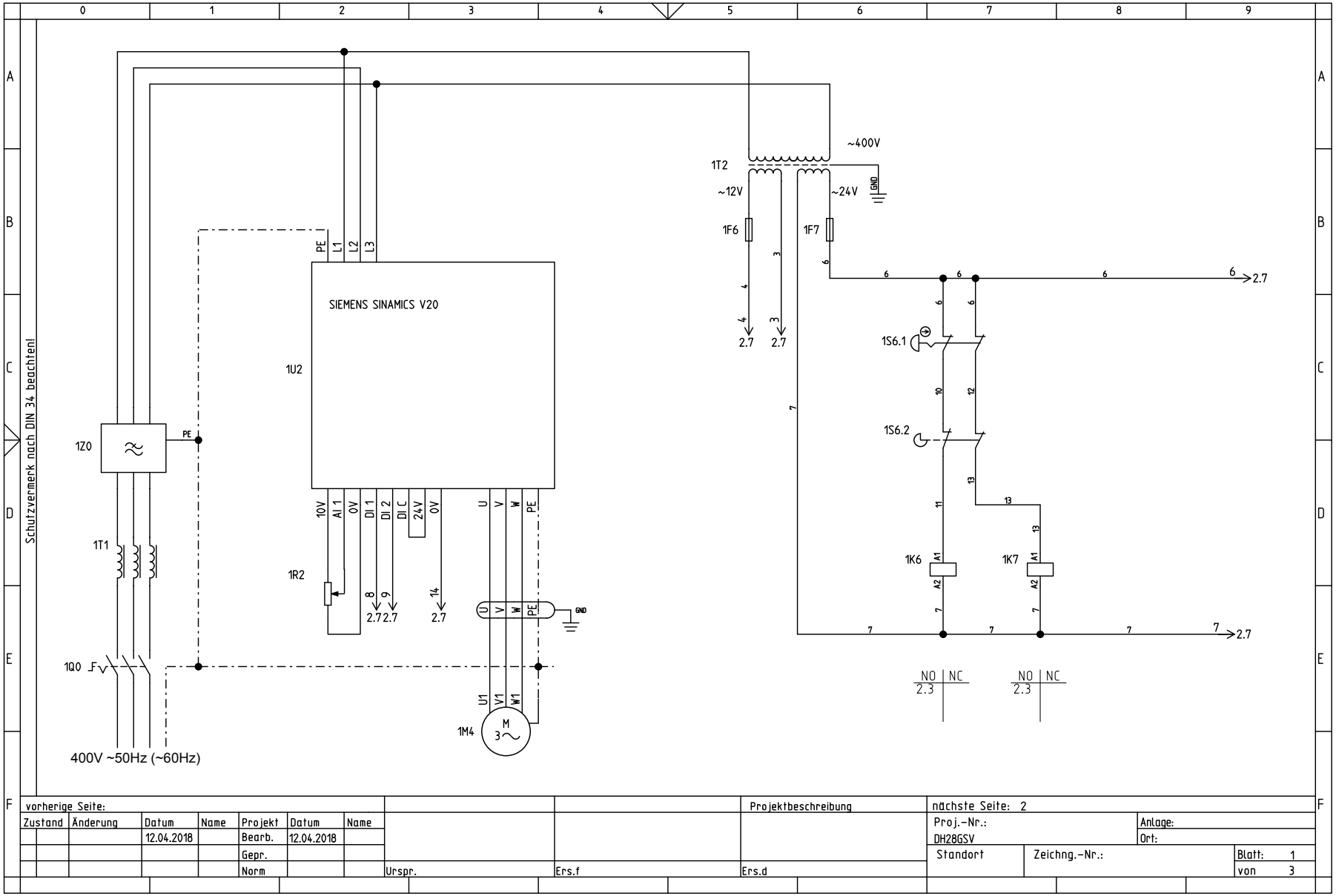
7.15 Schaltplan - Wiring diagram - DH26GTV - 2-3



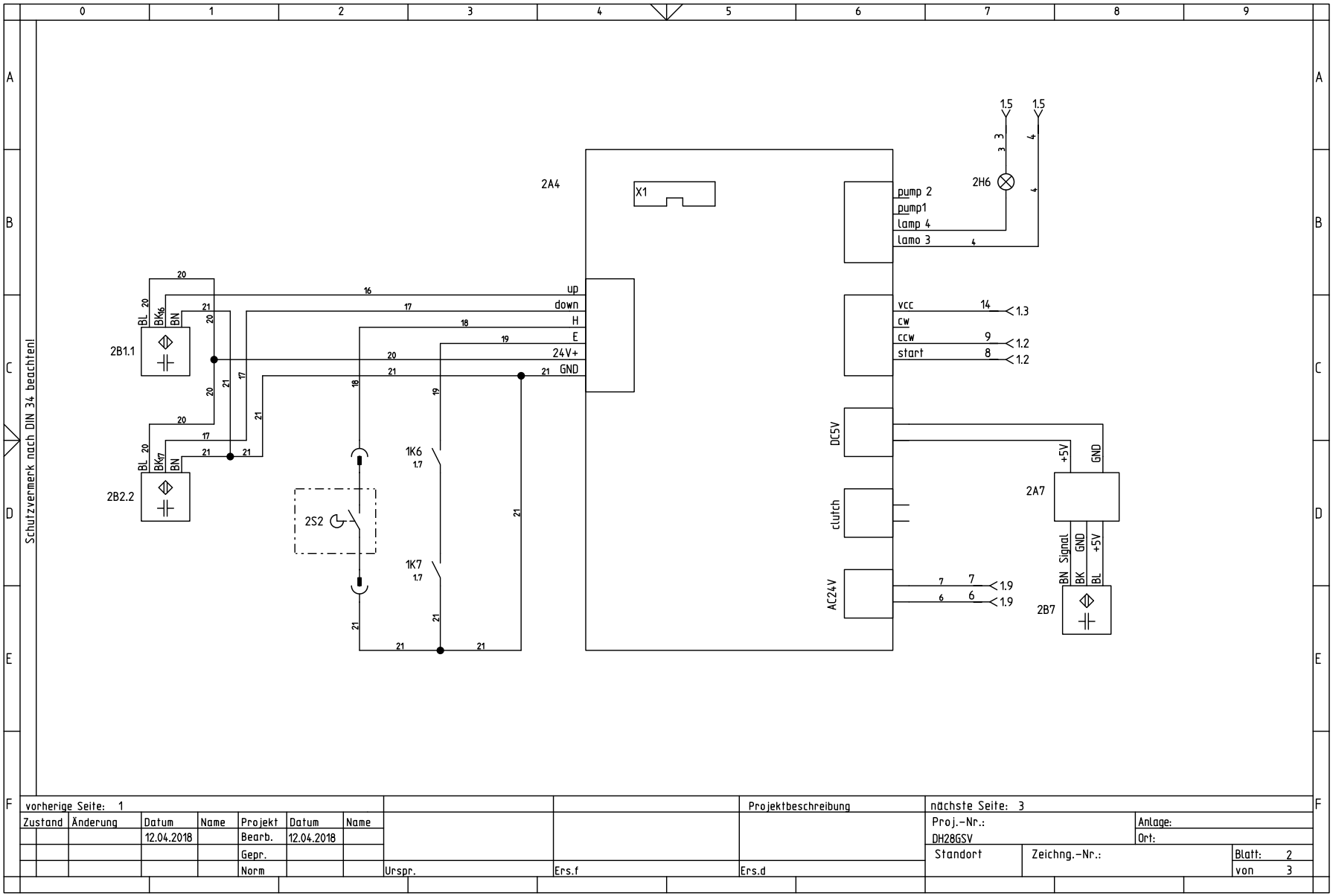
7.16 Schaltplan - Wiring diagram - DH26GTV - 3-3



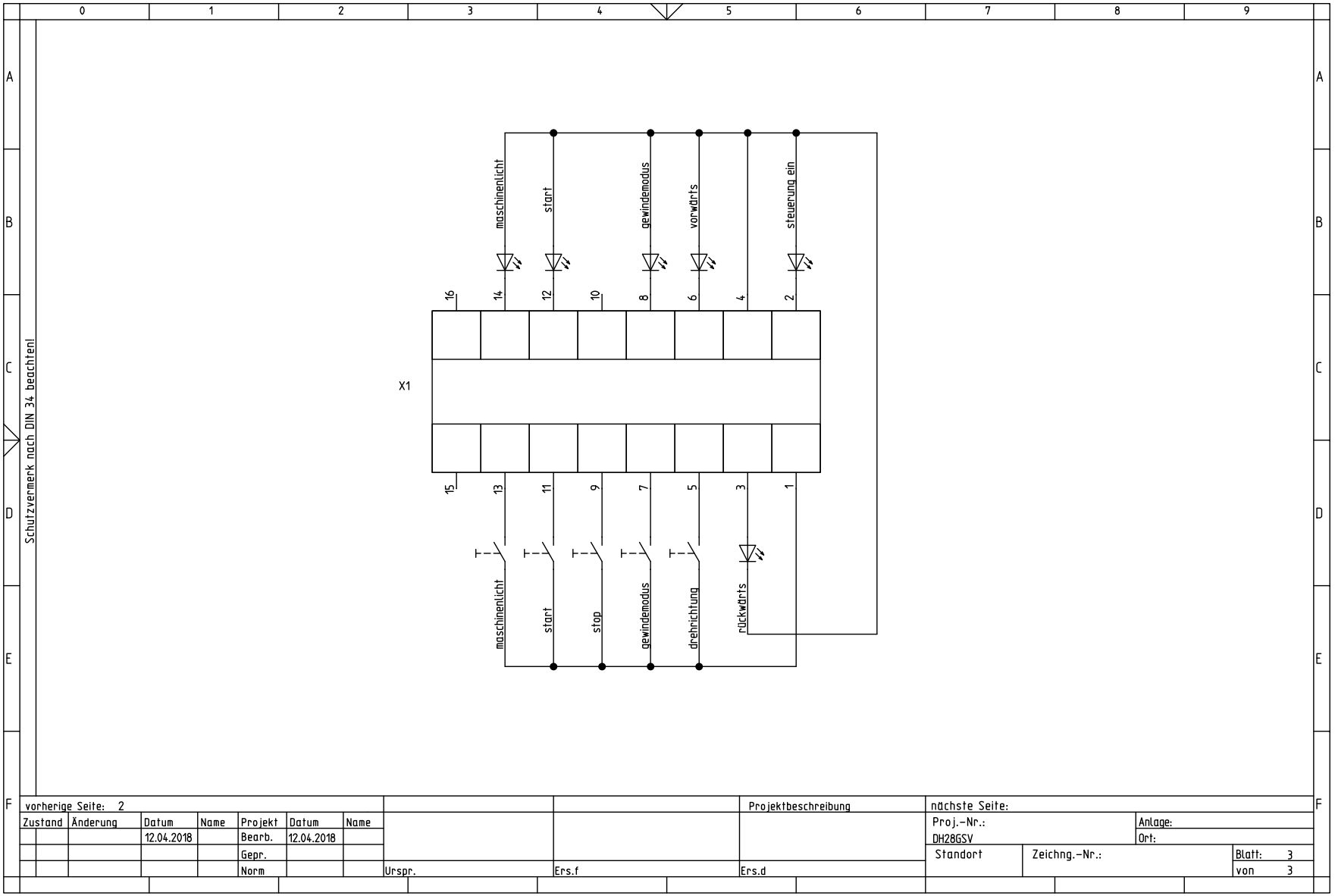
7.17 Schaltplan - Wiring diagram - DH28GSV(9680134/9680138) - 1-3



