

Operating Instructions

GANNOMat

ProTec



CNC Controlled Through-Feed and Return-Feed
Drilling Machine for Drilling, Grooving and Routing

Erwin Ganner GmbH & Co KG
Hermann Ganner Straße 1
A-6410 Telfs Tirol Austria

Phone: +43/5262-62532
E-Mail: ganner@gannomat.at
Website: www.gannomat.com

Edition: 14/01/2015
Version: 1.1.3



Machine number:
Year:



Table of contents

1	General information	3
1.1	Protection note	3
1.2	General Information	3
1.3	Intended Use	3
1.3.1	Improper use	4
1.3.2	Operator duties	4
1.4	Warranty	5
1.5	Declaration of conformity	6
2	Safety	7
2.1	Symbols	7
2.2	Basic safety instructions	8
2.3	Workplace safety	8
2.4	Safety of persons	8
2.5	Careful handling and use	9
2.6	Service	10
2.7	Residual risks	11
3	Product description	12
3.1	Machine overview front	12
3.2	Machine overview rear	14
3.3	Processing units	15
3.3.1	Processing unit - Standard	15
3.3.2	Processing unit with routing unit - Profit	16
3.3.3	Processing unit with routing unit - Profit HSK63F	16
3.3.4	Processing unit with routing unit - Profit HSK63F with 3-compartment magazine	17
3.3.5	Processing unit - options	18
3.4	Workpiece transport device in Y-axis	20
3.5	Front operating and control elements	21
3.6	Rear operating and control elements	22
3.7	Technical data and dimensions	23
3.8	Type Plate	25
4	Commissioning	26
4.1	Transport and installation	26
4.2	Installation plan	29
4.3	Installation of the machine	30
4.4	Transport safeguard	31
4.5	Electrical connection	32
4.6	Pneumatic connection	33
4.7	Suction	34

4.8	Permissible operator stations	35
5	Setting instructions	36
5.1	For your safety	36
5.2	Tool adjustment	36
5.3	Tool change	41
5.3.1	Prepare tool change	41
5.3.2	Tool change of the drilling unit	43
5.3.3	Tool change of the groove cutter unit	44
5.3.4	Tool change of the Profit routing unit (option)	45
5.3.5	Tool change of the profit HSK63F routing unit (option)	46
5.3.6	Tool change of the profit HSK63F routing unit with 3-compartment magazine (option)	47
5.4	Clamping devices of the routing units (option)	50
5.4.1	General	50
5.4.2	Tool limit values	51
5.5	Pressure settings	55
6	Operating Instructions	56
6.1	Before you begin	56
6.2	Turning the machine on	56
6.3	Equipping the processing unit	57
6.4	Opening the machine program	58
6.5	Creating a processing cycle	59
6.6	Loading the machine program	60
6.7	Inserting a workpiece, starting and removing	62
6.8	Turning the machine off	63
7	Maintenance instructions	64
7.1	Pneumatic maintenance unit	64
7.2	Central lubrication of axle drives	65
7.3	Drill head lubrication	66
7.4	Linear guides	67
7.5	Cleaning	68
7.6	Checking the pneumatic connections	69
7.7	Cleaning and maintenance of the HSK tool holder (option)	70
7.7.1	Daily checks and cleaning	70
7.7.2	Monthly lubrication	73
7.7.3	Other checks and maintenance	74
8	Shutting down and disposal	76
8.1	Shutting down	76
8.2	Disposal	76

1 General information

1.1 Protection note



Reference

Refer to protection notice ISO 16016.

Technical product documentation - Protection notices for restricting the use of documents and products.

- The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization is prohibited.
- Offenders will be held liable for the payment of damages.
- All rights reserved in the event of the grant of a patent, utility model or design.

1.2 General Information

These instructions are directed at qualified personnel in the cabinetry or window building trades (e.g., carpenters). All users must be familiar with the contents of these operating instructions and act accordingly. These operating instructions must be available to all users at any time.

Persons under age or people in training may only operate the machines under supervision of an experienced qualified person and after explicit permission of the operator.

The language of the original operating instructions is German. All other language versions are translations of the original operating instructions and identified as such.

1.3 Intended Use

The machine usage includes:

- Fabrication of holes in plate workpieces made from chipboard, MDF and solid wood.
- Hardwood solid wood plates can only be processed to some extent. Consultation with the manufacturer is needed.

Drilling:

- Holes in the flat side of plate workpieces with a maximum hole diameter of 35 mm.
- Holes in the front side of plate workpieces with a maximum hole diameter of 12 mm.

Grooves:

- Use of a grooving tool (saw) of 125 mm diameter with a mounting hole of 30 mm diameter and a maximum width of 8.5 mm.

Routing:

- Profit routing unit:
Routing tool, shaft diameter max. 20 mm, nominal diameter max. 25 mm, total length max. 130 mm, effective length max. 61 mm, clockwise.
- Profit HSK63F routing unit:
Routing tool, shaft diameter max. 25 mm, nominal diameter max. 25 mm.

Maximum workpiece size

- Plate workpiece with a minimum size of X 50 mm, Y 250 mm for 1341 drill head, (Y 265 mm for 1351 drill head), and Z 6 mm.

Maximum workpiece size:

- Plate workpiece with a maximum size of X 1000 mm, Y 1200 mm (without additional roller tables) and Z 60 mm.

- Plate workpiece with a maximum size of X 1000 mm, Y 2500 mm (with roller table 750 mm front and back) and Z 60 mm.
- For longer workpieces with a maximum length of 5000 mm, longer roller tables must be mounted in front of and behind the machine tables.
- The permissible top weight of a workpiece to be processed is 75 kg.

**IMPORTANT**

The machine may be used exclusively in the manner that is described in these instructions.

- Each other usage is deemed as not as intended and is therefore not permitted.

**IMPORTANT**

Fundamentally, no external software may be installed on the machine. In exceptional cases this can be authorised after consultation with Ganner. Any liability for possible damage in connection with the installation of external software is excluded. If the machine is operated in a network (e.g. internet access), the machine operator bears the responsibility for adequate fusing. Installation of an anti-virus software is recommended.

OCCUPIED WORK SPACE

When working with the machine, the operating personnel must stand in the areas specified in the Section >Acceptable Operator Stations< within reach of the start and emergency stop buttons.

ENVIRONMENTAL CONDITIONS

Do not use the machine in an environment where there is danger of explosion. Use the machine at a temperature range from 5 to 40 Celsius. (41 to 104 F) Make sure the working area around the machine is clear of debris and obstructions.

1.3.1 Improper use

Any use which is not outlined in the chapter > Intended use < is considered to be improper. The operator alone is liable for damages resulting from this.

The following use is not permitted:

- Use of the machine with breaking or splintering materials,
- Use of the machine with radioactive or explosive materials,
- Use with defective parts,
- Use in explosive or flammable surroundings,
- Use in damp area or outdoor area,
- Concurrent use by several people,
- Unauthorized changes and modifications to the machine,
- Operation of the machine with missing or not fully functioning protection devices.

1.3.2 Operator duties

After the takeover of the machine by the operator, he is responsible for the designated use. The operator is responsible for the fact that his entire staff fulfils all necessary physical and mental requirements for the activities assigned to them on the machine.

The operator of the machine remains responsible for its use at all times. This also applies if the machine is used by third parties.

The operator must:

- Assign the various tasks at the machine to certified, suitable and authorised staff,
- initiate measures for the removal of damage,
- ensure that all protection devices are present and fully functional,
- ensure that the machine is operated exclusively in a technically flawless state,

- ensure that facilities for first aid as well as means for firefighting are within easy reach, well accessible and in perfect condition,
- the staff is equipped with adequate protective work clothing,
- ensure that the machine is protected against unauthorized use after shift end.

1.4 Warranty

This machine is designed and built to the highest quality standards. It should provide years of precision use, provided it is used as intended and properly maintained. In your own interest please carry out the usual inspection of the machine immediately upon delivery. Note any apparent transport damage on bill of lading. If damage has occurred, note the damage to the transport company as well as the dealer or agent from whom you purchased the machine. The guarantee declaration includes only the change over of parts, not the mounting-time and travelling-time of the service technician and no expenses for consequential damages.

It is not included in the guarantee:

- Transport damage (please inform immediately the transport-agent)
- Damage to the machine caused by improper or inappropriate use
- Consequential damages
- Damages to the working material;
- Normal wear and tear of parts such as belts, pulleys, gears, bearings, fuses etc.
- The replacement of working time.

1.5 Declaration of conformity

Identification of the manufacturer:

Company: Ganner Maschinenproduktions G.m.b.H
Address: Hermann Ganner Straße 1
A-6410 Telfs, Tirol AUSTRIA

We confirm that the machine identified below, in the design that we brought to market, fulfils the requirements of the harmonized EC directives, EC safety standards and product-specific EC standards. This declaration becomes invalid if the machine is modified without our consent.

Product information:

Model: Protec
Type number: 0571A
Function: CNC-controlled throughput and return drilling, grooving and milling machine

EC-standards
2006/42/EG
2006/95/EG
2004/108/EG

Harmonized EC:
EN ISO 12100:2010
EN ISO 14121-1:2007
EN 60204-1:2007

Technical Documentation:

Documentation Agent: Seebacher Hans Georg
Address: See the address of the manufacturer

Telfs, 04.06.2013

Ing. Erwin Ganner
Managing Director



2 Safety

2.1 Symbols

EXPLANATION OF THE SYMBOLS USED

**DANGER**

Warning about possible severe to fatal injuries of persons.

**WARNING**

Warning about possible light injuries of persons or possible material damages.

**CAUTION**

Warning about possible defects or destruction of the product

**DANGER**

Warning about possible severe to fatal injuries of persons because of electrical voltages.

**IMPORTANT**

This symbol marks all important information that definitely needs to be observed. Ignoring them can lead to damages to the product.

**IMPORTANT**

Read first the instructions

**NOTE**

This symbol marks information that provides a better understanding of the machine processes.

**DISPOSAL**

This symbol marks information about disposing of components and operational materials.

**DANGER**

Warning about possible severe injuries to the hands.

**WARNING**

Warning about possible severe injuries to the eyes.

**WARNING**

Warning about possible exceeding of the maximum permitted noise emission.

**WARNING**

Wearing protective gloves is mandatory.

**WARNING**

The machine must be disconnected from the power supply.

**WARNING**

WARNING against falling objects.

**WARNING**

Warning against being pulled into the machine.

**WARNING**

WARNING of hot surface.

2.2 Basic safety instructions

The following safety information need to be understood as supplementary to already valid national accident prevention regulations and laws.

Existing accident prevention regulations and laws must be observed in any case.

**Danger!**

All safety notes and instructions need to be read carefully before the startup.

Errors in complying with the instructions listed below can cause electrical shocks, burns and serious injuries.

- Store these safety notes and instructions safely for further use.
- Familiarise yourself with the operating elements and the proper handling of the machine.
- Operate the machine only with proper training of the technicians.

2.3 Workplace safety

**Danger!**

If work is distracted or lacking concentration, you may loose control of the machine.

Disorderliness and unlit working areas can cause accidents.

Do not work with the machine in environments where there is an explosion hazard, in which there are flammable liquids, gases or dusts.

- Keep children and other people away during use.
- Keep the work area clean and tidy.

2.4 Safety of persons

**Danger!**

Inattention when operating the machine

can cause serious injuries!

- Be attentive, watch what you are doing and be sensible when working with the machine.
- Do not use the machine when you are tired or if you are under the influence of drugs, alcohol or medications.

**Warning!****Careful when loading and unloading a workpiece.**

The consequence is cuts to and/or crushing of the hands.

- Do not reach into moving parts of the machine.
- Wait until the machine has come to a standstill before loading and unloading.
- Do not reach into the clamp area of the workpiece clamping cylinder.
- Do not remove electrical and mechanical safety equipment.
- Do not carry out any settings during operation.

**Warning!****Sawdust develops during drilling and metal particles develop if a tool breaks.**

Injury of the eyes due to flung out sawdust or pieces of metal.

- Always wear protective goggles.

**Warning!****Maximum noise emission**

The maximum noise emission can be more than 85 dB.

- Always wear ear protection.

2.5 Careful handling and use

**Warning!****Defective machine parts.**

Many accidents are caused because machines are poorly maintained.

- Check whether moveable machine parts function properly and are not damaged.
- Have damaged machine parts definitely repaired before use.
- Keep the drilling tools clean and sharp.

**Warning!****Overloading the machine**

Damage of machine parts and/or workpieces.

- Using the fitting tools and or workpieces, you work better and safer in the specified working area.

**Caution****Incorrect workpiece dimensions**

Possible consequences include significant damage to the workpiece, workpiece spindle, clamping system and the unit guides; maladjustment of the machine calibration; machine down time and expensive repair work.

- When loading the machine with a workpiece, always ensure that the actual workpiece size corresponds with the programmed workpiece size.
- Incorrect specification of the workpiece length, width and height must not be made.

2.6 Service

**Danger!****During troubleshooting and repair**

there may be dangerous situations!

- During maintenance and setting work, the machine always has to be disconnected electrically as well as pneumatically from the supply.
- Maintenance and setting work may be conducted only by a certified technician.
- The machine needs to be secured by a warning sign.
- Exclusively original parts are to be used for repairs.

2.7 Residual risks

The machine was designed in accordance with guideline 2006/42/EC, which defines the primary requirements for safety in the workplace and health protection of personnel. Despite warning signs on the machine and warning advice in the documentation, the following residual risks remain in the event of negligence of the operator:










Residual risks	Measures	
Danger from falling objects	Securely position the workpiece on the support table to prevent the workpiece from falling before the gripper has closed. Workpiece dimensions see >Intended Use<	
Crushing, pulling and dragging danger between the gripper jaws	The machine may only be operated by authorised specialist personnel. Simultaneous use by several people is forbidden!	
Crushing, clamping and shearing danger between gripper, clothing and workpiece	During the processing run, hands must be outside the danger areas. Do not put your hands between moving components and rigid covers!	
Damage to the machine from incorrect operation	Cautious handling of programming and machine mode! Allow only authorised specialist personnel to perform work! Understand the operating instructions!	
Danger of injury and burns to the hands	Allow workpieces to cool before replacing them! Only carry out equipping when the pneumatic circuit is under pressure. Caution when handling the tools. Wear gloves in the equipping phase. Allow the machine to cool down before maintenance work.	 
Danger of electric shock	Only technicians authorised by the manufacturer may have the control box key and only this person may open the control box.	
Danger from defective tools and tool grinding	Tools must be in a flawless condition. Checks in the equipping phase.	
Danger during maintenance work	Disconnect the machine from the power supplies before carrying out maintenance work.	

Table1 – Residual risks

3 Product description

3.1 Machine overview front

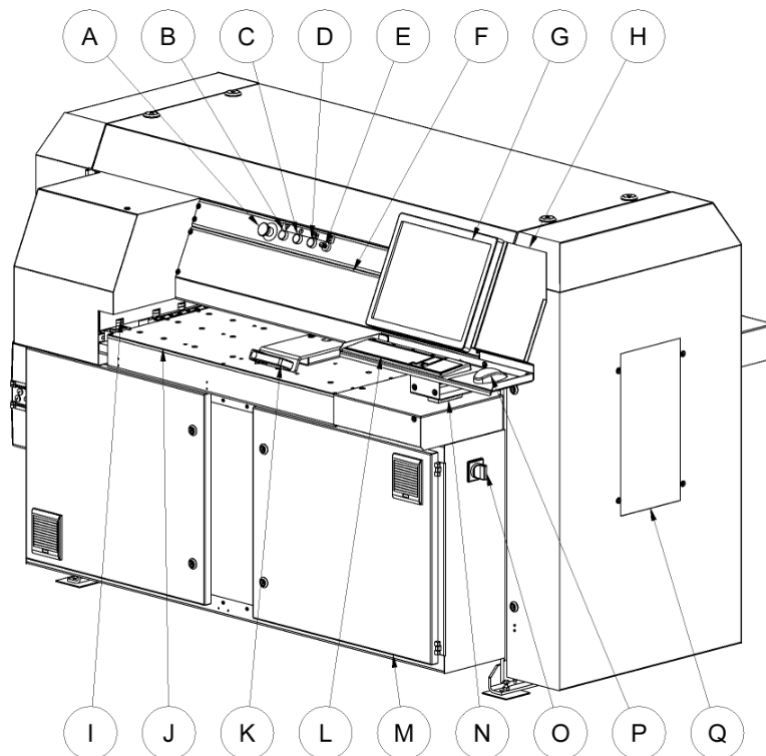


Fig. 1 – Machine Overview Front

Item	Description
A	Emergency stop pushbutton front
B	Red fault or status light
C	Control ON button (illuminated green when control is ON)
D	Start button blue
E	Setting potentiometer for milling feed rate
G	Monitor
H	Storage compartment
I	Rigid workpiece roller stop in Y-axis
J	Front air cushion table
K	Moveable workpiece roller stop in X-axis
L	Keyboard
M	Electrical control cabinet
N	USB distributor
O	Electrical main switch
P	PC mouse
Q	Viewing window in the processing room

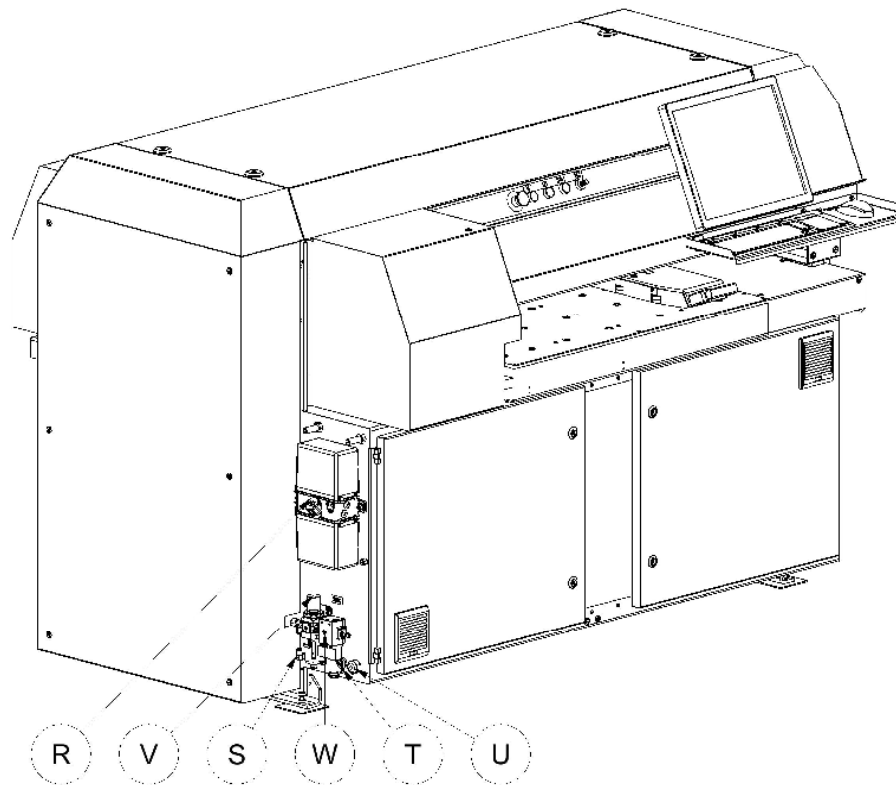


Fig.2- Machine Overview Front

Item	Description
R	Central lubrication system for axles
S	Pressure monitor of pneumatics
T	RJ45 network connector
U	Cable inlet for electrical supply
V	Filter pressure regulator for main pneumatic pressure
W	Soft start valve (option)

3.2 Machine overview rear

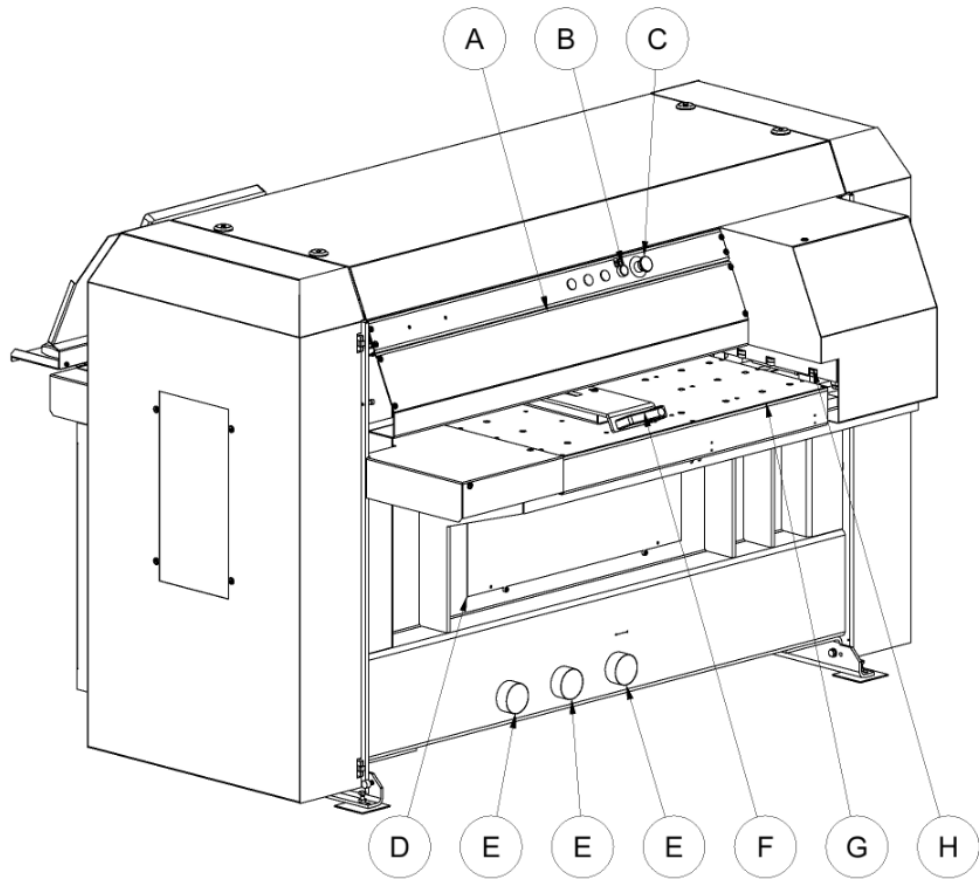


Fig.3 – Machine overview rear

Item	Description
A	Rear terminal protection
B	Rear start button (the button is lit blue if there is a possibility of a program start)
C	Emergency stop pushbutton rear
D	Maintenance opening rear
E	Three suction nozzles for drill head, saw and miller, diameter 80 mm
F	Moveable workpiece roller stop in X-axis
G	Rear air cushion table
H	Rigid workpiece roller stop in Y-axis

3.3 Processing units

3.3.1 Processing unit - Standard

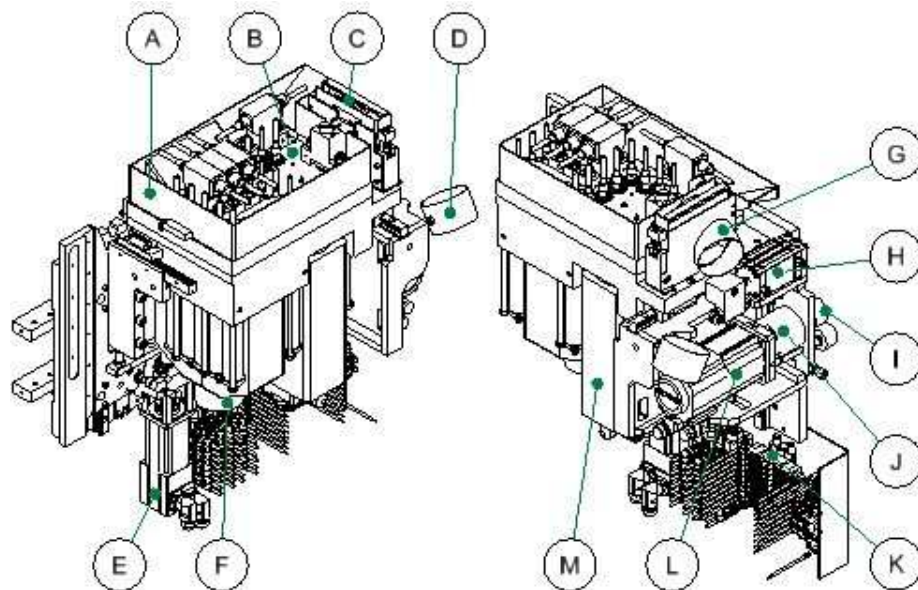


Fig.4- Processing unit – Standard

Item	Description
A	Drilling unit exhaust hood
B	Drilling unit BK1341, 13 vertical spindles, 4 horizontal double spindles, 1 saw unit
C	Saw unit
D	Suction connection pipe - saw unit (80 mm diameter)
E	Servo motor of the Z-axis (with brake, 0.51 kW, 1.2 Nm)
F	Suction connection pipe - drilling unit (80 mm diameter)
G	Saw unit exhaust hood
H	Cylinder for Y-drill feed
I	Drive gear X-axis
J	Planetary gear set X-axis
K	Valve block - processing unit
L	X-axis servo motor (1.1 kW, 1.8 Nm)
M	Drilling and saw unit drive motor (1.5 kW)

Options:

- Drilling unit BK1351, 13 vertical spindles, 5 horizontal double spindles, 1 saw unit
- Routing unit - Profit
- Routing unit - Profit HSK63F
- Routing unit - Profit HSK63F with 3-compartment magazine

3.3.2 Processing unit with routing unit - Profit

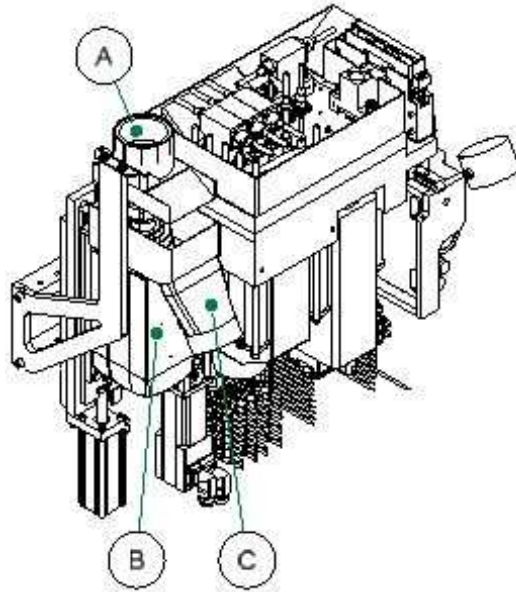


Fig.5- Processing unit with Profit routing unit

Item	Description
A	Routing unit exhaust hood
B	Routing unit - Profit
C	Suction connection pipe (80 mm diameter) - routing unit

3.3.3 Processing unit with routing unit - Profit HSK63F

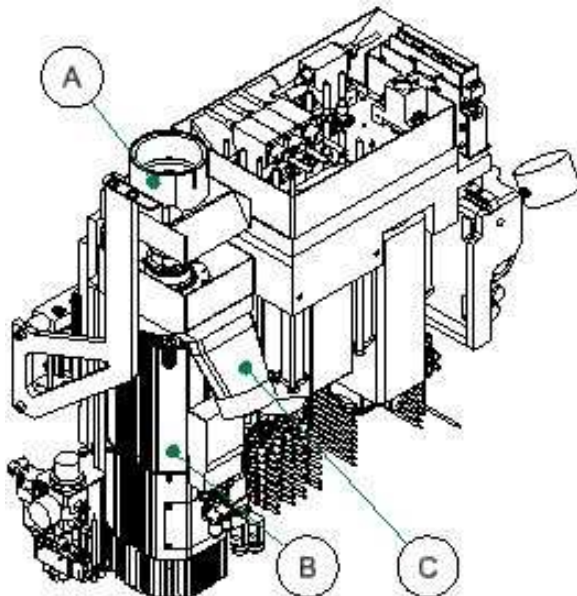


Fig.6- Processing unit with Profit routing unit HSK63F

Item	Description
A	Routing unit exhaust hood
B	Routing unit - Profit HSK63F
C	Suction connection pipe (80 mm diameter) - routing unit

3.3.4 Processing unit with routing unit - Profit HSK63F with 3-compartment magazine

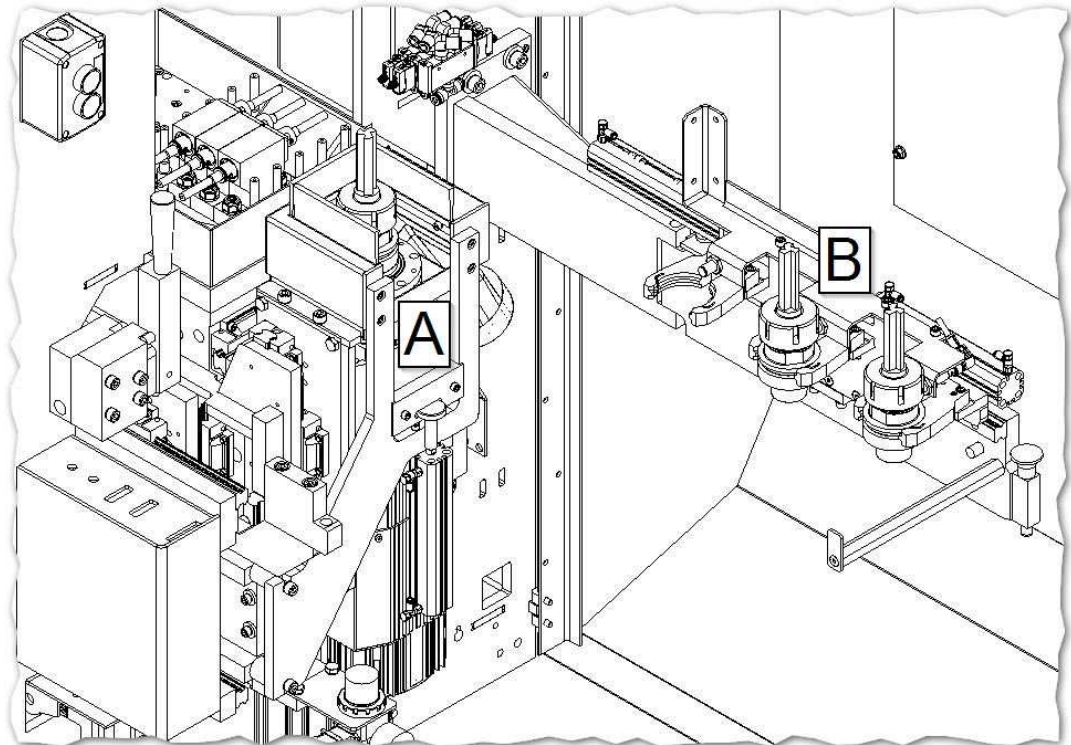


Fig.7- Processing unit with routing unit - Profit HSK63F with 3-compartment magazine