7.18 Schaltplan - Wiring diagram - DH28GSV(9680134/9680138) - 2-3



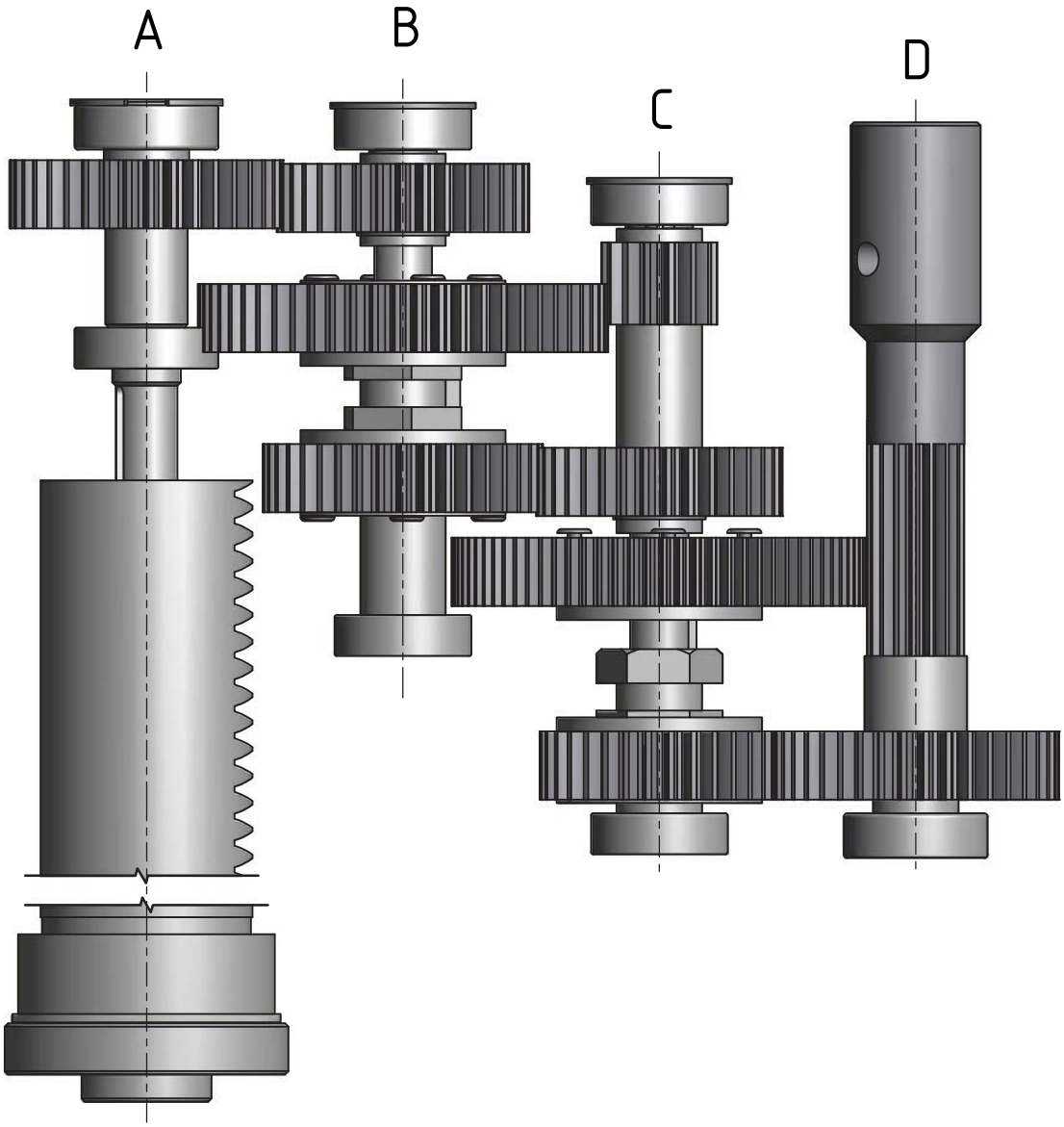
7.19 Schaltplan - Wiring diagram - DH28GSV(9680134/9680138) - 1-3



Teileliste elektrische Komponente - Spare part electrical component - DH26GTV | DH28GSV(9680134/9680138)				
Pos.	Bezeichnung	Description	Grösse Size	Artikelnummer Item no.
1Q0	Hauptschalter	Main switch	DH26GTV	030342251Q0
			DH28GSV(9680134/9680138)	030342351Q0
1T1	Drossel	Inductor	DH26GTV	030342251T1
			DH28GSV(9680134/9680138)	030342351T1
1Z0	Netzfilter	Line filter	DH26GTV	030342251Z0
			DH28GSV(9680134/9680138)	030342351Z0
1U2	Frequenzumrichter	Frequency conventer	DH26GTV	030342251U2
			DH28GSV(9680134/9680138)	030342351U2
1R2	Potentiometer	Potentiometer	DH26GTV	030342251R2
			DH28GSV(9680134/9680138)	030342351R2
2A4	Steuerung	Control	DH26GTV	030342252A4
			DH28GSV(9680134/9680138)	030342352A4
1T2	Transformator	Transformer	DH26GTV	030342251T2
			DH28GSV(9680134/9680138)	030342351T2
1F6/1F7	Sicherung	Fuse	DH28GSV(9680134/9680138)	03034225
1M4	Antriebsmotor	Drive motor		03034230182
1K6/1K7	Sicherheitsrelais	Control relays		030342251K6
1S6.1	Not-Halt-Schalter	Emergency stop button		03034230142
1S6.2	Schalter Bohrfutterschutz	Drill chuck switch		030342301104
2B1.1	Sensor obere Stellung	Top position sensor		03034245S6
2B2.2	Sensor untere Stellung	Down position sensor		
2S2	Schalter Fusspedal (option)	Foot switch (option)		03050032
2A7	Stuerung Drehzahlanzeige	Rotation speed indicator control		030342252A7
2B7	Drehzahlsensor	Rotation speed sensor		03034225124
2H6	Maschinenlampe	Machine lamp		03034230148

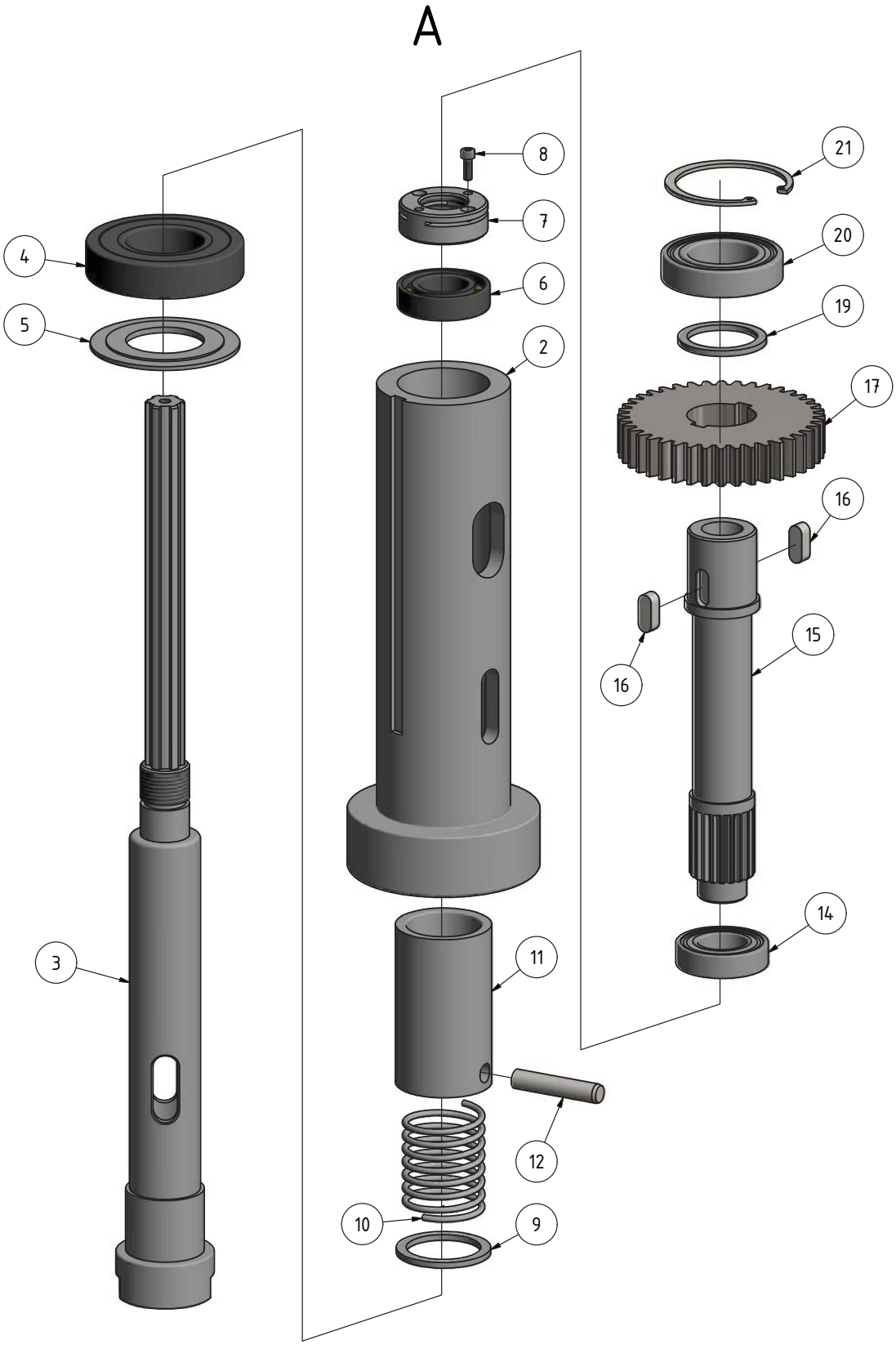
8 Ersatzteile - Spare parts - DH32GSV(9680135/9680139)