Item	Description
A	Processing unit - Profit HSK63F
B	3-compartment magazine

3.3.5 Processing unit - options

3.3.5.1 Routing unit with second double horizontal spindle in X-axis

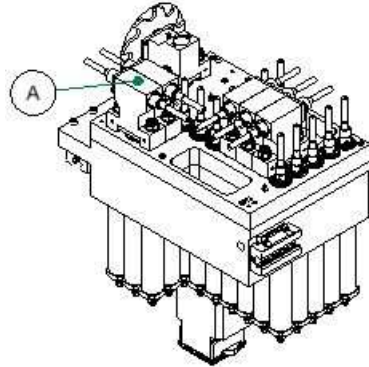


Fig.8- Routing unit with second double horizontal spindle in X-axis

Item	Description
A	Second double horizontal spindle in X-axis

3.3.5.2 Routing unit - Profit

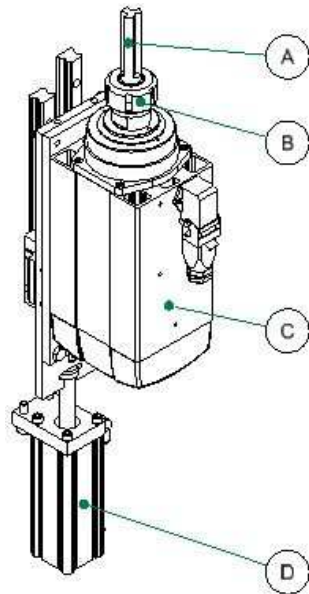


Fig.9 - Routing unit - Profit

Item	Description
A	Tool
B	Tool holder, ER32 collet chuck up to 20 mm diameter shaft
C	Electro spindle 4.5 kW
D	Feed cylinder

3.3.5.3 Routing unit - Profit HSK63F

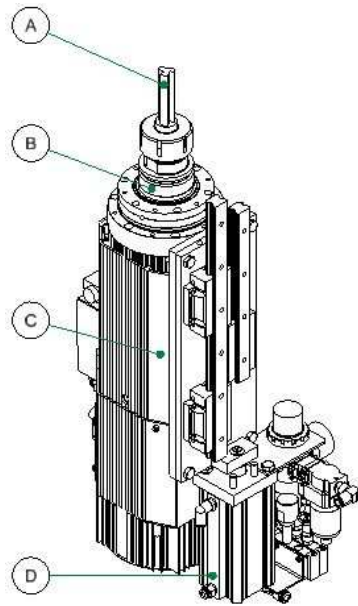


Fig.10 - Routing unit - Profit HSK63F

Item	Description
------	-------------

- | | |
|---|---|
| A | Tool |
| B | Tool holder, HSK63F with OZ25 collet chuck up to 25 mm diameter shaft |
| C | Electro spindle 5.5 kW |
| D | Feed cylinder |

3.4 Workpiece transport device in Y-axis

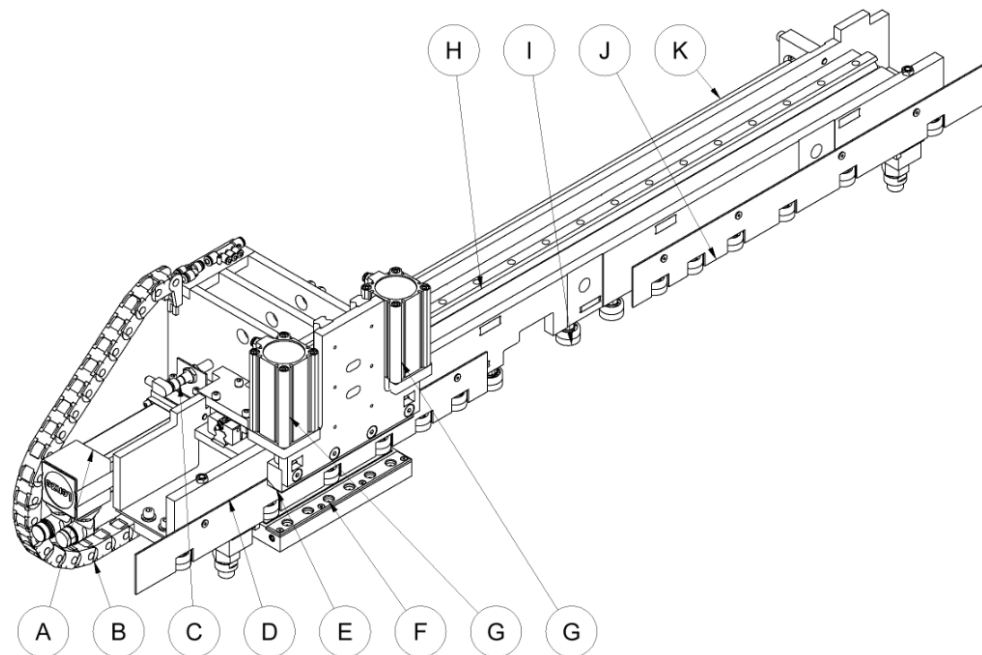


Fig.11– Workpiece transport

Item	Description
A	Drive motor for workpiece transport in Y-axis
B	Cable tow for pneumatics and lubrication lines
C	Reference check sensor
D	Front stop rollers and roller protection
E	Upper clamping jaw
F	Lower clamping jaw
G	Feed cylinder clamping jaw
H	Guide rail for workpiece transport
I	Stop roller
J	Rear roller protection
K	Ball screw spindle

3.5 Front operating and control elements

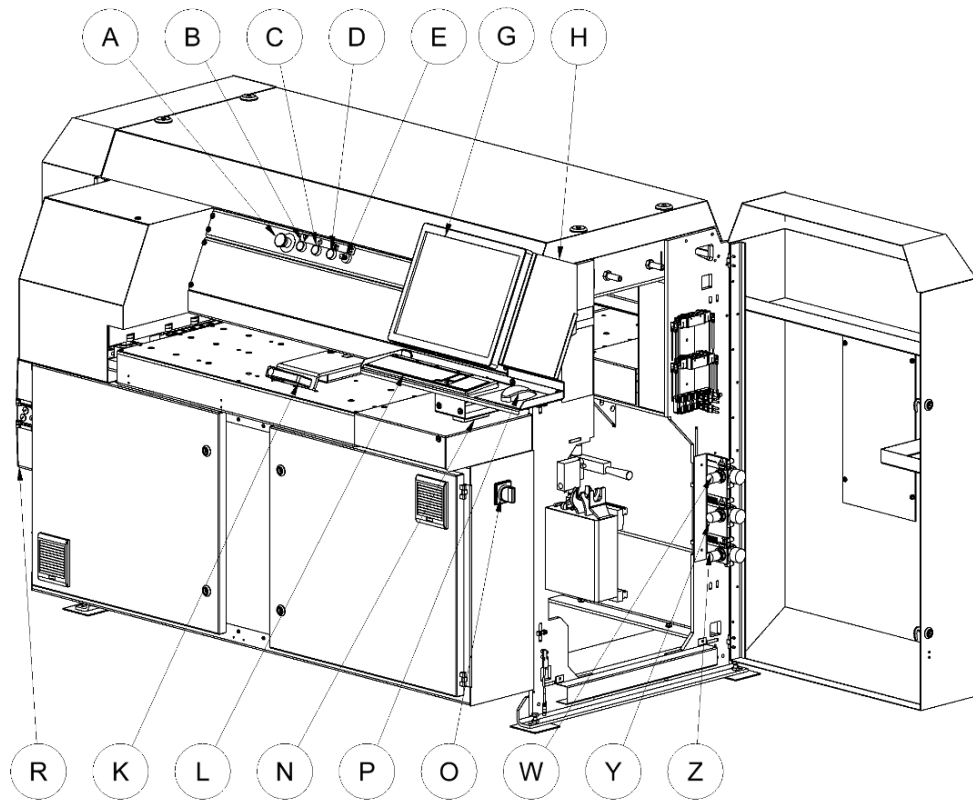


Fig.12- Front operating and control elements

Item	Description
A	Emergency stop pushbutton front
B	Red fault or status light
C	Control ON button (illuminated green when control is ON)
D	Start button blue
E	Setting potentiometer for milling feed rate
G	Monitor
H	Storage compartment
R	Central lubrication
K	Moving side clamping beam with pneumatic parking device
L	Keyboard
N	USB distributor
O	Electrical main switch
P	PC mouse
W	Pressure setting main pressure gripper
Y	Pressure setting pre-pressure gripper
Z	Pressure setting main pressure tensioner (optional)

3.6 Rear operating and control elements

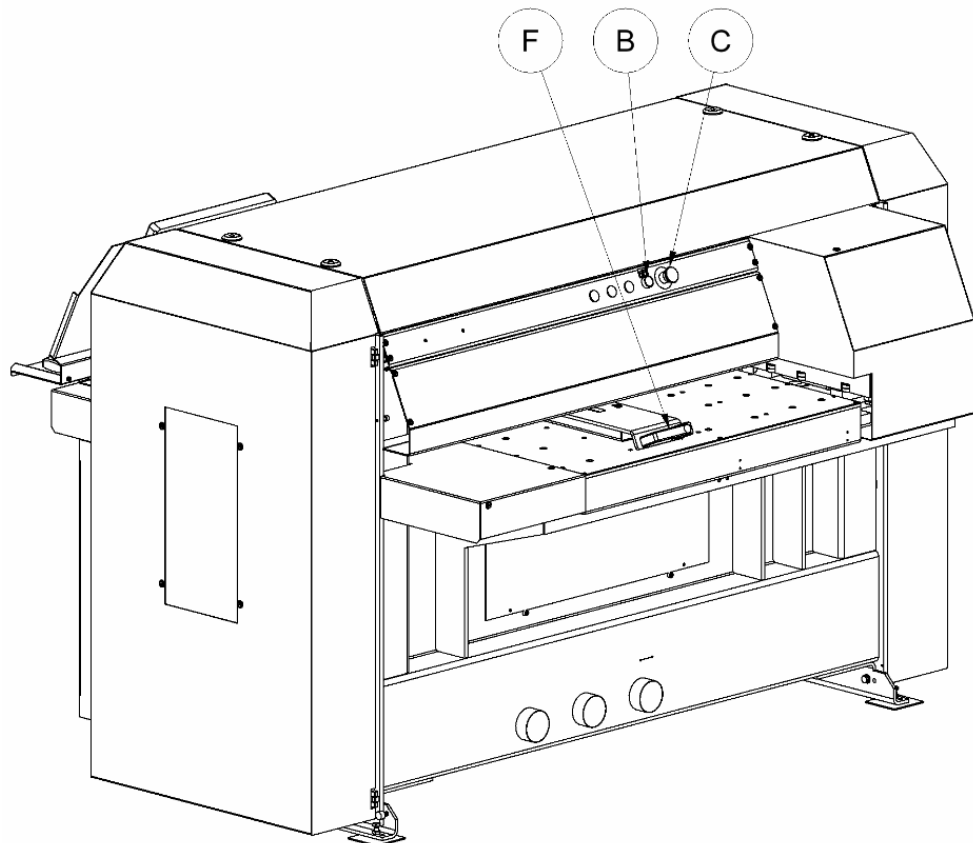


Fig.13- Rear operating and control elements

Item	Description
C	Emergency stop pushbutton rear
B	Start button blue
F	Moving side clamping beam with pneumatic parking device

3.7 Technical data and dimensions

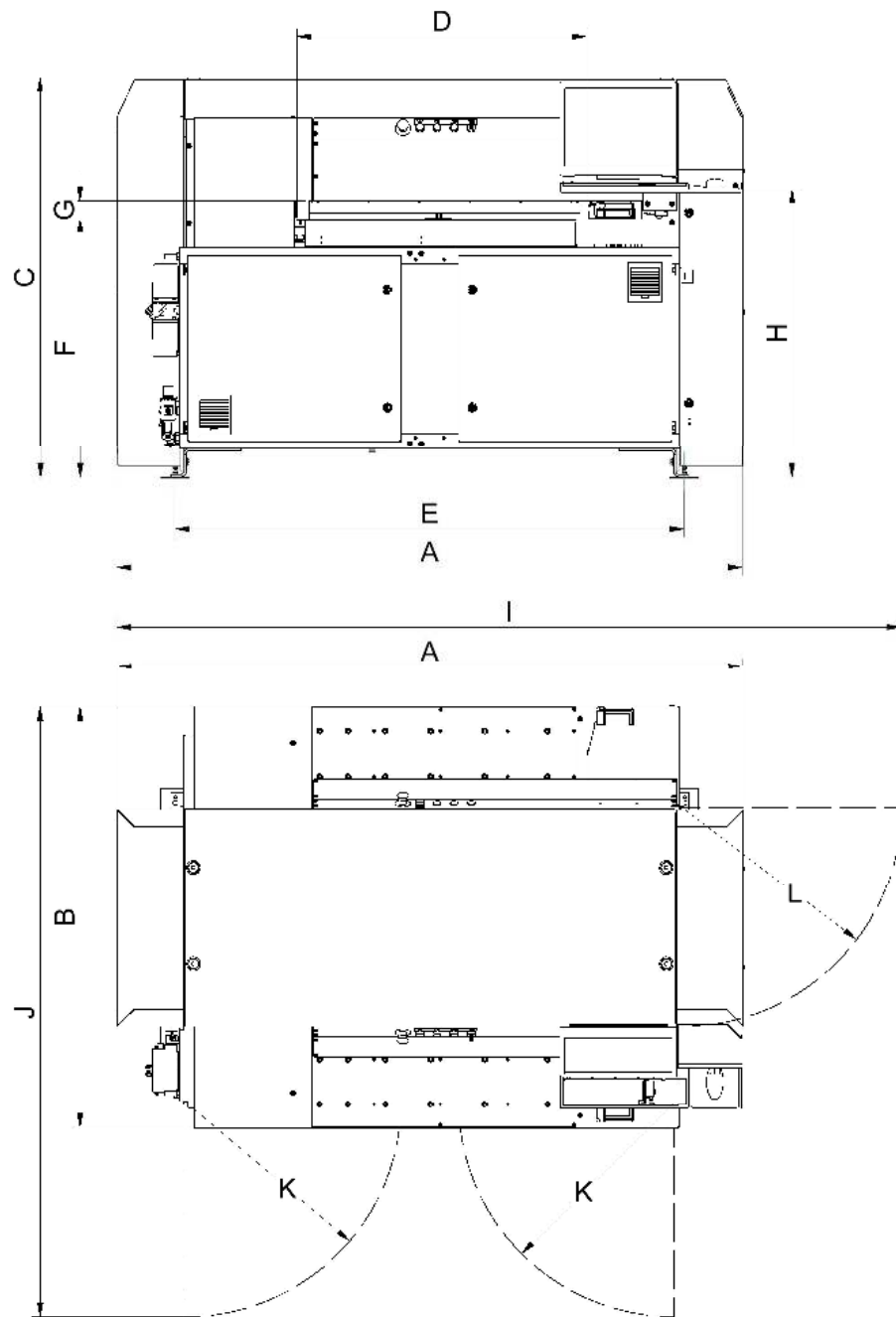


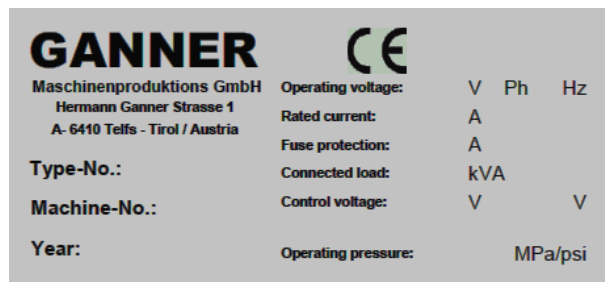
Fig.14– Layout

A	2200 / 2325 mm	G	60 mm
B	1484 mm	H	1020 mm
C	1409 mm	I	2758 / 2883 mm
D	1000 mm	J	2150 mm
E	1790 mm	K	R 758 mm
F	915 mm	L	R 770 mm