8.1 Bohrkopf- Drilling head



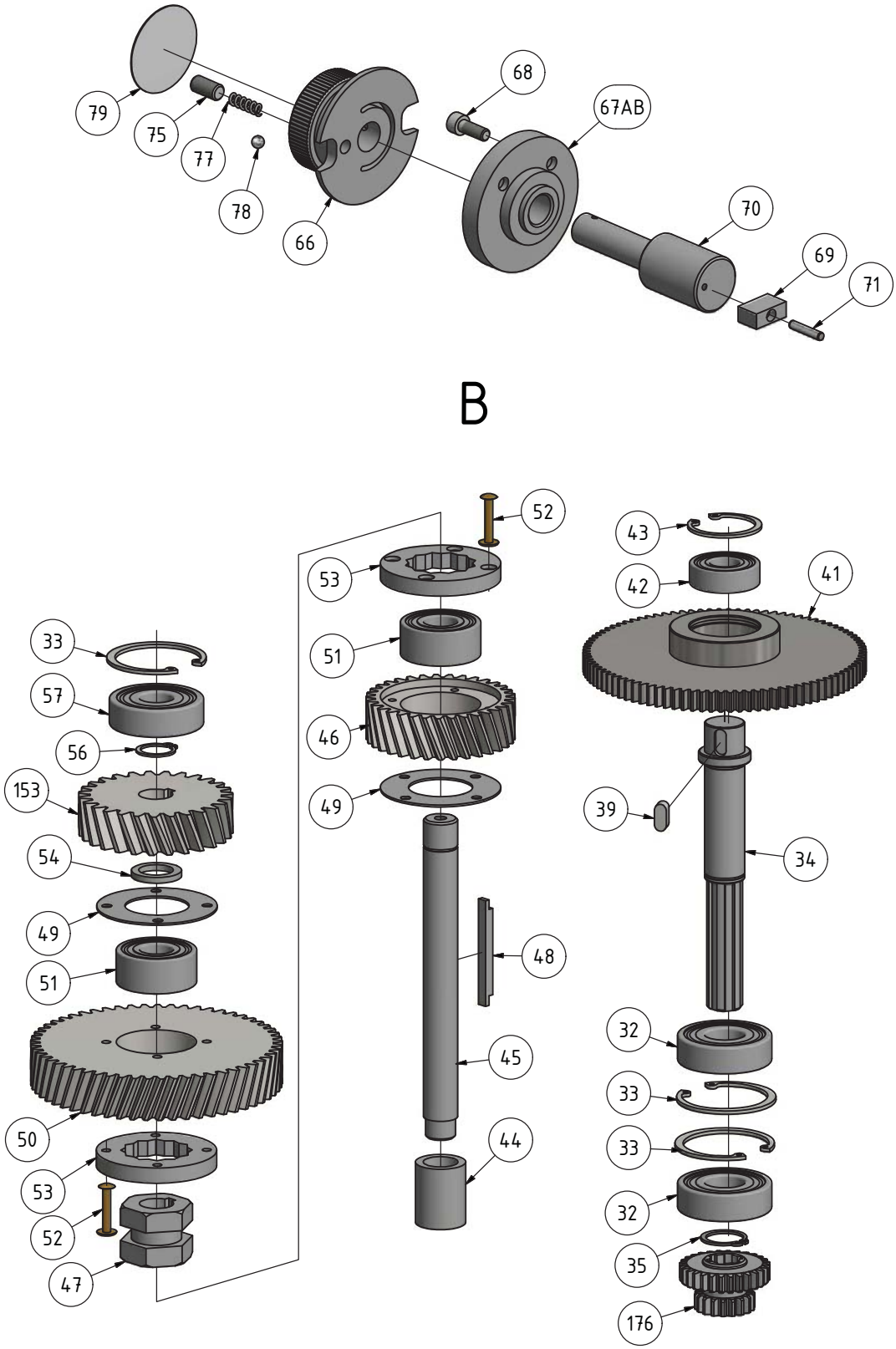
8-1: Bohrkopf - Drilling head

8.2 Bohrkopf - Drilling head



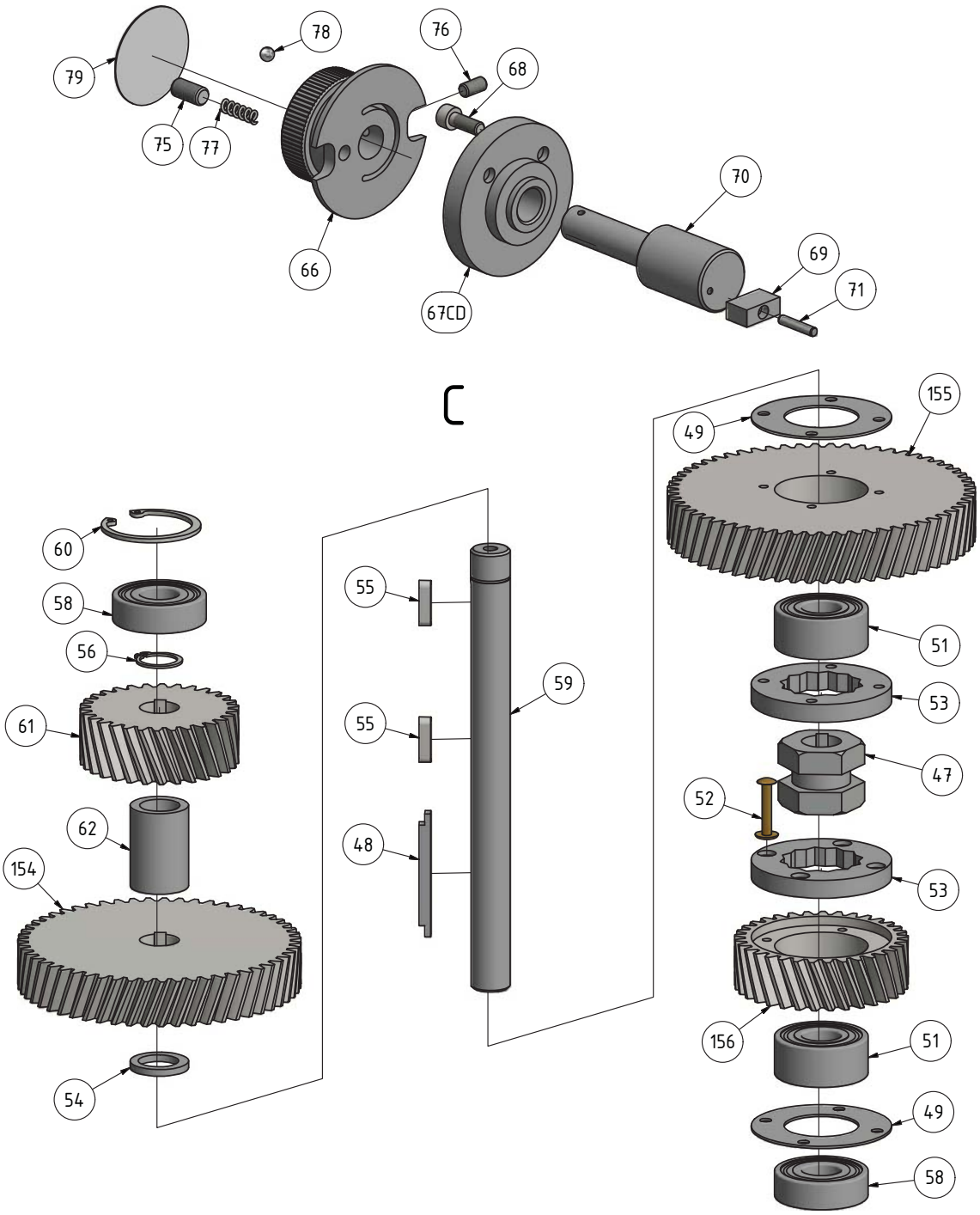
8-2: Bohrkopf - Drilling head

8.3 Bohrkopf - Drilling head



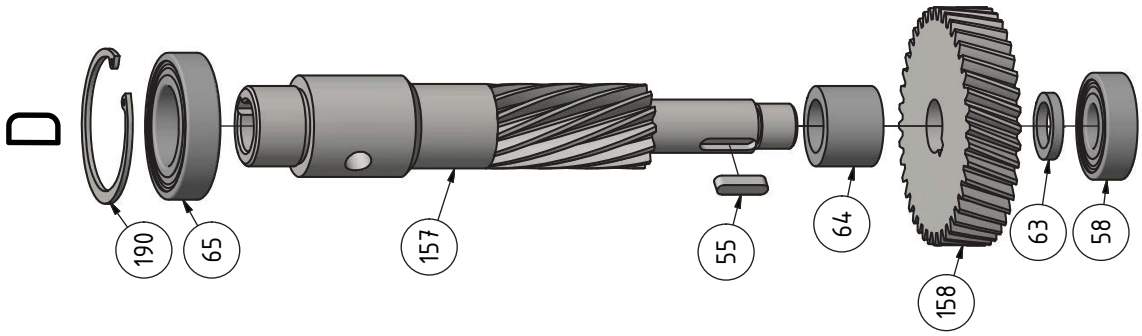
8-3: Bohrkopf - Drilling head

8.4 Bohrkopf - Drilling head



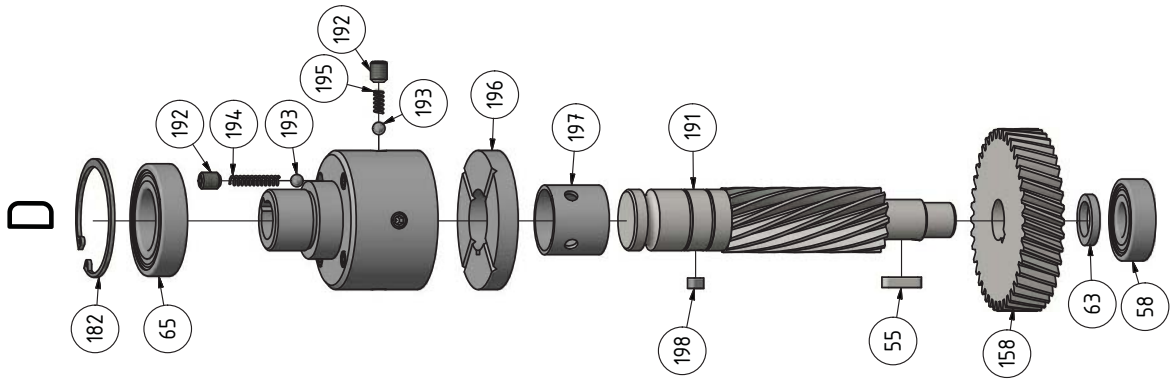
8-4: Bohrkopf - Drilling head

8.5 Bohrkopf - Drilling head, Version 1.0



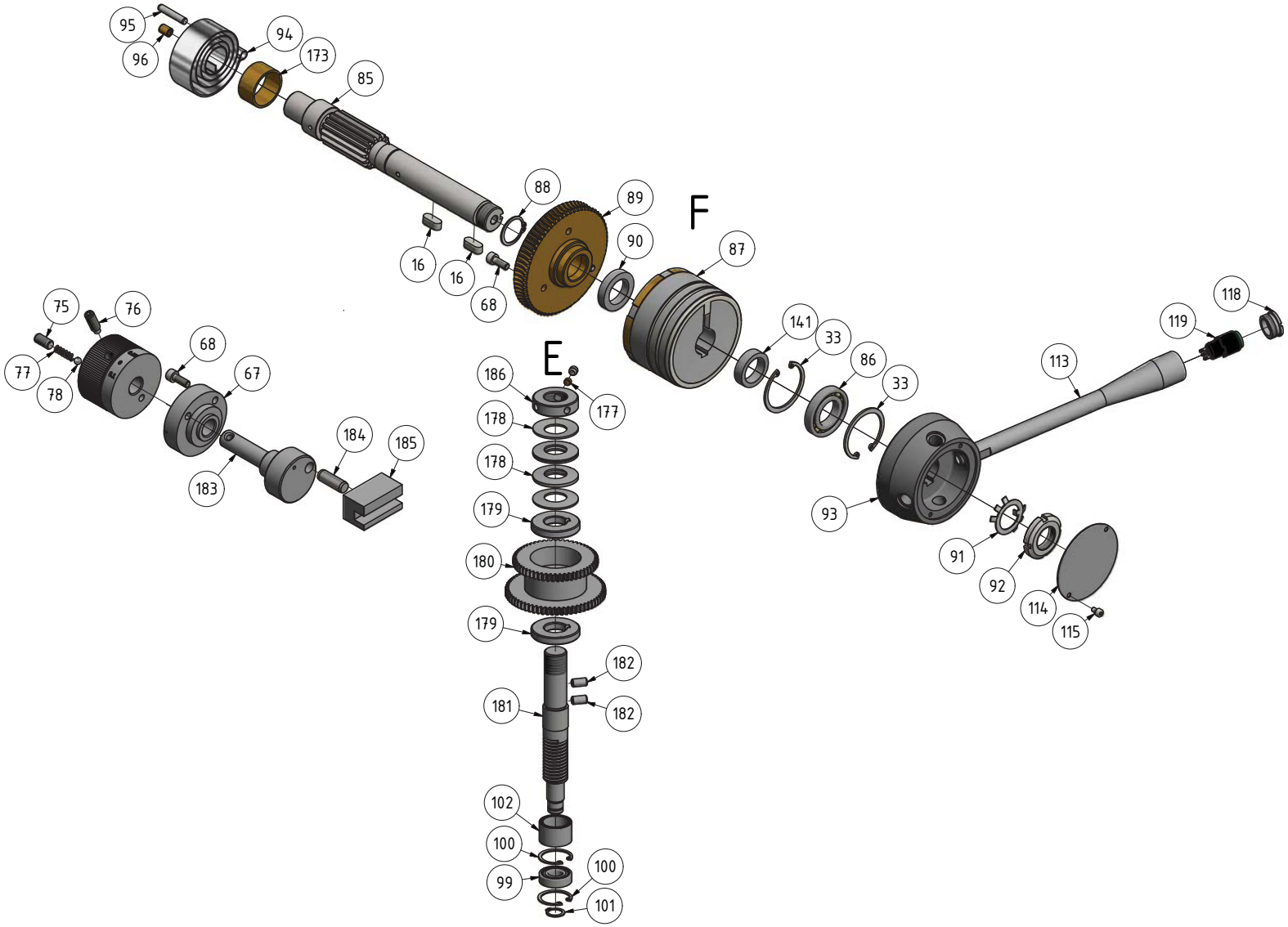
8-5: Bohrkopf - Drilling head

8.6 Bohrkopf - Drilling head, Version 2.0



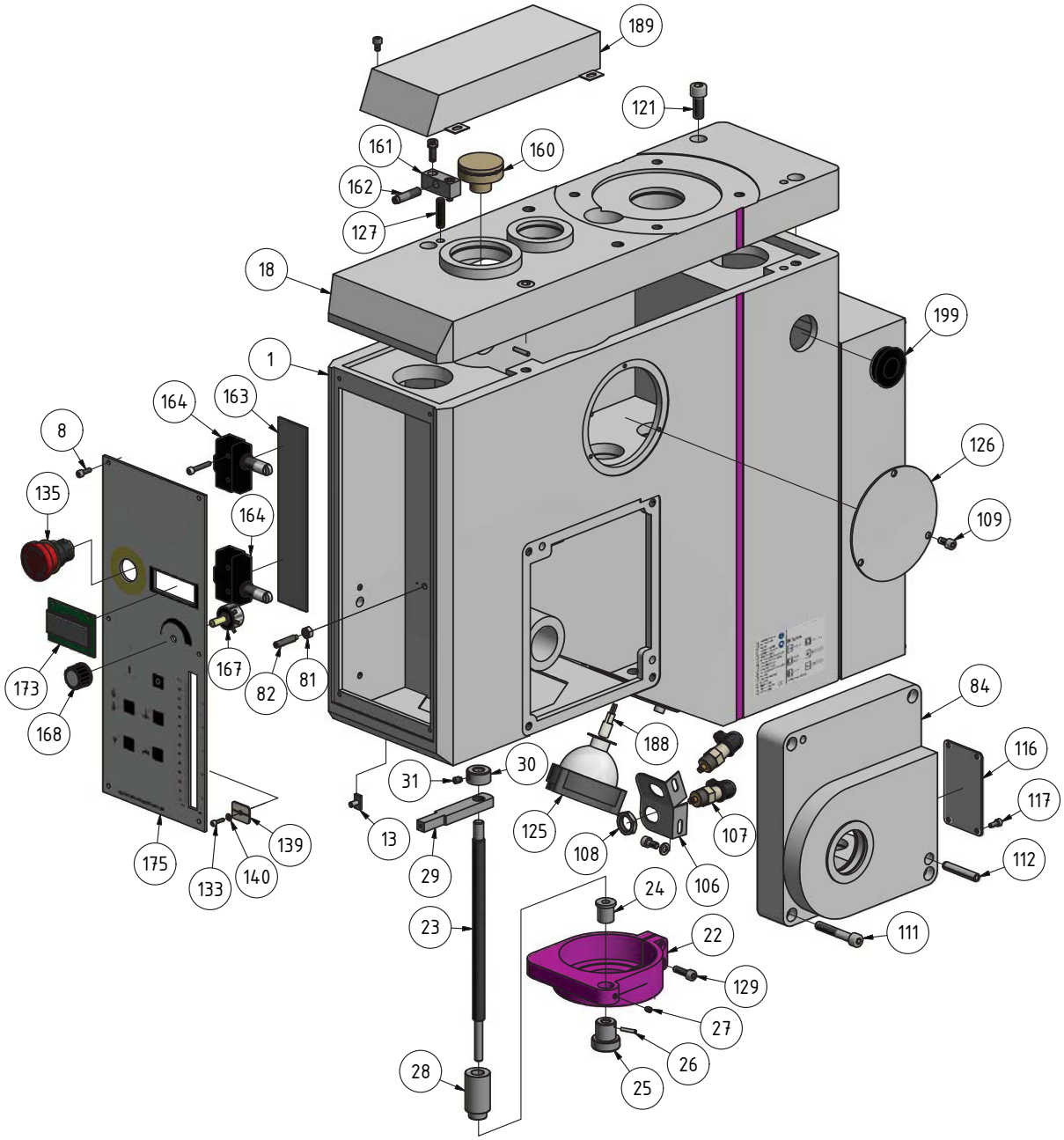
8-6: Bohrkopf - Drilling head

8.7 Bohrkopf - Drilling head



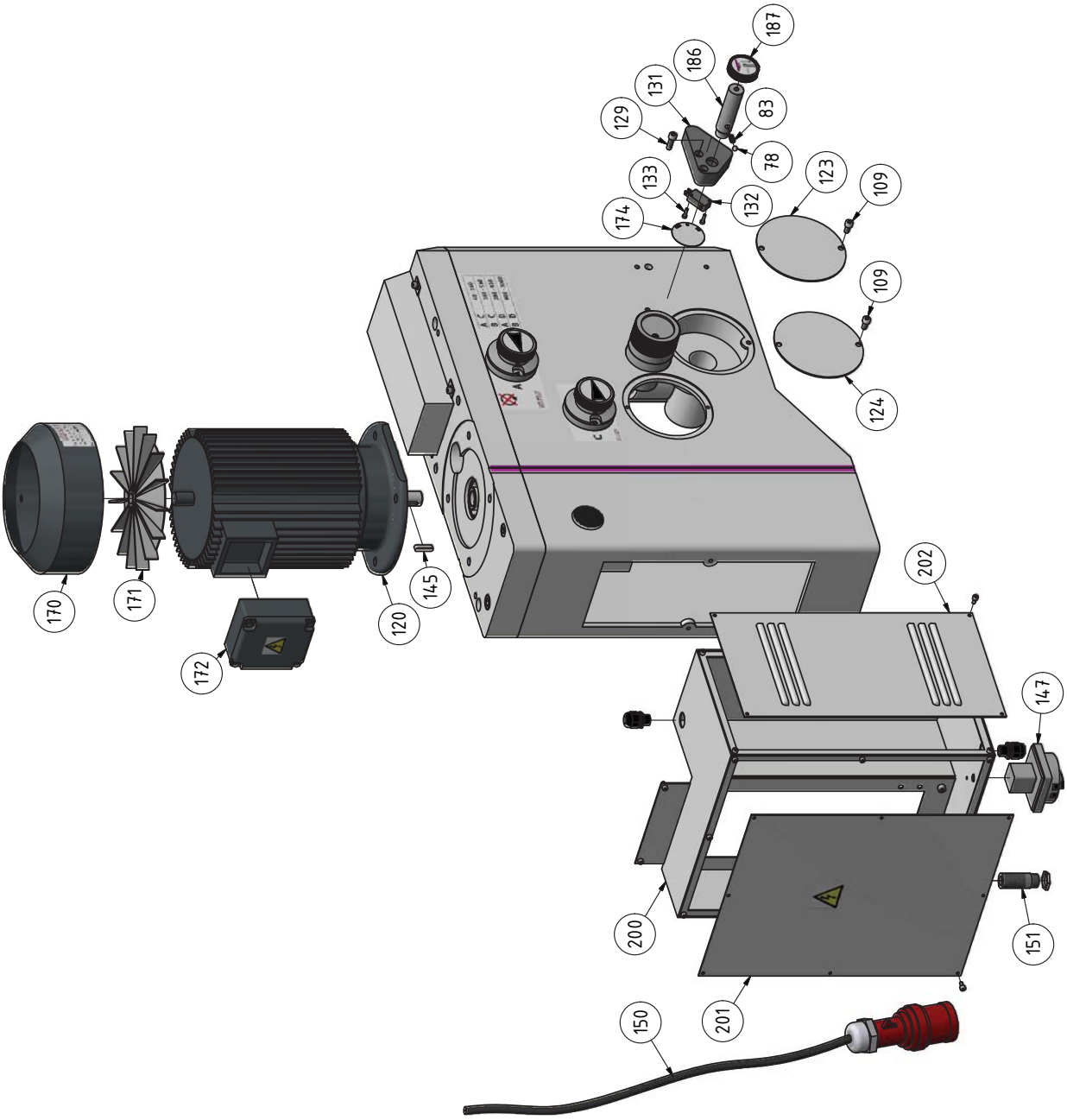
8-7: Bohrkopf - Drilling head

8.8 Bohrkopf - Drilling head - DH32GSV(9680135/9680139)



8-8: Bohrkopf - Drilling head

8.9 Bohrkopf - Drilling head - DH32GSV(9680135/9680139)

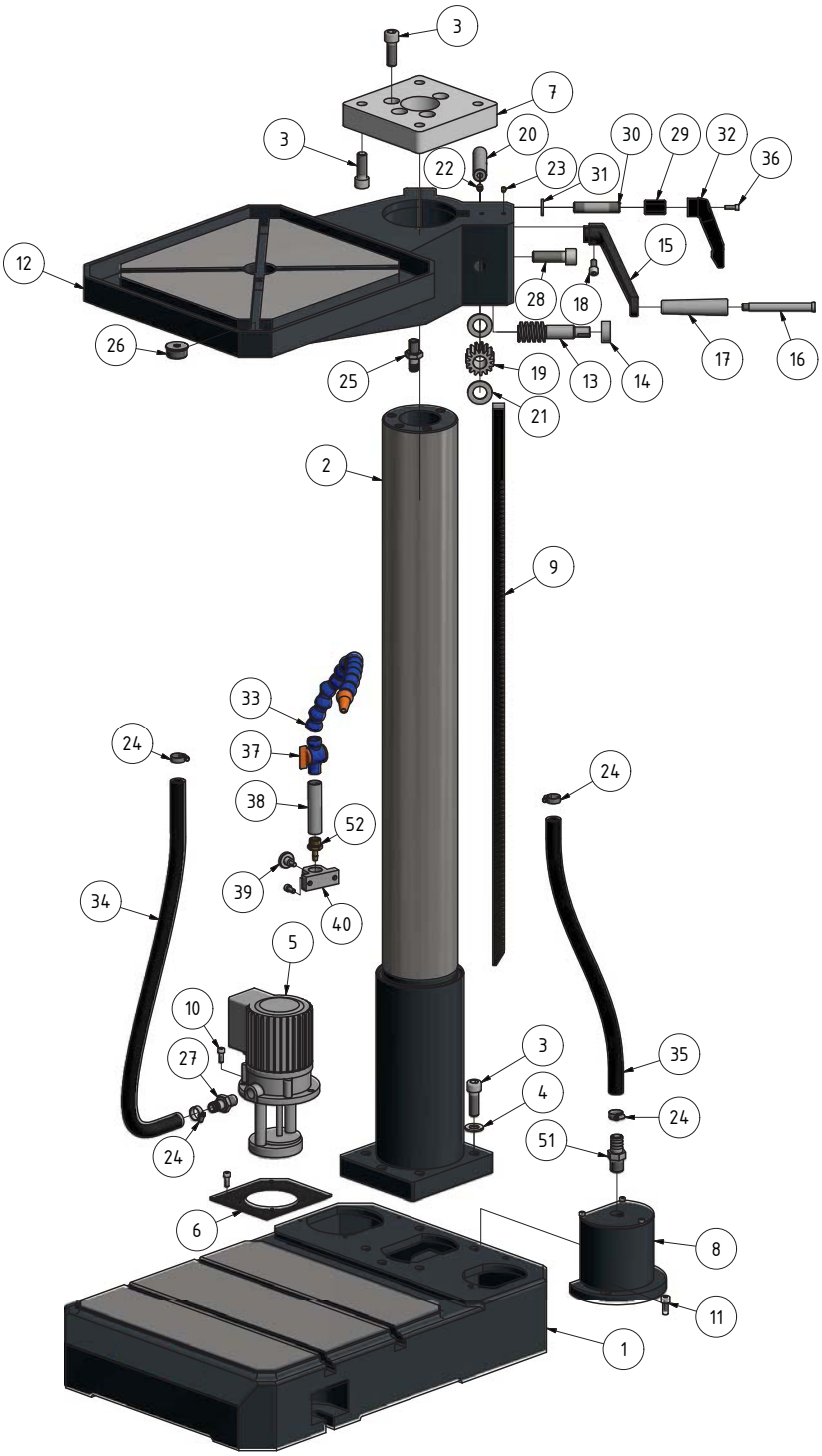


8-9: Bohrkopf - Drilling head

Ersatzteilliste Bohrkopf DH 32GSV - Spare part list drilling head DH 32 GSV					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Gehäuse	Gehäuse	1		0303424001
2	Pinole	Sleeve	1		0303424002
3	Bohrspindel	Drill spindel	1	6208-2R	0406208R
4	Kugellager	Ball bearing	1	7208C	0407208R
5	Ring	Ring	1		0303424005
6	Kugellager	Ball bearing	1	7005C	0407005R
7	Nutmutter	Groove nut	1		0303424007
8	Innensechskantschraube	Socket head screw	8	ISO 4762 - M4 x 12	
9	Ring	Ring	1		0303424009
10	Feder	Spring	1		0302033317
11	Hülse	Sleeve	1		0303424011
12	Zylinderstift	Cylindrical pin	1	GB 119-86 - A 10 x 50	0302033315
13	Nutenstein	Slot nut	1		0303424013
14	Kugellager	Ball bearing	1	6005-2R	0406005.2R
15	Welle	Shaft	1		0303424015
16	Passfeder	Fitting key	4	DIN 6885 - A 8 x 7 x 20	
17	Zahnrad	Gear	1	M2,5x40	03034240171
18	Platte	Plate	1		0303424018
19	Ring	Ring	1		0303424019
20	Kugellager	Ball bearing	1	6007-2Z	0406007.2R
21	Sicherungsring	Retaining ring	1	DIN 472 - 62 x 2	0303424021
22	Aufnahme	Collet	1		0303424022
23	Gewindestange	Threaded rod	1		0303424023
24	Buchse	Bushing	1		0303424024
25	Buchse	Bushing	1		0303424025
26	Spannstift	Spring pin	1	GB 879-86 - 3 x 16	
27	Gewindestift	Grub screw	1	ISO 4028 - M5 x 6	
28	Buchse	Bushing	1		0303424028
29	Halter	Holder	1		0303424029
30	Buchse	Bushing	1		0303424030
31	Gewindestift	Grub screw	1	ISO 4028 - M6 x 8	
32	Kugellager	Ball bearing	2	6204-2Z	0406204.2R
33	Sicherungsring	Retaining ring	5	DIN 472 - 47 x 1.75	
34	Welle	Shaft	1		0303424034
35	Sicherungsring	Retaining ring	1	DIN 471 - 20x1,2	
39	Passfeder	Fitting key	2	DIN 6885 - A 6 x 6 x 14	
41	Zahnrad	Gear	1	M1,5/92Z	0303424041
42	Kugellager	Ball bearing	1	6202-2RSL	0406202.2R
43	Sicherungsring	Retaining ring	1	DIN 472 - 35 x 1,5	
44	Buchse	Bushing	1		0303424044
45	Welle	Shaft	1		0303424045
46	Zahnrad	Gear	1	M2/33Z	0303424046
47	Buchse	Bushing	2		0303424047
48	Passfeder	Fitting key	2		0303424048
49	Ring	Ring	4		0303424049
50	Zahnrad	Gear	1	M2/Z58	0303424050
51	Kugellager	Ball bearing	5	3203-2Z	0403203.2R
52	Niet	Rivet	24	GB 873 4 x 28 x 23,4	
53	Ring	Ring	4		0303424053
54	Ring	Ring	2		0303424054
55	Passfeder	Fitting key	4	DIN 6885 - A 5 x 5 x 20	
56	Sicherungsring	Retaining ring	2	DIN 471 - 17x1	
57	Kugellager	Ball bearing	1	6303-2Z	0406303.2R
58	Kugellager	Ball bearing	3	6203-2Z	0406203.2R