General technical data	ProTec
Maximum length	2200 mm 2325 mm (HSK63F option)
Maximum depth	1484 mm
Maximum height	1409 mm
Working height	915 mm
Motor – drilling and grooving drive	1.5 kW
Speed – drilling spindle	3095 RPM - 50 Hz / 3710 RPM - 60 Hz
Speed – grooving spindle	3975 RPM - 50 Hz / 4770 RPM - 60 Hz
Motor – milling spindle Profit	4.5 kW
Milling spindle speed Profit (option)	4000 – 18,000 RPM
Motor – milling spindle Profit HSK63F (option)	5.5 kW
Grooving spindle speed Profit HSK63F (option)	1000 – 20,000 rpm
Speed – drilling unit Z-axis	Max. 15 m/min
Sound pressure level according to EN ISO 3746:1996	99.2 dB
Emission sound pressure level according to EN ISO 11202:2009	85.8 dB
Suction diameter	3 x 80 mm diameter
Required suction air volume	3000 m ³ /h
Weight	1550 kg 1650 kg (HSK63F option)
Required space	X = 2.2 m / 2.4m (option HSK63F) Y = 1.5 m Z = 1.4 m
Compressed air consumption	300 l/min
Compressed air connection	6-8 bar / 85-112 psi
Power consumption	See wiring diagram

3.8 Type Plate

The type plate is arranged on the backside of the control cabinet.



Type-No.	Type number of the machine
Machine-No.	Coded machine number consisting of part number and date
Year	Year the machine was constructed
Operating voltage	Specification of the operating voltage in >V< Volt, >P< number of phases and >Hz< of the required network frequency
Rated Current	Maximum rated current of the machine in ampere
Fuse Protection	Required onsite fuse for the machine
Connected load	Maximum consumed apparent power of the machine
Control voltage	Voltages of the control circuits of the machine
CE	Conformity symbol
Operating pressure	Information about operating pressure in MPa / PSI

4 Commissioning

4.1 Transport and installation

The machine is shipped fully assembled and can be lifted and transported from under the central base frame by a forklift with a minimum loading capacity of 2000 kg.
Weight: 1650 kg

**WARNING**

Persons who are not required to install the machines may not remain in the danger area!

**Important note**

The machine is delivered on a pallet for unloading with a forklift as standard. Unloading by crane is not allowed with this pallet, as this can lead to damage to the machine frame and it can alter the calibration. Four M20 DIN 580 ring screws are provided for unloading by crane. These are screwed onto the top of the dust cover.

**WARNING**

Only lift the machine at the prescribed points!

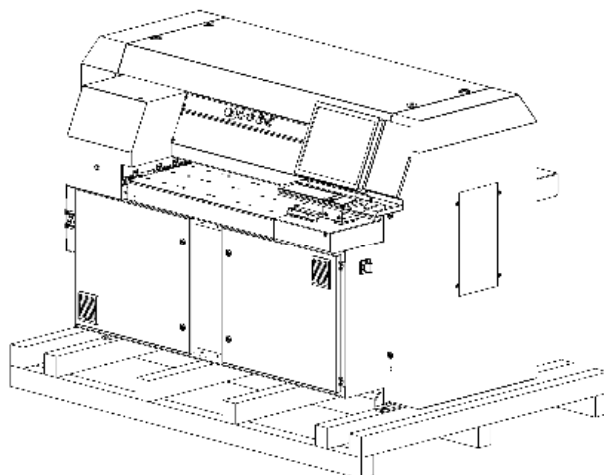


Fig.15- Delivery condition with standard pallet

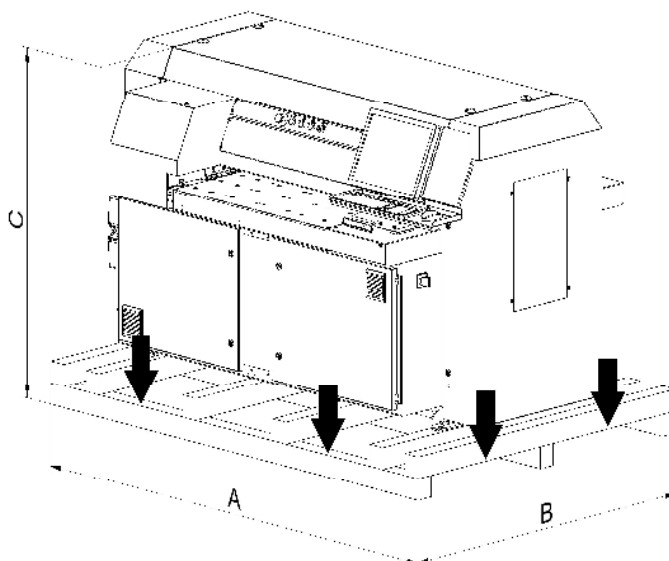


Fig.16- Lifting and unloading points with a standard pallet

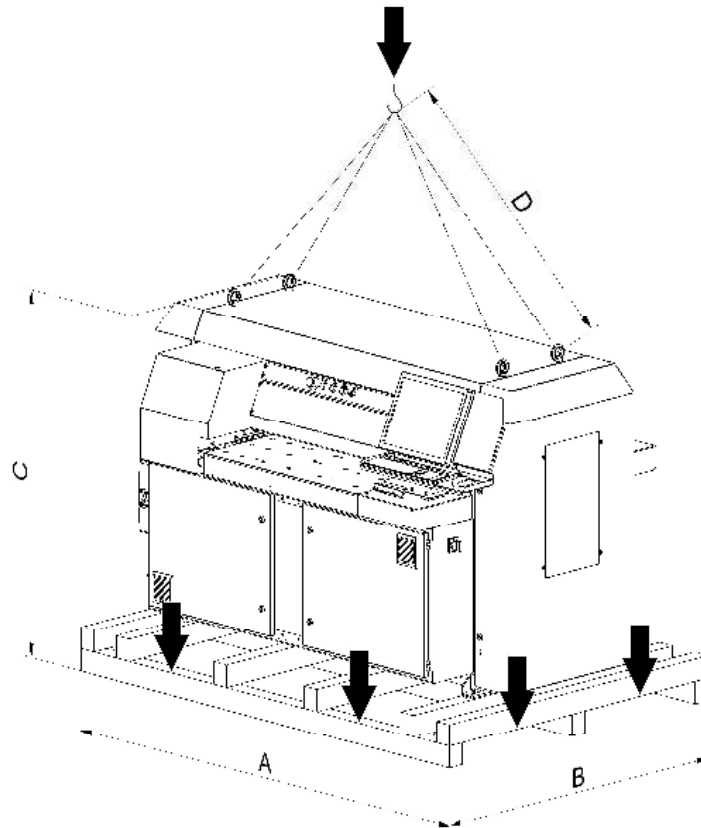


Fig.17– Transporting and lifting down the machine from the standard pallet with the ring screws

- A 2280 mm
- B 1600 mm
- C 1606 mm

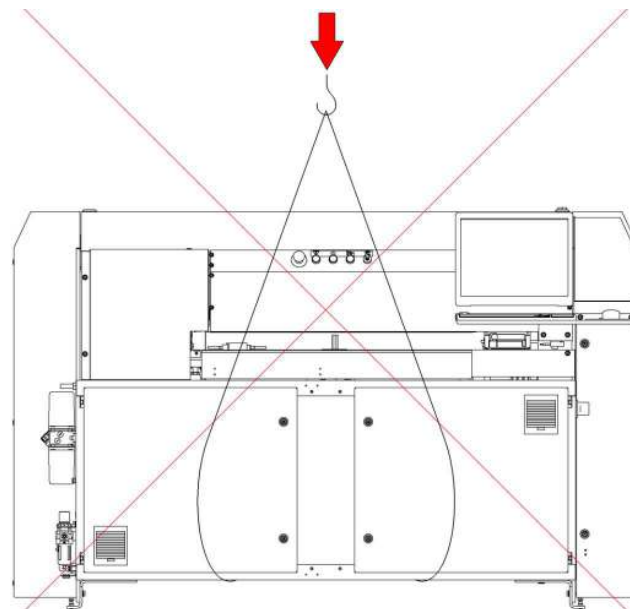


Fig.18– Transporting and lifting down the machine without the ring screws is not permissible.

**Warning!**

The centre of gravity is slightly outside the centre of the machine (to the right, in direction of monitor).

The machine tipping over when it is lifted can damage the machine and cause bodily injury.

- Determine the centre of gravity by lifting slightly.

4.2 Installation plan



Important note

Make sure that there is sufficient distance from walls and room dividers to prevent clamping and shearing dangers and to ensure safe access to media connections (suction, etc.), as well as being able to open the control cabinet and the maintenance door on the right. Distance A must be at least the maximum workpiece length plus 500 mm.

(e.g.: maximum workpiece length used is 5600 mm, this results in a distance A of 6100 mm).



WARNING

Clamping and shearing danger between wall and moving workpiece

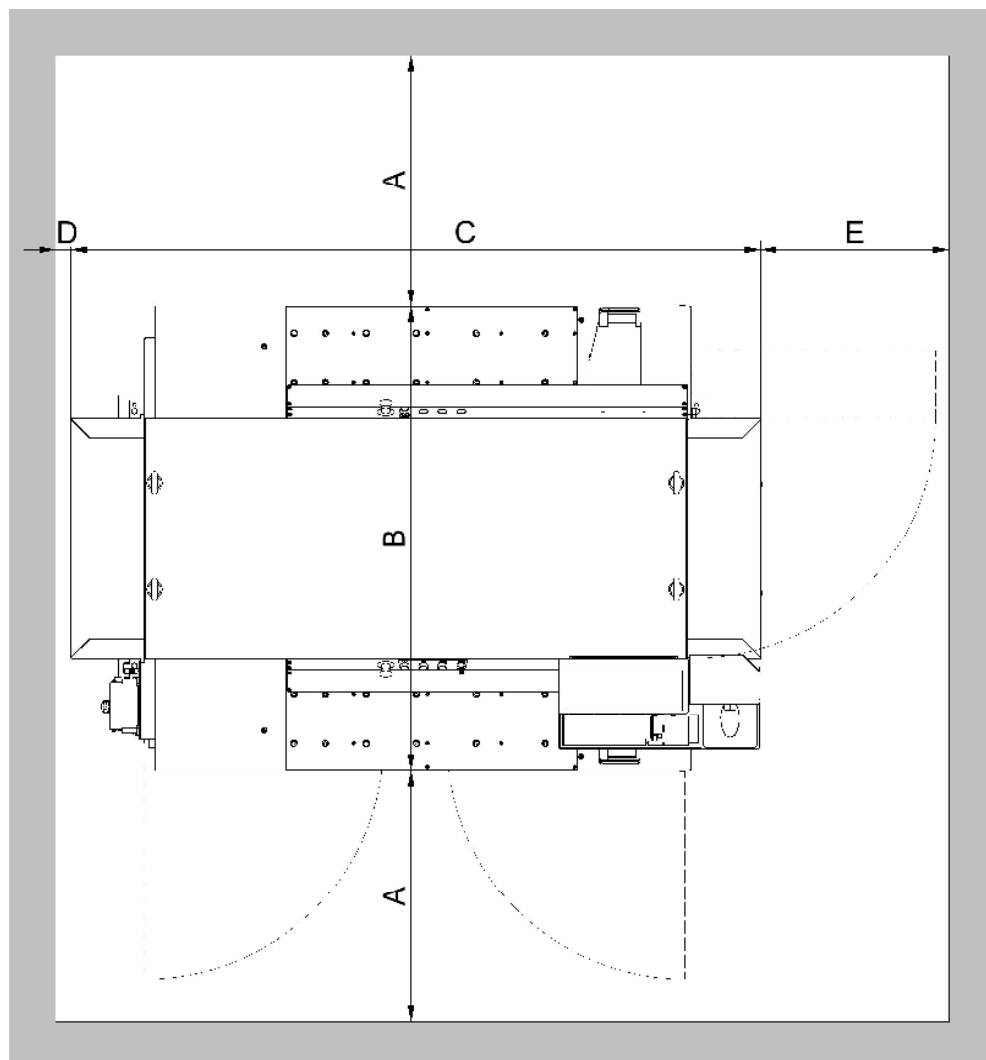


Fig. 19 – Installation plan

A	6100 mm
B	1484 mm
C	2200 mm 2325 mm (HSK63F option)
D	50 mm
E	600 mm

4.3 Installation of the machine

Follow the step-by-step instructions.

1. Unpack the machine.
2. Clean machine of preserving agent.
3. Remove all previously described transport safeguards.
4. The machine is to be installed level and stable using a spirit-level and with the assistance of the measuring points described.
5. Remove the transport safeguard of the processing unit (see Chapter 4.4, pg.31).
 - The lower linear guide rail is the reference level for the X-direction.
 - The settings of the Y-direction are carried out on the measuring bolts above the central lubrication (front left) and with the maintenance door open (above right).
 - The adjustment is made via the levelling screws on the base frame. Measured with a level (precision at least 0.05 mm/m).

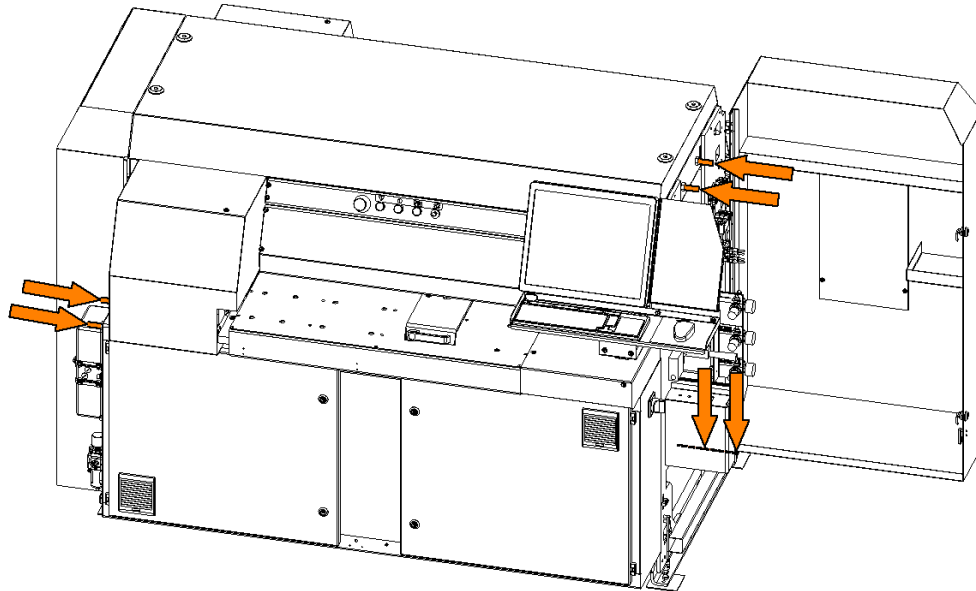


Fig.20 – Reference level

Requirements on the floor

1. The floor must be designed for the following loads:
 - Maximum load per levelling screw: 375 kg
 - The floor must be made of concrete, be level and guarantee a pressure resistance of 415 kg/cm².
 - ✓ The machine must be installed on a stable and even floor.

4.4 Transport safeguard

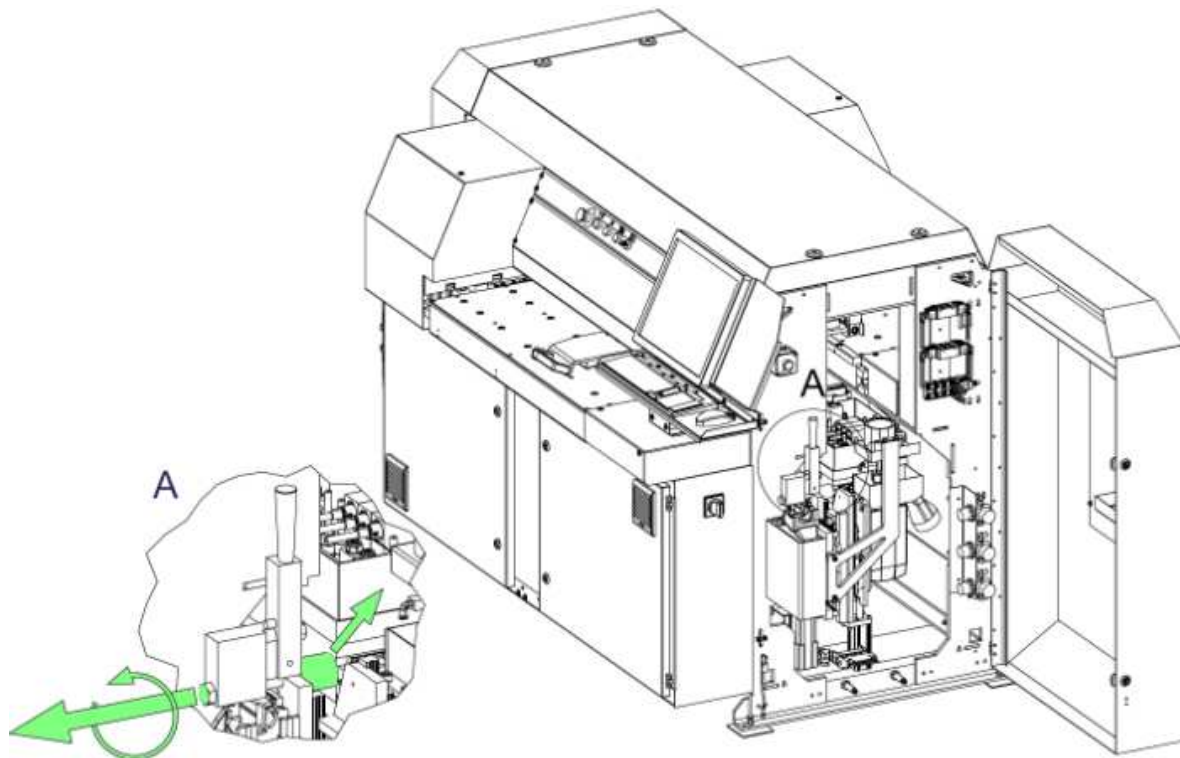


Fig.21- Remove transport safeguard of the processing unit.

Remove transport safeguard

1. The mechanical transport safeguard of the processing unit must be removed before the first reference run:
 - Unscrew safety screw M16 with spanner SW24.
 - Remove spacer.
 - It must be possible to move the processing unit by hand.
2. When switching the machine on for the first time, the operator will be asked if the transport safeguard was removed.
 - The operator must confirm this by clicking a button.
3. If the machine is to be transported at a later point in time, the mechanical transport safeguard must be reattached and the software lock re-activated.
4. Activate software lock
 - Switch to the machine software.
 - Open the command line (Ctrl + Shift + F12).
 - enter >translock<.
5. Mount the mechanical transport safeguard.
 - Move the processing unit into position by hand.
 - Insert spacer.
 - Tighten safety screw M16 with spanner SW24.

4.5 Electrical connection



Danger

Electrical voltage

Severe to fatal injuries, possible malfunctions or damage to the control components can result from an improper electrical connection.

- The electrical connection may only be established by an authorised electrician.



Caution

Permitted network forms

Damage to electrical components.

- Operation of TT-networks, TN-networks or networks with a central ground point without additional measures.
- The neutral conductor must always be connected if a matching transformer (B) is not available.



Important

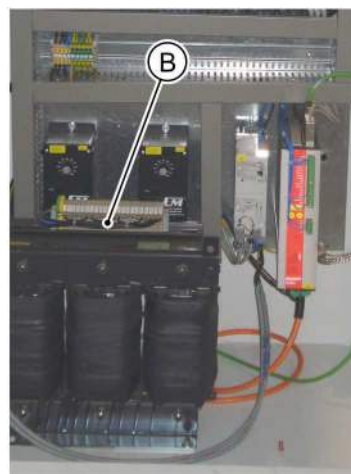
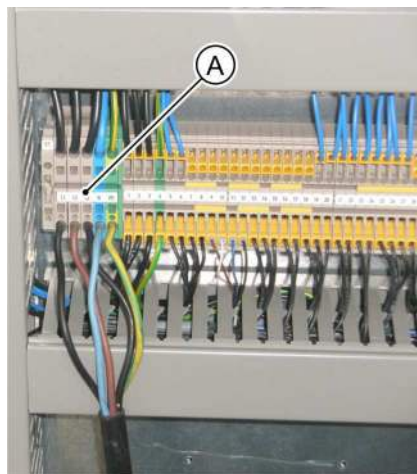
Operation with ground fault circuit interrupter

Erroneous activation of the ground fault circuit interrupter

- An AC/DC sensitive ground fault circuit interrupter is to be used.
- Alternatively, a permanent installation in accordance with EN 50 178 can be used.
- With certain technical designs, the start of operation can only take place with a permanent installation. Information on this can be found in the control cabinet.

Electrical connection

1. Insert the main connection cable into the switch box via the supplied cable gland on the rear of the switch box.
 - Dimensioning of the connection cable must correspond to the fuse and the national regulations.
2. Clamp the cable in accordance with the electrical circuit diagram. Clockwise rotating field is to be observed.
 - The machine can be directly connected to the supply terminal (A) with a network voltage of 400 V.
 - For all other voltages, the machine must be equipped with a transformer (B) (optional).



4.6 Pneumatic connection



Important!

The prescribed pneumatic pressure is controlled by the control system during operation. In the event of a lack of pressure, a message is output in the programming software. If a processing step (e.g. drilling) cannot be carried out due to a lack of pressure, the pressure regulator or the compressed air supply is to be checked.



ATTENTION

Not enough pressure in the pneumatic system

This can result in damage to the drill drives, the tools and the workpiece.

- Check the pressure setting on the manometer (C) on the maintenance unit before the start of production.

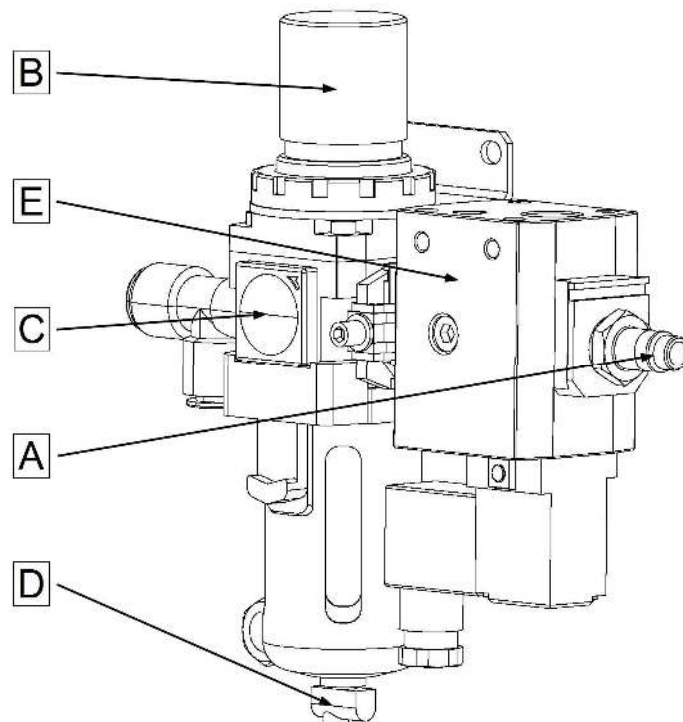


Fig.22- Maintenance unit (with soft start valve option)

A	Quick-release coupling (standard without soft start valve)
B	Pressure regulator
C	Pressure gauge
D	Discharge
E	Soft start valve (for HSK63F option)

Pneumatic connection

1. Connect the main power supply of the machine to the quick-release coupling (A).
 - The diameter of the supply line must be at least 12 mm. Compressed air consumption (see chapter 3.7, pg.23)
2. Set a working pressure of 6-8 bar (87-116 PSI) on the pressure regulator (B).
 - The configured pressure is displayed on the manometer (C).

4.7 Suction

Connecting the suction(See Fig.:3, page14position E)

1. A suction hose is to be connected to the 80 mm diameter suction nozzles on the rear side of the machine.
 - The corresponding hose components (distributor pieces) are to be supplied by the customer.
 - ✓ The suction system requires at least 25 m/sec air speed at the suction nozzle and an air flow rate of at least 3000 m³/h.



CAUTION Incorrect programming!

This can lead to significant damage to the workpiece, to the tool spindles, the clamping system and the unit guides. It can also lead to misalignment of the machine calibration and to a machine standstill.

- For milling contours across the entire workpiece thickness, it must be ensured that no workpiece residue enters the suction system.
- For larger recesses (holes, pockets, etc.) workpiece residues must be completely machined away in the programme sequence.
- Incorrect details of workpiece length, width and height are forbidden.

4.8 Permissible operator stations



Danger!

Crushing of hands when feeding and removing the workpieces as well as adjustment work and the tool change function.

Crushing of fingers.

- Never reach under the front or rear trap protection.
- Press the emergency stop button in dangerous situations.
- For adjustments, bring the machine to a standstill using the emergency stop button.
- Never reach between the workpiece and the guide rollers when processing the workpiece.
- Use the >Tool Change< software function only to change tools (see Programming instructions - Tool change)

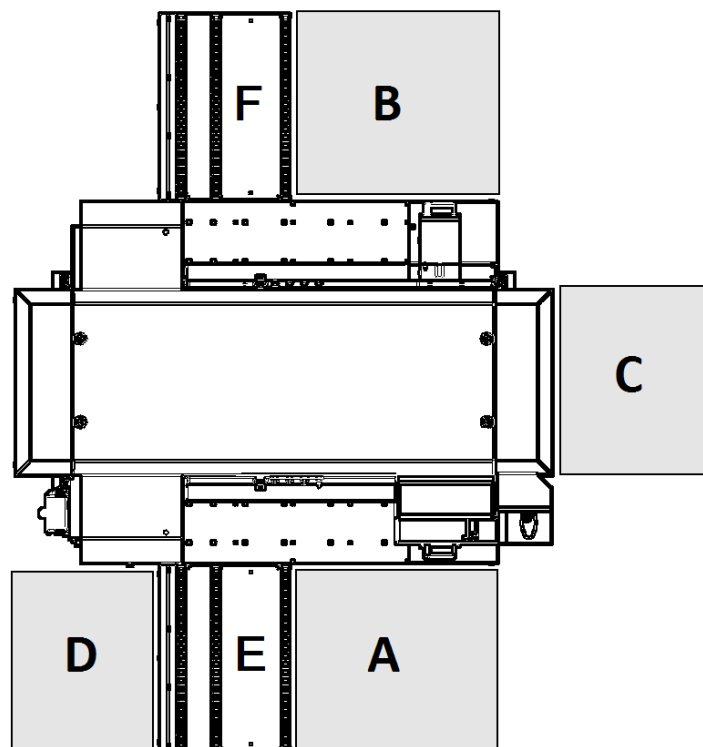


Fig.23- Permissible operator stations

- A: Programming station and feed and removal of the workpieces, emergency stop, control ON and program start, electrical main switch to turn the machine on.
- B: Rear insertion and removal of the workpieces, emergency stop and program start
- C: Tool change and maintenance door
- D: Maintenance for compressed air connector and central lubrication system.
- E/F: Danger area
 - Nobody may remain in the danger area during processing.
 - Press the emergency stop button in dangerous situations.



Note

The previous illustration shows the roller folding tables. These tables are available as an option.

5 Setting instructions

5.1 For your safety

**Danger****Serious injuries from moving parts and crushing points.**

- Always observe the safety instructions in the various setting instructions.
- Do not attempt any setting or repair work that you do not master.
- Always use the software when carrying out movements of the processing unit that are necessary for setting work.

**Danger!****Crushing of the hands when inserting and removing workpieces as well as during setting work and the tool change function.****Crushing of fingers**

- Never reach under the front and rear clamping protection.
- In case of danger, press the emergency stop button.
- For setting work, shut down the machine with the emergency stop button.
- When moving the workpiece, never reach between the workpiece and the guide rollers.
- Use only the software function >Tool change< to change tools (see programming instructions – Tool change)

**WARNING**

Wearing protective gloves is mandatory.