59	Welle	Shaft	1		0303424059
60	Sicherungsring	Retaining ring	1	DIN 472 - 40 x 1,75	
61	Zahnrad	Gear	1	M2x30Z	0303424061
62	Hülse	Sleeve	1		0303424062
63	Ring	Ring	1		0303424063
64	Buchse	Bushing	1		0303424064
65	Kugellager	Ball bearing	1	6006-2RZ	0406006.2R
66	Wahlknopf	Knob	3	alt	0303424066
66	Wahlknopf	Knob	3	neu	03034240661
67	Aufnahme	Collet	3	alt	0303424067
67AB	Aufnahme	Collet	3	neu AB	0303424067AB
67CD	Aufnahme	Collet	3	neu CD	0303424067CD
68	Innensechskantschraube	Socket head screw	9	ISO 4762 - M6 x 16	
69	Klotz	Block	2		0303424069
70	Welle	Shaft	2		0303424070
71	Zylinderstift	Cylinderical pin	2	4x20	
75	Gewindestift	Grub screw	3	GB 77-85 - M8 x 16	
76	Gewindestift	Grub screw	3	GB 79-85 - M8 x 25	
77	Druckfeder	Spring	3		0303424077
78	Stahlkugel	Steel ball	4		0303424078
79	Anzeige	Indicator	3		0303424079
81	Sechskantmutter	Hexagon nut	1	GB 6170-86 - M6	
82	Gewindestift	Grub screw	1	GB 79-85 - M6 x 30	0303424082
83	Feder	Spring	1		0303424083
84	Aufnahme	Collet	1		0303424084
85	Welle	Shaft	1		0303424085
86	Kugellager	Ball bearing	1	16005	0303424086
87	Elektrokupplung	Electrical clutch	1		0303424087
88	Sicherungsring	Retaining ring	1	DIN 471 - 25x1,2	
89	Schneckenrad	Worm gear	1		0303424089
90	Ring	Ring	1		0303424090
91	Sicherungsblech	Lock washer	1	GB 858-88 - 24 x 34	
92	Nutmutter	Groove nut	1	GB 812-88 - M24x1,5	
93	Aufnahme	Collet	1		0303424093
94	Spirafeder	Spring	1		0303424094
95	Zylinderstift	Cylindrical pin	1	ISO 2338 - 6 h8 x 32 - B	
96	Schmiernippel	Lubrication cup	1	JB-T7940.4-1995-1_8mm	0303424096
99	Schrägkugellager	Angular ball bearing	1	6002-2Z	0406002.2R
100	Sicherungsring	Retaining ring	2	DIN 472 - 32 x 1.2	