5.2 Tool adjustment

Basic drill data

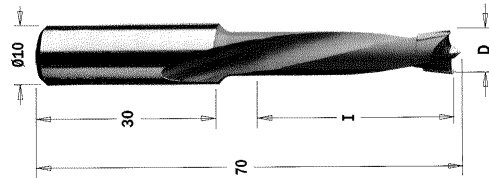
- Length entry of the tool possible from min. 55 to max. 70 mm.
- Tools over 70 mm total length (without centring tip) may not be used.
- The maximum drill depths are in reference to a tool length of 70 mm.
- Vertical drilling depth from 0 to 32.5 mm.
- Horizontal drilling depth from 0 to 35 mm.
- Vertical drilling diameter from 3 mm to 30 mm applicable on all spindle positions.
- Vertical drilling diameter 35 mm only applicable on a certain spindle position (see chapter 37, pg. 57). The possible tool diameter will be verified during entry in the tool list.
- Horizontal drilling diameter from 3 mm to 12 mm applicable on all spindle positions.
- The limit values of possible drills is in reference to the standard material (foil-coated chipboard). All deviating materials can result in deviations of the performance data. It should be noted that it is not possible to define general performance data because of the large differences in the required cutting force due to differing cutting geometries and cutting materials. (Example: Leuco VHW dowel drill approx. 1/5 of the cutting force of a conventional drill, depending on application)



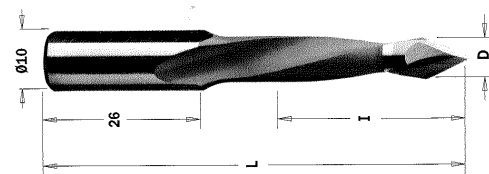
IMPORTANT

The maximum drill depth may not exceed the effective length of the tool and it is also limited by the value listed in the table >Programmable drill depth<.

It should be noted that all tool manufacturers (e.g. Leitz, Leuco, Guhdo, JSO Schmid, CMT and Oertli) specify the whole length of the dowel drill from the end of the shaft to the tool tip. The effective length is measured from the cutting edge, however. For row drills, the effective length is indicated both from the tip as well as from the start of the cylindrical hole. Cylinder head drills are always measured from the cutting edge.

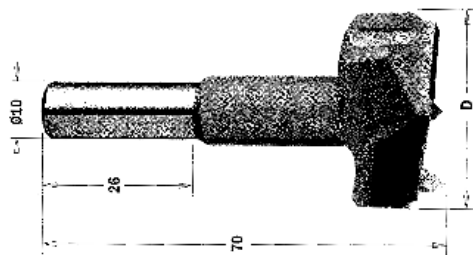


Dowel drill with standard effective length



Row drill

Dowel and row drill for vertical processing	Length	Effective length	Programmable vertical / horizontal drill depth
Dowel drill D from 4 mm to 16 mm	57 mm	25 mm	V 19 mm
Dowel drill D from 5 mm to 16 mm	70 mm	35 mm	V 32 mm
Row drill D from 5 to 8 mm	57 mm	25 mm	V 19 mm
Row drill D from 12 to 12 mm	70 mm	44 mm	V 32 mm

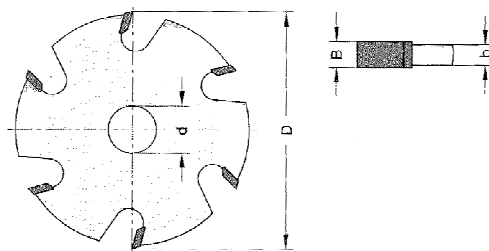


Cylinder head drill

Cylinder head drill for vertical processing	Length	Effective length	Programmable vertical / horizontal drill depth
Cylinder head drill D from 15 mm to 40 mm	57 mm	30 mm	V 19 mm
Cylinder head - drill D from 15 mm to 35 mm	70 mm	42 mm	V 32 mm

Basic groove cutter data

- External tool diameter D = 125 mm
- Tool mount diameter d or BO = 30 mm
- Effective width SB or B = 3 mm to 8.3 mm
- Mounting body width TDI or b = max. 8 mm
- Number of teeth Z = 6 to 18
- Tool speed for drill unit, n = 4000 RPM
- Maximum programmable depth of a groove = 20 mm
- The limit values of usable groove cutters are in reference to the standard material (foil-coated chipboard). All deviating materials can result in deviations of the performance data. It should be noted that it is not possible to define general performance data because of the large differences in the required cutting force due to differing cutting geometries and cutting materials.



IMPORTANT

Feed information from Leitz Catalogue Edition 4

These specifications can vary for other tool types and tool manufacturers.

- Formula: $V = fz \cdot n \cdot Z$
- fz = tooth feed
- n = tool speed = 4000 rpm
- z = number of teeth in the tool
- vf = feed speed in mm/min = 4000 to 28,000

Calculation of the optimum feed speed (mm/min)

1. Grooves in X-direction with 125 diameter groove cutter, number of teeth is 12
 - For groove cutter with speed of 4000 RPM and 12 teeth in coated chipboard with a fed rate per tooth of 0.2 = 9200 mm/min
 - For groove cutters with speed of 4000 RPM and 12 teeth in solid wood with a tooth feed of 0.6 longitudinal and 0.3 lateral = 28,000 longitudinal, 14,000 mm/min lateral
2. Grooves in Y-direction (dipping) with groove cutter of diameter 125, number of teeth is 12
 - For groove cutter with speed of 4000 RPM and 12 teeth in coated chipboard with a feed rate per tooth of 0.09, dipped in top layer: 4600 mm/min
 - For groove cutter with speed of 4000 RPM and 12 teeth in solid wood with a feed rate of 0.6 longitudinal and 0.3 lateral = 28,000 longitudinal dipping, 14,000 mm/min lateral dipping

Examples of popular manufacturers with article numbers.

Manufacturer	Article number
Leitz	Groove cutter WF 100-2-02, D125_BO 30_SB 1.5 mm to 10 mm
Leuco	Groove cutter 109015, D125_d 30_B 1.5 mm to 10 mm
Guhdo	HW groove cutter Z12, 3008 HW, D 125_d 30_ B 1.5 mm to

6 mm

Basic end mill data

1. for Profit routing unit:
 Tool nominal diameter D = 8 mm to 25 mm
 Tool shaft diameter S = 8 mm to 20 mm
 Tool speed n = 6,000 to 18,000 rpm
 Total length L or L1 = 70 to 130 mm
2. for profit routing unit HSK63F:
 Tool nominal diameter D = 8 mm to 25 mm
 Tool shaft diameter S = 8 mm to 25 mm
 Tool speed n = 1,000 to 20,000 rpm
 Total length L or L1 = 89 to 150 mm
3. Effective length l, L2 or NL = 5 mm to 62 mm
4. The limit values of usable cutters are in reference to the standard material (foil-coated chipboard). All deviating materials can result in deviations of the performance data. It should be noted that it is not possible to define general performance data because of the large differences in the required cutting force due to differing cutting geometries and cutting materials.



Solid carbide end mill



IMPORTANT

Feed details from GUHDO Catalogue 04-2008

These specifications can vary for other tool types and tool manufacturers.

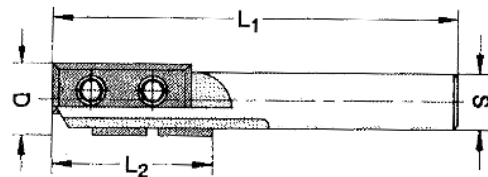
- Feed rates in reference to speed and cutting quantity.
- Vf = Feed rate in m/min or mm/min.
- N= Speed in RPM
- z = Number of cuts

The optimum feed rate

1. Tool z1 at 18,000 rpm = 4000 mm/min to 6000 mm/min
2. Tool z2 at 18,000 rpm = 8000 mm/min to 12000 mm/min
3. Tool z3 at 18,000 rpm = 12,000 mm/min to 18,000 mm/min

Popular manufacturers with article numbers.

Manufacturer	Article number
Leitz	Spiral finishing router cutter WO 160-2-05, D 20 mm, GL 120 mm, NL 60 mm, S 20x55, Z 3
Leitz	Turncutter WL 101-1, D 18 mm, GL 115 mm, NL 50 mm, S 20x50, Z 1
Guhdo	HWM finishing cutter Z3 with chip breaker 6248, D 20 mm, l 55 mm, L 120 mm, S 20
Leuco	Roughing/finishing cutter VHW 129460, D 20 mm, L1 120 mm, L2 70 mm, d 20 mm, Z 4
JSO , Jakob Schmid	Inserts end mill 22008, D 20 mm, L1 120 mm, L2 58 mm, S 20x55, Z 1
JSO , Jakob Schmid	Finishing cutter VHW 20258, d 20 mm, L1 115 mm, L2 55 mm, S 20 mm, Z 2



Inserts end mill



IMPORTANT

The reference value for the effective tool length is the maximum tool length of 130 mm and the maximum effective length of 70 mm.

The maximum programmed milling depth may not exceed the effective length of the tool and it is also limited by the value listed in the table >Maximum programmable mill depth<.

Total length of the tool	Maximum programmable milling depth
130 mm	61 mm
120 mm	51 mm
115 mm	46 mm
110 mm	41 mm
100 mm	31 mm
90 mm	21 mm
80 mm	11 mm
70 mm	1 mm



WARNING

Ejection of workpieces

Severe or fatal injuries can result

- When replacing worn inserts, the torques prescribed by the manufacturer must be changed with the help of a torque wrench!



CAUTION

Incorrect programming!

This can lead to significant damage to the workpiece, to the tool spindles, the clamping system and the unit guides. It can also lead to misalignment of the machine calibration and to a machine standstill.

- For milling contours across the entire workpiece thickness, it must be ensured that no workpiece residue enters the suction system.
- For larger recesses (holes, pockets, etc.) workpiece residues must be completely machined away in the programme sequence.
- Incorrect details of workpiece length, width and height are forbidden.

5.3 Tool change

5.3.1 Prepare tool change

Call up tool change in the programme

1. The machine must be in >Control ON< mode.
 - The green >Control ON< button is lit.
2. Press the (F3) button in the main menu.
 - The software changes to the >Drill head< menu.
3. Open >Tooling (F3)< in the >Tool change (F7)< menu.
 - The processing unit will travel to the tool change position
 - Vertical and horizontal drilling spindles are brought forward.
 - The groove cutter unit is brought forward.
 - The routing unit (optional) moves into the tool change position.
 - For the Profit HSK63F routing unit with 3-compartment magazine (optional), the clamped tool holder is placed into the 3-compartment magazine by the processing unit, so that it can be changed.
 - Control system is put into a safe standby mode.

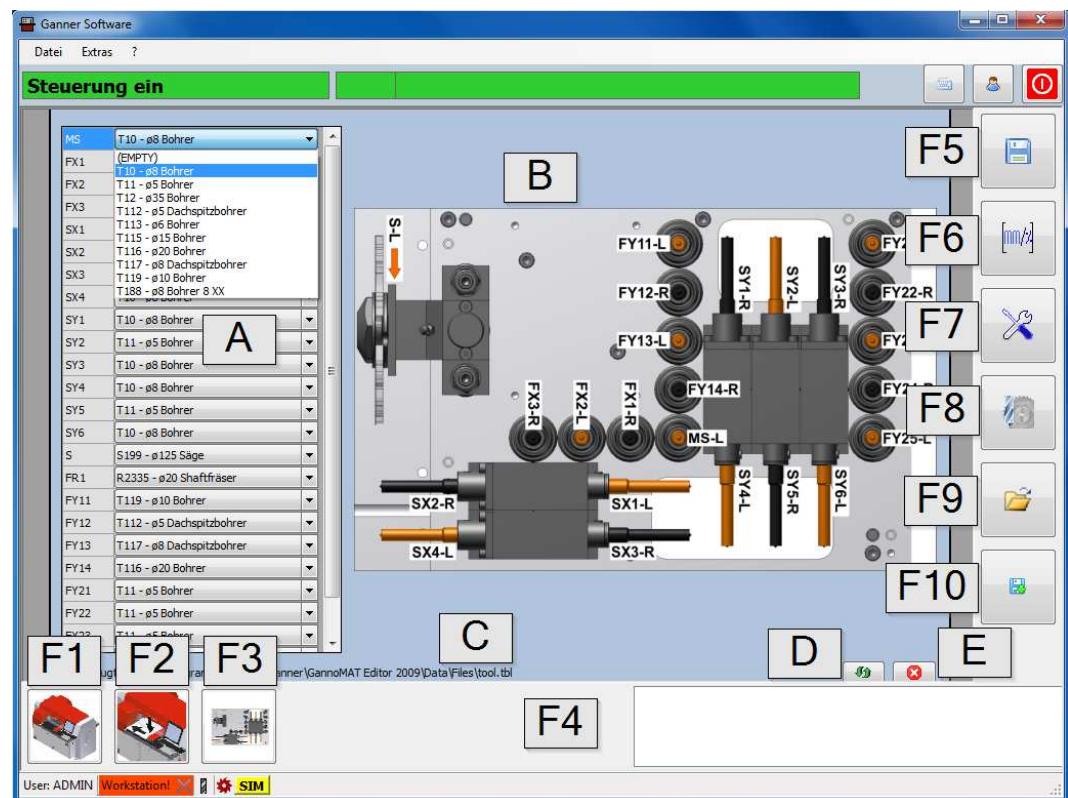


Fig.24- Drill head menu

Opening the machine before the tool change.

1. Unlock door locks (A) with the corresponding key.
2. Open doors.
3. Tilt lever (B) by 90°horizontal to the right.
4. Pull out the processing unit.
5. The processing unit is ready for the tool change.
6. Close the doors after the tool change.
 - Carry out the above steps in reverse order.
 - ✓ Tool was changed.

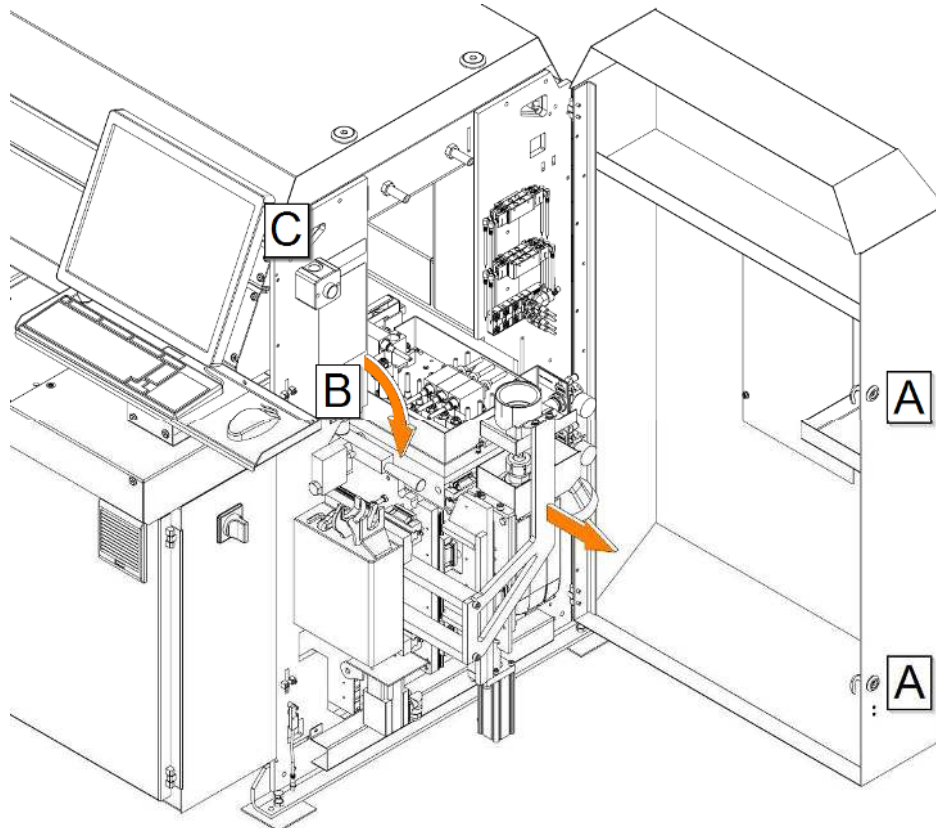


Fig.25- Processing unit in tool change position

**IMPORTANT**

Do not push the drill unit back too far into the machine because the extended tools can push up against the supporting table.

5.3.2 Tool change of the drilling unit

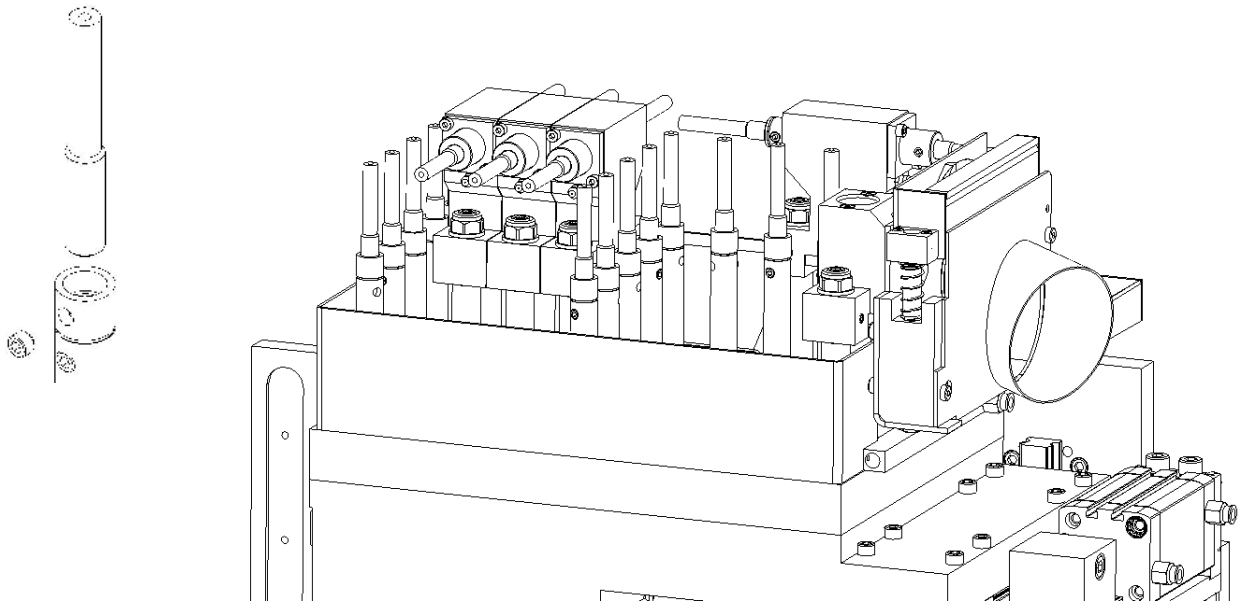


Fig.26– Drilling and groove cutter unit

Replace drill

1. The drill head is to be equipped according to the tab >Tool list< in the >Tooling (F3)< menu.
 - With the blue selector button (C, see Fig.25, on pg.42) as per the explanation sign (on the side of the selector button), initially the horizontal spindles, then the groove cutter unit and finally the vertical spindles can be reset. This function serves to change the tools more easily.
2. The clamping pins on the chuck are opened with an SW 3 pin spanner.
3. Remove the drill that was used.
4. Insert new drill.
5. Tighten clamping pins on the chuck.
 - ✓ Drill has been replaced.



IMPORTANT

Drills can get stuck in the chuck over time due to fretting corrosion.

- Lightly oil the drill chuck and tool shaft when changing the tool.

Observe the direction of rotation of the tools used on the drill head according to the menu >Spindle settings< in tab >Tools in spindle<.

- L = counterclockwise; R = clockwise
- Drill rotation direction marking: yellow, orange or red = counterclockwise, or black = clockwise



WARNING

Wearing protective gloves is mandatory.



WARNING

Hot surface

Danger of burns to the hands

- Allow workpieces to cool before replacing them!

5.3.3 Tool change of the groove cutter unit

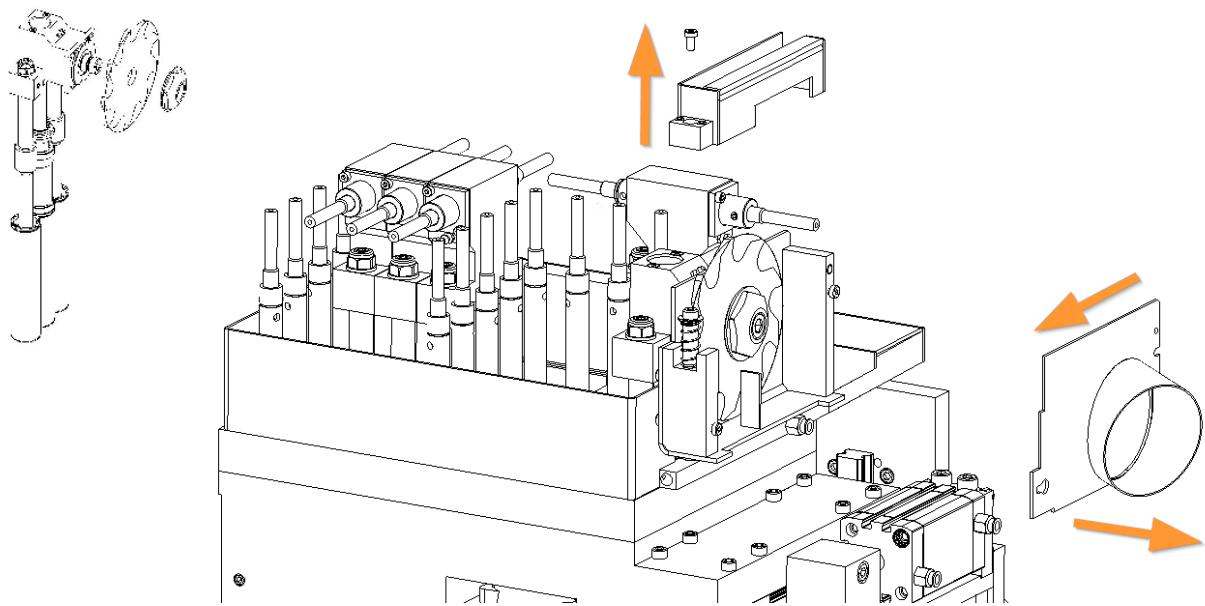


Fig.27– Drilling and groove cutter unit

Replace groove cutter

1. The drill head is to be equipped according to the tab >Tool list< in the >Tooling (F3)< menu.
2. Push the exhaust hood to one side and remove it from behind.
3. Loosen the screws of the anti-skid protection with an SW3 pin wrench.
4. Pull out the anti-skid protection.
5. Fix groove cutter spindle with an SW8 pin wrench.
6. Loosen nut on groove cutter spindle with an SW41 open-ended wrench and unscrew it.
7. Pull off existing groove cutter.
8. Insert new groove cutter.
9. Carry out the above steps in reverse order.
 - ✓ Groove cutter has been replaced.



WARNING

Wearing protective gloves is mandatory.



WARNING

Hot surface

Danger of burns to the hands

- Allow workpieces to cool before replacing them!

5.3.4 Tool change of the Profit routing unit (option)

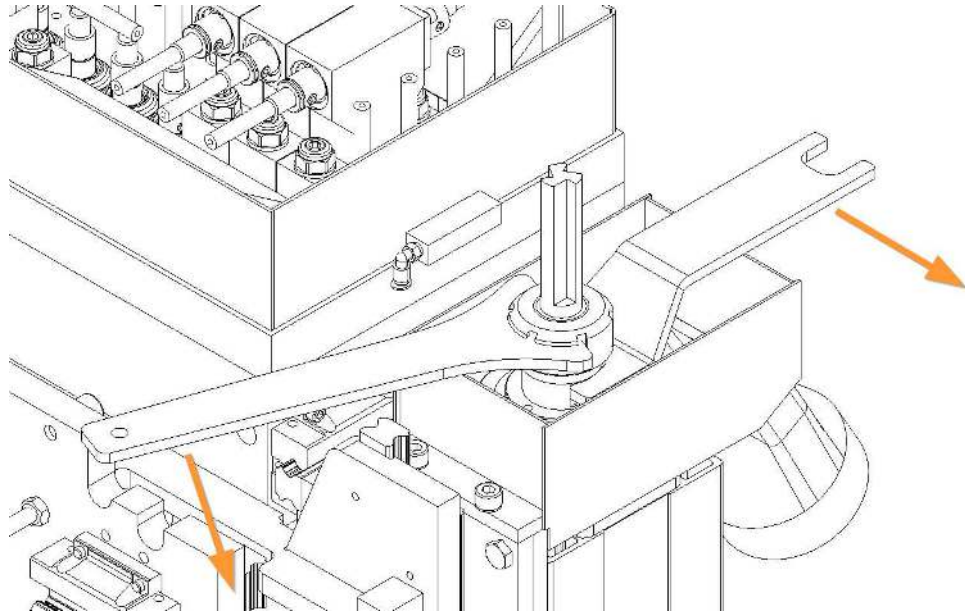


Fig.28– Routing unit tool change – Profit (upper exhaust hood hidden)

1. The routing unit is to be equipped according to the tab >Tool list< in the >Tooling(F3)< menu.
2. Hold the routing spindle with a SW32 square open-ended wrench.
3. Loosen the clamping nut with the ER32 hook wrench and unscrew.
4. Remove the existing tool.
5. Insert the new router.
6. Thoroughly clean the collet chuck and clamping nut and re-install.
7. Push tool shaft into the collet chuck.
 - Clamp tool shaft L along the whole length of the collet chuck (see chapter5.4.2.4, on pg.51).
 - Observe the minimum clamping length of the tool.
 - Do not clamp directly on the radius transition to the cutting part.
8. Tighten the clamping nut again with the required tightening torque (see table -3, on pg.52).

For a description, also see "Changing the tool" (Chapter5.4.2.7, on pg.54).



WARNING

Wearing protective gloves is mandatory.



WARNING

Hot surface

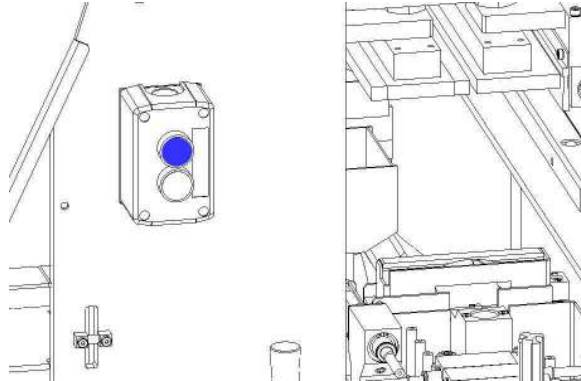
Danger of burns to the hands

- Allow workpieces to cool before replacing them!

5.3.5 Tool change of the profit HSK63F routing unit (option)

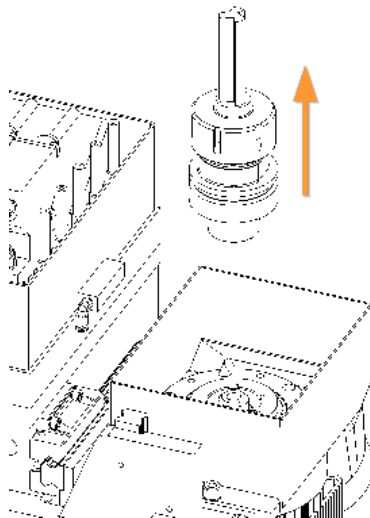
Replacing the tool holder

1. The routing unit is to be equipped according to the tab >Tool list< in the >Tooling (F3)< menu (seeChapter5.3.1, pg.41).
2. Press the white button.



- The tool holder sits loosely on the routing unit.

3. Remove the tool holder.



4. Insert new tool holder.
 - The tool holder sits loosely on the routing unit.
5. Press the white button.
 - The tool holder is clamped on the routing unit.
 - ✓ Tool holder has been replaced.



Attention!

Make sure that the mounting areas of the tool holder and the tool holder mount are clean.



WARNING

Wearing protective gloves is mandatory.



WARNING

Hot surface

Danger of burns to the hands

- Allow workpieces to cool before replacing them!

5.3.6 Tool change of the profit HSK63F routing unit with 3-compartment magazine (option)

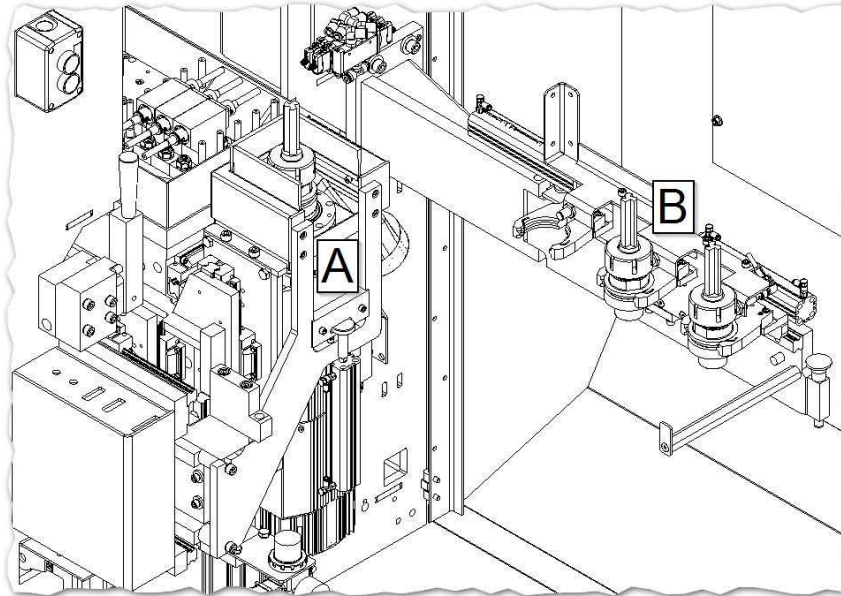


Fig.29- Routing unit Profit HSK63F with 3-compartment magazine

Item	Description
A	Processing unit - Profit HSK63F
B	3-compartment magazine

The tool change is automatically carried out during processing by the machine. The machine can exchange a tool holder from a magazine with 3 tool holders. The tool holder can be equipped as described in chapter 5.4.2.7 on pg.54.



Wearing protective gloves is mandatory!

- Risk of injury to the hands!



The magazine can remain closed during the tool holder exchange.