Ersatzteilliste Bohrkopf DH 32GSV - Spare part list drilling head DH 32 GSV					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
101	Sicherungsring	Retaining ring	1	DIN 471 - 15 x 1	
106	Winkel	Holder	1		03034240106
107	Kontaktgeber	Contact maker	2		03034240107
108	Sechskantmutter	Hexagon nut	2		03034240108
109	Innensechskantschraube	Socket head screw	17	ISO 4762 - M6 x 12	
111	Innensechskantschraube	Socket head screw	4	ISO 4762 - M8 x 50	
112	Spannstift	Lock pin	2	GB 879-86 - 8 x 45	
113	Hebel	Lever	3		03034240113
114	Abdeckung	Cover	1		03034240114
115	Innensechskantschraube	Socket head screw	2	ISO 4762 - M4 x 6	
116	Abdeckung	Cover	1		03034240116
117	Innensechskantschraube	Socket head screw	4	ISO 4762 - M4 x 10	
118	Verschluss	Plug	3		03034240118
119	Taster	Button	3		03034240119
120	Motor	Motor	1		03034240120
123	Abdeckung	Cover	1		03034240123
124	Abdeckung	Cover	1		03034240124
125	Maschinenlampe	Machine lamp	1		03034240125
126	Abdeckung	Cover	1		03034240126
127	Zylinderstift	Cylindrical pin	2	ISO 8734 - 8 x 30 - A	
129	Innensechskantschraube	Socket head screw	4	ISO 4762 - M6 x 20	
131	Abdeckung	Cover	1		03034240131
132	Mikroschalter	Micro switch	1		03034240132
133	Innensechskantschraube	Socket head screw	3	ISO 4762 - M3 x 12	
135	NOT-Halt Schalter	Emergency stop button	1		03034240135
136	Kippschalter	Tapper switch	2		03034240136
139	Skala	Scale	1		03034240139
140	Scheibe	Washer	1	DIN 125 - A 3,2	
141	Ring	Ring	1		03034240141
145	Wahlschalter	Mode switch	1		03034240145
146	Sensor	Sensor	2	Omron	03034240146
147	Hauptschalter	Main switch	1		03034240147
150	Anschlusskabel	Connector cable	1		03034240150
151	Stecker, Fusspedal	Plug, foot pedal	1		03034240151
153	Zahnrad	Zahnrad	1	M2,5x27	030342401531
154	Zahnrad	Zahnrad	1	M2/55Z	03034240154
155	Zahnrad	Gear	1		03034240155
				ab/from 06/2018 M2/60Z	030342201921
156	Zahnrad	Zahnrad	1	M2/33Z	03034220193
157	Zahnwelle	Gear shaft	1		03034220127
				ab/from 06.2018 /M2/Z13	030342201221
158	Zahnrad	Gear	1	M2/40Z	03034240158
160	Signalgeber	Signal transmitter	1		03034245160
161	Halter Sensor	Holder sensor	1		03034245161
162	Drehzahlsensor	Rotation speed sensor	1		03034245162
163	Platte	Plate	1		03034245163
164	Endschalter	End switch	2		03034245164
167	Potentiometer	Potentiometer	1		03034245167
168	Knopf	Knob	1		03034245168
169	Schaltkasten	Switch box	1		03034245169
170	Lüfterdeckel	Fun cover	1		03034245170
171	Lüfterrad	Fun	1		03034245171
172	Klemmkasten	Electrical box	1		03034245172
173	Drehzahlanzeige	Rotation speed indicator	1		03034245173
174	Label	Lable	1		03034245173
175	Bedienpanel	Control	1		03034245175
176	Zahnrad	Gear	1	M1,5x18Zx28Z	03034240176
177	Messingstift	Brass pin	1		03034240177
178	Tellerfeder	Plate spring	6		03034240178
179	Scheibe	Washer	2		03034240179
180	Zahnrad	Gear	1		03034240180
181	Welle	Shaft	1		03034240181
182	Stift	Pin	2		03034240182
183	Welle	Shaft	1		03034240183
184	Stift	Pin	1	8x28	03034240184
185	Gabel	Fork	1		03034240185
186	Buchse	Bushing	1		03034240186
187	Knopf	Knob	1		03034240187
188	Glühlampe	Lamp	1	24V/20W	03034240188
189	Abdeckung	Cover	1		03034240189
190	Sicherungsring	Retaining ring	1	55	
191	Welle	Shaft	1		03034240191
192	Gewindestift	Grub screw	8	M8x10	
193	Stahlkugel	Steel ball	8	6	03034220186
194	Feder	Spring	8	0,8x5x25	03034220187
195	Feder	Spring	8	0,8x5x16	03034220188
196	Scheibe	Washer	1		03034220189
197	Hülse	Sleeve	1		03034220190
198	Passfeder	Fitting key	1	5x5x10	
199	Stopfen	Plug	2		03034240199
200	Schaltbox	Switch box	1		03034245200
201	Abdeckung	Cover	1		03034245201
202	Abdeckung	Cover	1		03034245202

8.10 Bohrtisch - Drilling table

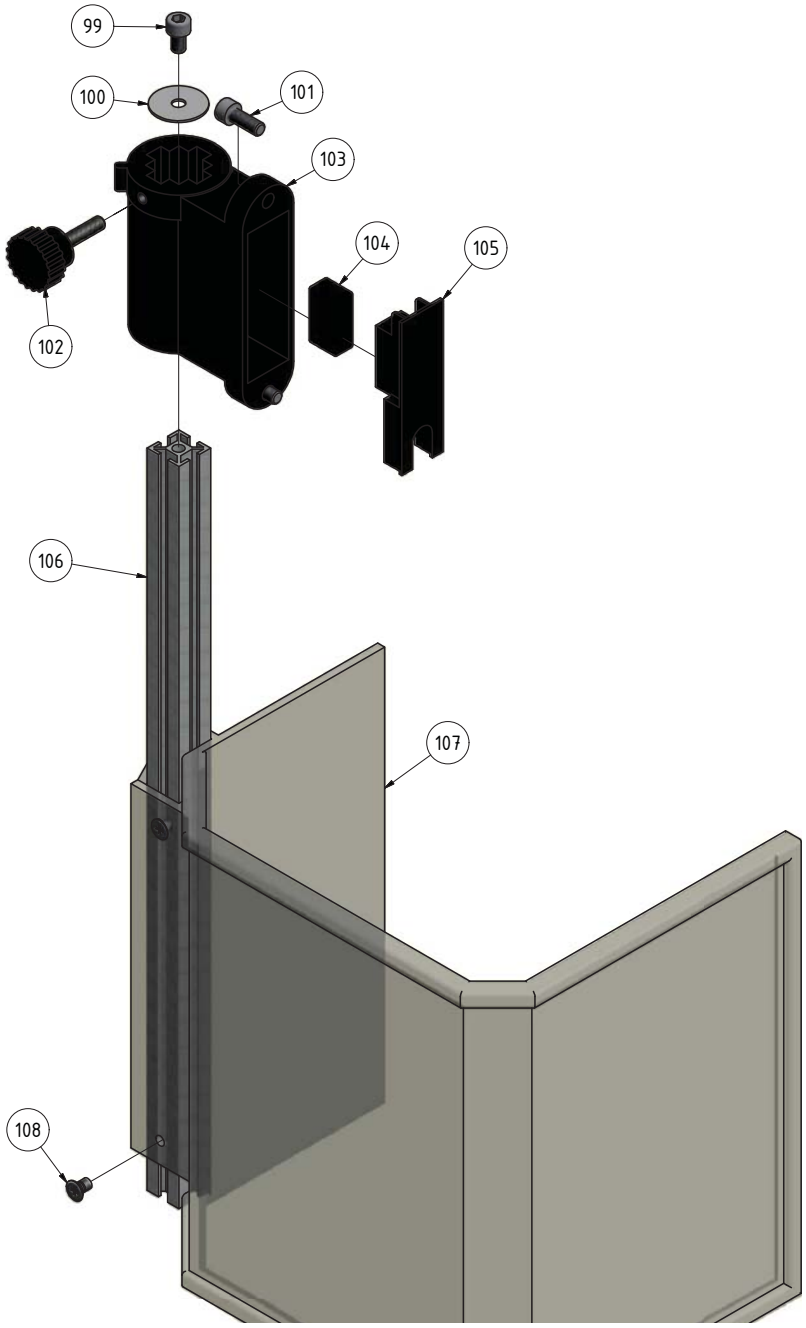


8-10: Bohrtisch - Drilling table

Ersatzteilliste Bohrtisch- Spare part list drilling table - DH 32 GSV					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
1	Maschinenfuss	Machine base	1		0303424021
2	Bohrsäule	Drill column	1		0303424022
3	Innensechskantschraube	Socket head screw	13	ISO 4762 - M14 x 40	
4	Scheibe	Washer	5	DIN 125-A 14	
5	Kühlmittelpumpe	Coolant pump	1		03034340216
6	Platte	Plate	1		0303424026
7	Platte	Plate	1		0303424027
8	Spänefilter	Chip filter	1		03020285304
9	Zahnstange	Rack	1		0303424029

Ersatzteilliste Bohrtisch- Spare part list drilling table - DH 32 GSV					
Pos.	Bezeichnung	Description	Menge Qty.	Grösse Size	Artikelnummer Item no.
10	Innensechskantschraube	Socket head screw	8	ISO 4762 - M6 x 16	
11	Innensechskantschraube	Socket head screw	2	ISO 4762 - M8 x 20	
12	Bohrtisch	Drilling tabel	1		03034240212
13	Welle	Shaft	1		03034240213
14	Ring	Ring	1		03034240214
15	Kurbel	Crank	1		03034240215
16	Schraube	Screw	1		03034240216
17	Griff	Grip	1		03034240217
18	Innensechskantschraube	Socket head screw	1	ISO 4762 - M8 x 16	
19	Zahnrad	Gear	1		03034240218
20	Welle	Shaft	1		03034240219
21	Scheibe	Washer	2	20	
22	Schmiernippel	Lubrication cup	1	JB-T7940.4-1995-1_8mm	03034240222
23	Schmiernippel	Lubrication cup	2	JB-T7940.4-1995-1_6mm	03034240223
24	Schlauchbinder	Hose fitting	4		
25	Anschluss	Connector	1		03034240225
26	Stopfen	Plug	1		03034240226
27	Anschluss	Connector	1		03034240227
28	Innensechskantschraube	Socket head screw	1	ISO 4762 - M16 x 50	
29	Buchse	Bushing	1		03034240229
30	Welle	Shaft	1		03034240230
31	Scheibe	Washer	1		
32	Hebel	Lever	1		03034240232
33	Kühlmitteleinrichtung	Coolant unit	1		03034240233
34	Kühlmittelschlauch	Coolant hose	1		03034240234
35	Kühlmittelschlauch	Coolant hose	1		03034240235
36	Innensechskantschraube	Socket head screw	1	ISO 4762 - M5 x 16	
51	Fitting	Fitting	1		03034240251
52	Anschluss	Plug	1		03034240252

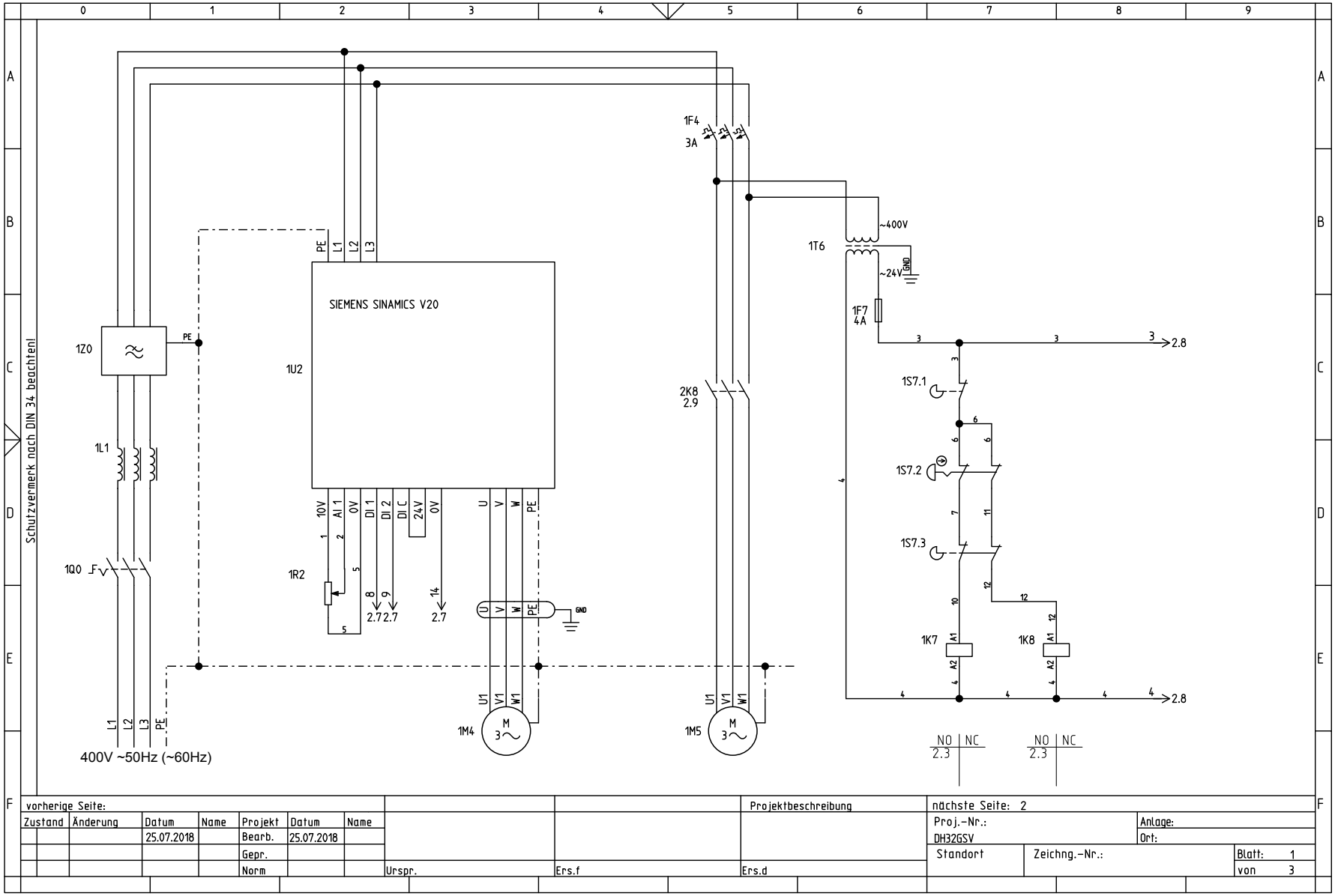
8.11 Bohrfutterschutz - Drilling chuck protection



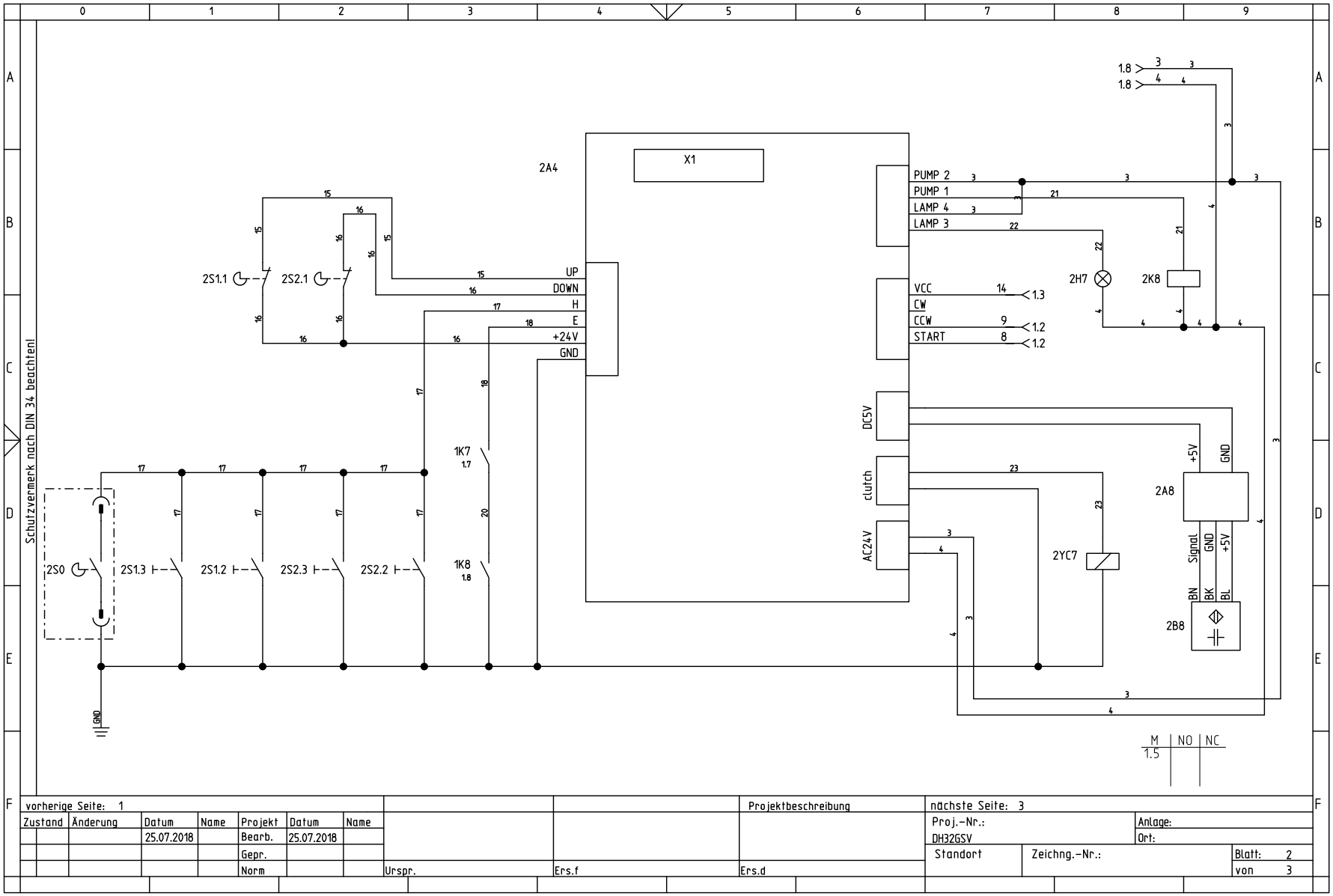
8-11: Bohrfutterschutz- Drilling chuck protection

Ersatzteilliste Bohrfutterschutz - Spare part list drilling chuck protection				
Pos.	Bezeichnung	Description	Menge Qty.	Artikelnummer Item no.
99	Innensechskantschraube	Socket head screw	1	030342301199
100	Scheibe	Washer	1	030342301100
101	Innensechskantschraube	Socket head screw	1	030342301101
102	Rändelschraube	Knurled screw	1	030342301102
103	Halterung	Fixture	1	030342301103
104	Mikroschalter	Microswitch	1	030342301104
105	Platte	Plate	1	030342301105
106	Alu- Profil	Aluminium profile	1	030342301106
107	Bohrfutterschutz	Drill chuck protection	1	030342301107
108	Schraube	Screw	1	030342301108
109	Bohrtabelle	Drilling chart	1	030342301109
110	Label Schaltstellung	Label switch position	1	030342301110

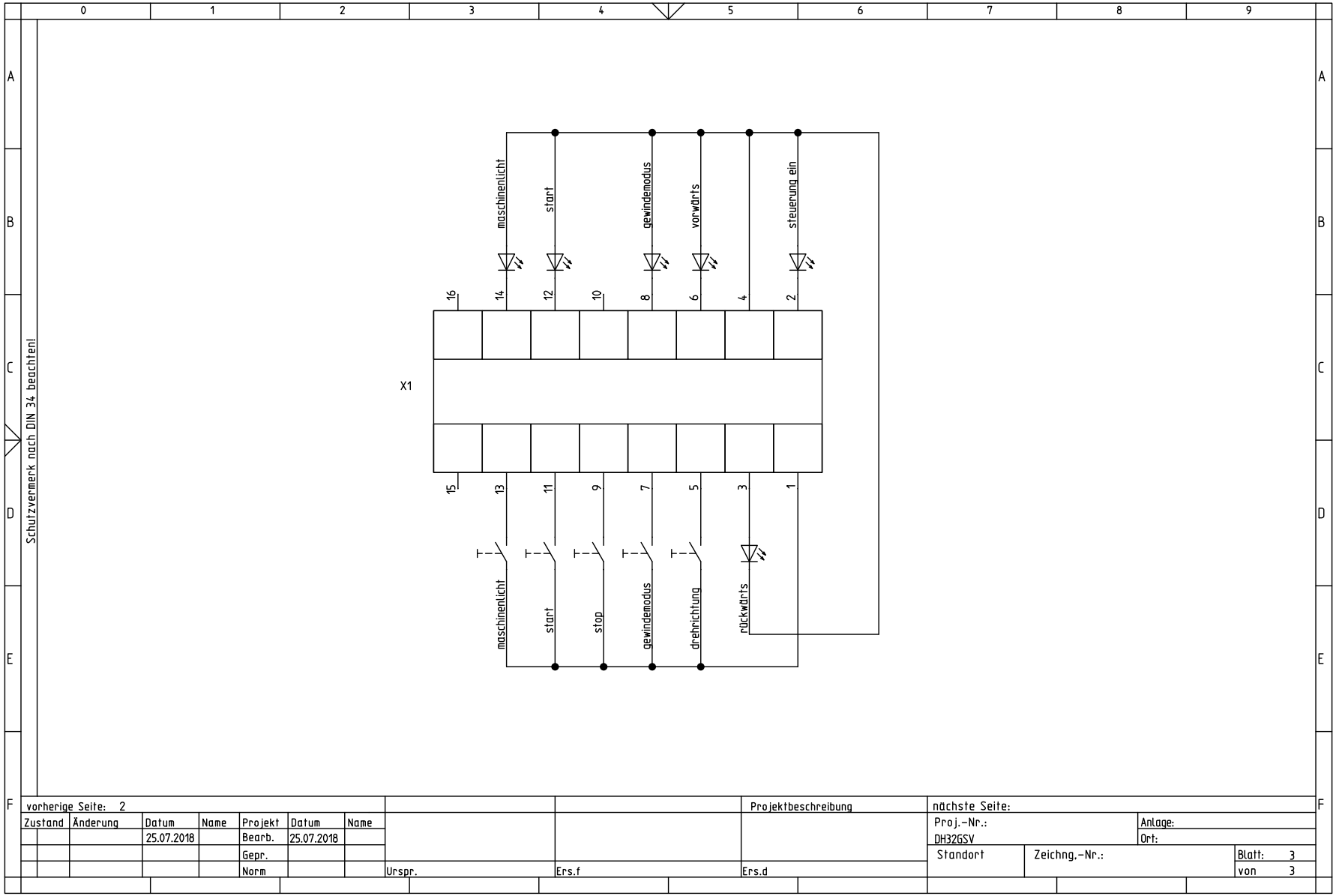
8.12 Schaltplan - Wiring diagram - DH 32 GSV - 1-3



8.13 Schaltplan - Wiring diagram - DH 32 GSV - 2-3



8.14 Schaltplan - Wiring diagram - DH 32 GSV - 3 of 3



Teileliste elektrische Komponente - Spare part electrical component - DH 32 GSV					
Pos.	Bezeichnung	Description	Menge Qty.	Größe Size	Artikelnummer Item no.
1F4	Sicherungsautomat	Automatical fuse	1		03034245F4
1F7	Sicherung	Fuse	1		03034245F7
1M4	Antriebsmotor	Drive motor	1		03034240120
1M5	Motor Kühlmittelpumpe	Coolant pump motor	1		03034340216
1Q0	Hauptschalter	Main switch	1		03034240147
1R2	Potentiometer	Potentiometer	1		03034245167
1L1	Drossel	Inductor	1		030342451L1
1T6	Transformator	Transformer	1		03034245T1
1U2	Frequenzumrichter	Frequecy converter	1		030342451U2
1Z0	Netzfilter	Line filter	1		030342451Z0
2A4	Steuerung	Control	1		030342452A4
2A8	Steuerung Drehzahlanzeige	Control rotation speed indicator	1		030342452A8
2B8	Drehzahlsensor	Rotation speed sensor	1		03034245162
2H7	Maschinenlicht	Machine lamp	1		03034245H7
2K8	Relais Kühlmittelpumpe	Coolant pump relay	1		03034245K8
2S0	Schalter Fusspedal (option)	Foot pedal (option)	1		03050032
2S2.1	Positionsschalter untere Stellung	Top position switch	2		03034245S6
2S1.1	Positionsschalter obere Stellung	Down position switch			
2S1.2/ 2S1.3/ 2S2.3/ 2S2.2	Drucktaster automatischer Vorschub	Button automatc feed	4		03034240119
1S7.2	Not-Halt-Schalter	Emergency stop button	1		03034240135
1S7.3	Schalter Bohrfutterschutz	Drill chuck switch	1		030342301104
1S7.1	Schalter Werkzeugaustreiber	Tool remove switch	1		03034245S9
2YC7	Elektrokupplung	Electrical coupling	1		0303424087
1K7/1K8	Steuerrelais	Control relays	2		03034245K7

9 Malfunctions

Malfunction	Cause/ possible effects	Solution
Motor is hot	• Wrong electrical connection of 400V machines	• ☞ "Electrical connection“ 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.6-5: “Gear opening DH 26 GTV, DH 28 GSV“ on page 59
Bit „burnt“	• Drill speed too high /feed too high • Chips do not come out of the drill hole. • Drill blunt • No or too little cooling	• Select another speed • Extract drill more often during work • Sharpen or use new drill • Use cooling agent
Drill tip is running off centre, the drilled hole is non-round	• Hard points on the workpiece • Length of the cutting spirals/or angles on the tool are unequal • Drill deformed	• Use new drill
Drill is defective	• No base / support used.	• Use support and clamp it with the workpiece
Drill is running non-round or shaking	• Bit deformed • Bearing worn down • Drill is not correctly clamped. • Drill chuck defective	• Use new drill • Have the spindle bearings replaced • Correctly clamp drill • Replace the drill chuck
It is not possible to insert the drill chuck or the taper mandrel	• Dirt, grease or oil on the taper inside of the drill chuck or on the taper surface of the drill spindle • Positioning the follower in the drill spindle is not considered	• Clean surfaces well • Keep surfaces free of grease Img.4-6: “Quick-action drill chuck“ on page 40
Motor does not start.	• Motor is wrongly connected • Fuse is defective • Drill chuck guard not closed	• Have it checked by qualified • Close drill chuck guard
Motor is overheating and there is no power	• Motor overloaded? • Too low mains voltage • Motor is wrongly connected	• Reduce feed Disconnect immediately and have it checked by authorized personnel • Have it checked by qualified
Precision of the work deficient	• Irregularly heavy or tensed work-piece • Inexact horizontal position of the work-piece holder	• Balance the piece statically and secure without straining • Adjust workpiece-holder
Drilling spindle sleeve does not return to its initial position	• Spindle return spring does not work	• Check spindle return spring, replace it, if necessary

Malfunction	Cause/ possible effects	Solution
The drilling spindle cannot be moved downwards.	• Integrated drill has been swiveled inwards • 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
Rattle the spindle if the work-piece surface is rough.	• Excessive slack in bearing. • 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 renew the tool. • Clamp the workpiece firmly.

10.1 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 21

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

- Maximum stacking height

  Example: not stackable - do not stack a second packing case 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.

10.2 Advice for disposal / Options of reuse:

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

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

10.2.1 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.

- **Unplug the power cord.**
- **Cut the connection cable.**
- **Remove all operating materials from the used device which are harmful to the environment.**
- **If applicable remove batteries and accumulators.**
- **Disassemble the machine if required into easy-to-handle and reusable assemblies and component parts.**
- **Dispose of machine components and operating fluids using the intended disposal methods.**

10.2.2 Disposal of new device packaging

All used packaging materials and packaging aids from the machine are recyclable and gener-ally need to be supplied to the material reuse.

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

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

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

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

10.2.3 Disposal of the old device

INFORMATION

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

Please note that the electrical devices comprise a variety of reusable materials as well as envi-ronmentally hazardous components. Please ensure that these components are disposed of separately and professionally. In case of doubt, please contact your municipal waste manage-ment. If appropriate, call on the help of a specialist waste disposal company for the treatment of the material.

10.2.4 Disposal of electrical and electronic components

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

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

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

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

10.2.5 Disposal of lubricants and coolants

ATTENTION!

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

INFORMATION

Used coolant emulsions and oils should not be mixed since it is only possible to reuse oils with-out pre-treatment when they have not been mixed.

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

10.3 Disposal via municipal collection facilities

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

The sign on the product or on its packing indicates that the product must not be handled as common household waste, but that is needs to be disposed of at a central collection point for recycling. Your contribution to the correct disposal of this product will protect the environment and the public health. Incorrect disposal constitutes a risk to the environment and public health. Recycling of material will help reduce the consumption of raw materials. For further information about the recycling of this product, please consult your District Office, municipal waste collec-tion station or the shop where you have purchased the product.

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