- This facilitates changing the tool holder.



CAUTION

Invisible laser radiation when the door is open.

- Do not look into the beam!



WARNING

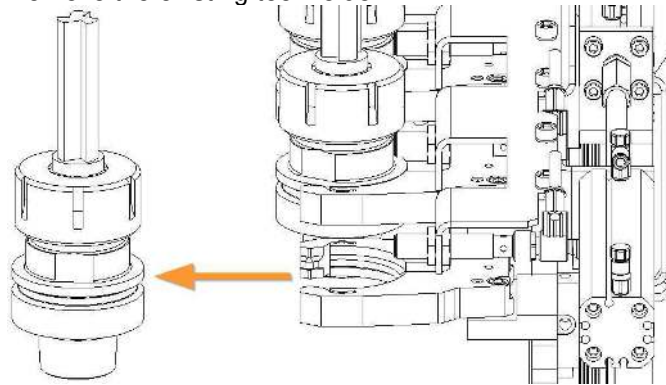
Hot surface

Danger of burns to the hands

- Allow workpieces to cool before replacing them!

Replacing the tool holder

1. Remove the existing tool holder.



2. The magazine is to be equipped according to the tab >Tool list< in the >Tooling< menu.
 - The >Tool changer< sub-menu shows how the magazine is to be equipped.



3. Insert programmed tool holder.
 - ✓ Tool holder has been replaced.



Check that the mounting areas of the tool holder and the tool holder mount are clean. If they are dirty, see chapter 7.7, on pg.70.



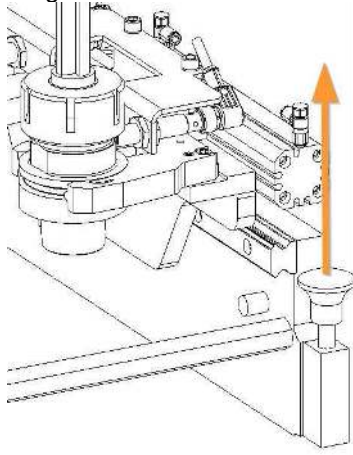
It is IMPERATIVE to ensure that the programmed tools are placed in the 3-compartment magazine!

- Danger of damaging the machine
- Danger of tool breakage

The following steps are to be additionally carried out for drill and groove cutter replacement in a machine with a Profit HSK63F routing unit with a 3-compartment magazine:

replace drill and groove cutter

1. Pull the locating pins upwards with the black mushroom button and unlock the magazine.



2. Swivel the magazine by 90°degrees.
 - Magazine is open.
3. Lift lever (B, see figure25, on pg.42) by 90 degrees°horizontal to the right.
4. Pull out the processing unit.
5. Replace drill and groove cutter as described in chapter5.3.2, on pg.43and chapter5.3.3, on pg.44.
6. Carry out the above steps in reverse order.
 - ✓ Tools were changed.

**IMPORTANT**

Do not push the drill unit back too far into the machine because the extended tools can push up against the supporting table.



It is IMPERATIVE to ensure that the programmed tools are placed in the 3-compartment magazine!

- Danger of damaging the machine
- Danger of tool breakage

5.4 Clamping devices of the routing units (option)

5.4.1 General



The clamping device of the routing units corresponds to the requirements in EN 847-3.



Inspect machine settings, check direction of rotation!

- Danger of clamping device becoming loose.



The prescribed maximum values for the tool dimensions, diameter and cantilever length must be kept.

- Danger of clamping device becoming loose.



All clamping surfaces must be free of dirt, grease, oil and water. Tighten the clamping nut before use.

- Danger of clamping device becoming loose.



Damaged and worn parts (e.g. collet chuck) must be replaced immediately . The collet chuck must also be replaced after a tool breakage.

- Danger of tool breakage and loosening of the tool.



Check the tool clamping at regular intervals. Temperature fluctuations and vibrations can reduce the tightening torque.

- Danger of the tool loosening.



The cutters, tool body and the collet chuck are to be checked for damage before installation in the machine. The operating instructions of the shaft tool are to be observed during installation of the system (collet chuck mount - collet chuck - tool). Observe the minimum clamping length of the tool shaft and the eccentricity of the system.



An unpermissible eccentricity or an imbalance can lead to damage to the system. When using stacked tools, make sure that the cutters do not hit each other.

- Danger of tool breakage.



The maximum speed "n" on the clamping device may not be exceeded. If the maximum speed of the tool is lower, so is the maximum speed of the system.

- Danger of tool breakage.



The direction of rotation given on the clamping device is to be noted and complied with. The direction of rotation of the tool and the clamping device must be the same.

- Danger of tool breakage.

5.4.2 Tool limit values

5.4.2.1 Max. permissible tool diameter

The max. permissible tool diameter is **25 mm diameter!**



WARNING

The max. permissible tool diameter may not be exceeded!

- Danger of tool breakage
- Danger of damaging the machine

5.4.2.2 Tool shaft diameter

Tool shaft diameter = nominal diameter of the collet chuck 0 / -0.5 mm (or according to clamping device manufacturer)



Never clamp shafts that have a larger shaft diameter!

5.4.2.3 Maximum permissible tool weight

The maximum permissible tool weight is specified by the clamping device manufacturer !



WARNING

The max. permissible tool weight may not be exceeded!

- Danger of tool breakage
- Danger of damaging the machine

5.4.2.4 Minimum tool clamping length

Correct clamping of the tool

- Clamp tool shaft L along the whole length of the collet chuck (see Fig.33, on pg.53).
- Note maximum clamping length of the tool.
- The free shaft length L0 should be as short as possible in order to achieve a higher stiffness and a lower risk of breaking.
- Do not clamp directly on the radius transition to the cutting part.
- On most tools, the minimum clamping length is marked on the tool shaft.

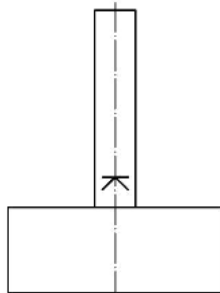


Fig.30– Marking of the minimum clamping length

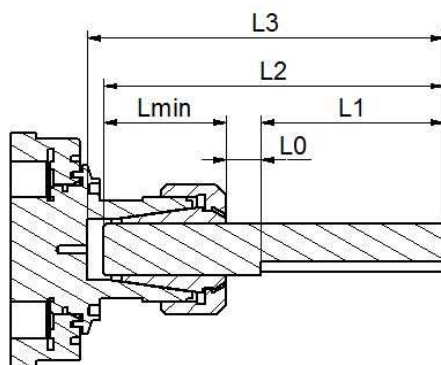


Fig.31– Clamping length for ER 32 collet chuck mount

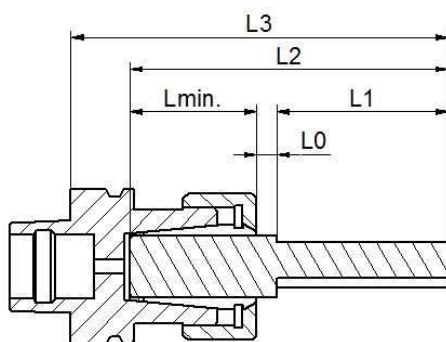


Fig.32– Clamping length for OZ 25 collet chuck mount

- Lmin Minimum clamping length
- L0 Free shaft length
- L1 Effective length
- L2 Tool length
- L3 Total length (length, which is programmed)

Minimum clamping lengths	
Shaft diameter (tolerance according to EN 847-1)	Min. clamping length Lmin
10 mm ≥ d	20 mm
10 mm ≤ d ≤ 25 mm	2 x d

Table2- Minimum clamping lengths

Tightening torques for the clamping nuts		
Threads	Key	Tightening torque
M30 x 1.5 / M33 x 1.5	SW 40/42	100 Nm
M40 x 1.5	SW 45/50	120 Nm
M48 x 2 / M50 x 2	SW 58/62	145 Nm

Table3- Tightening torques for clamping nuts

5.4.2.5 Replace collet chuck

- Through replacing the collet, the collet chuck can clamp different shaft diameters.
- Only double slotted collet chucks with continuous clamping holes may be used.
- The force transmission in the whole clamping area is only ensured by these types of collet chucks.
- Only use collet chucks which correspond to the standard named in the table!
- The collet chucks must be renewed after a certain period of time (see details from the collet manufacturer).

Routing unit	Nominal size	EN standard	d [mm]	D [mm]	L [mm]
Profit	ER 32	470 E	2-20	33	40
Profit - HSK63F - with 3-compartment magazine	OZ 25	462 E	2-25	35.05	52

Table4- Collet chuck specification

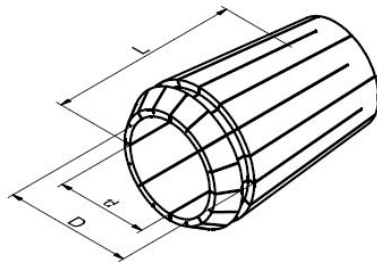


Fig.33– OZ 25 collet chuck acc. to EN 462 E



Attention!

Thoroughly clean collet holder, collet chuck and clamping nut before re-installation.

5.4.2.6 Labelling of the HSK63F tool holder

Schematic diagram:

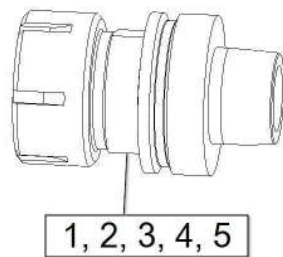


Fig.34– Clamping device acc. to EN 847-3

- 1 Manufacturer or supplier
- 2 Top speed
- 3 Direction of rotation
- 4 Collet chuck type
- 5 Further manufacturer's markings

5.4.2.7 Replacing tool for HSK63F routing unit



Securely fix the tool before installation.

- Danger of cutting injuries from sharp tool cutters.

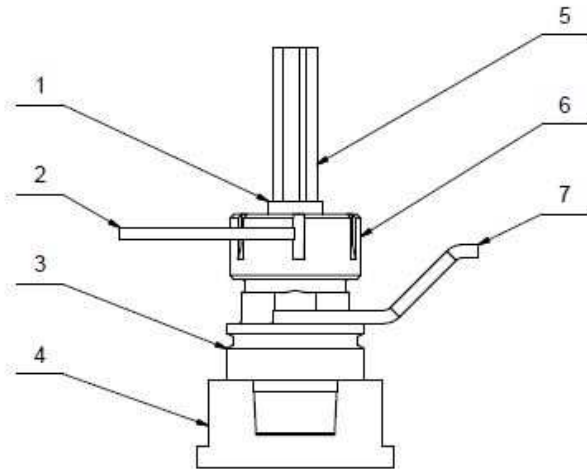


Fig.35– Tool change in assembly device

1	Tool shaft
2	Hook wrench
3	Tool holder
4	Assembly device
5	Tool
6	Collet nut
7	Square open-ended wrench



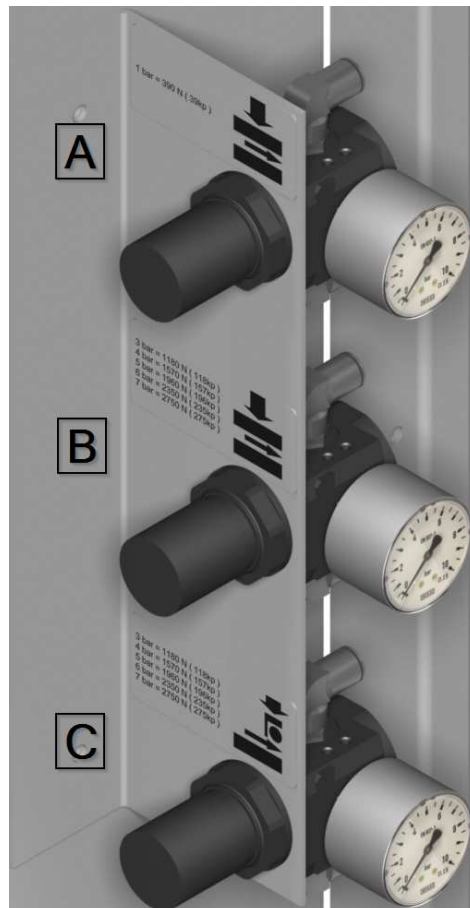
Attention!

HSK - Thoroughly clean mount, tool holder, collet chuck and collet nut before re-installation.

1. Mount tool holder in assembly device, or hold with square open-ended wrench.
2. Loosen the clamping nut with the hook wrench and unscrew.
3. Remove the existing tool.
4. Thoroughly clean tool holder, collet chuck and clamping nut and re-install.
5. Push tool shaft into the collet chuck.
 - Clamp tool shaft L along the whole length of the collet chuck (see Fig.33, on pg.53).
 - Observe the minimum clamping length of the tool.
 - Do not clamp directly on the radius transition to the cutting part.
6. Tighten clamping nut again with the required tightening torque (see table3, pg.52).

5.5 Pressure settings

1. The initial pressure of the workpiece clamp is set with pressure regulator (A)(factory setting 1 bar).
 - This setting must be between 1 bar to 1.8 bar (protection against injuries to the finger when clamping the workpiece).
2. The main pressure of the workpiece clamp is set with the pressure regulator (B) (factory setting 6 bar).
 - This setting should be between 3 bar to a maximum of 7 bar. This corresponds to a clamping force of 1180N (118kp) to 2750N (275kp).
 - If the clamping force is set too low, the workpiece will not be picked up correctly and this will lead to inaccuracies. This could also lead to damage to the workpiece or the drill unit.
3. The main pressure of the workpiece clamp is set with the optional pressure regulator (C) (factory setting 6 bar).
 - Attention, option: This setting serves to reduce the clamping pressure when drilling sensitive sheet materials (reduced pressure is already used for grooving and milling).



Important

Clamping pressure too low

Damage to the workpiece or the drill unit

- The factory setting of the clamping pressure is 6 bar = 2350 N. This corresponds to a workpiece weight of maximum 70 kg.
- Only reduce the clamping pressure for sensitive workpiece surfaces.
- The total weight of the workpiece may only be 25% to 30% of the clamping pressure. (e.g.: 4 bar = 160 kp = 40 to 48 kg maximum workpiece weight)

6 Operating Instructions

6.1 Before you begin

1. In case you have no experience in handling the machine, familiarise yourself with the following points before starting work:
 - The operating and control elements
 - The equipment
 - The function
 - The immediate surroundings
 - The safety equipment
 - The measures to take in case of an emergency.
2. No persons or objects may be in the danger area of the machine when it is switched on.
3. Check all safety equipment and emergency off buttons for fault-free function. If there are malfunctions, they need to be rectified by authorised maintenance personnel before starting up.

6.2 Turning the machine on

1. Turn electrical main switch >ON<. (O, see Fig.1, pg.12)
 - The operating system of the controller and all other control components are starting up.
 - The machine software will boot automatically until the start screen.
2. When the start screen is displayed, the machine controller must be activated by pressing the >Control ON< button (C).
 - If the machine cannot be switched on and the control lamp (B) is lit, it should be checked whether all emergency stop buttons are disengaged. Make sure the protective door for the tool change is also closed as it is queried via a circuit breaker.
 - Now a reference run of each axis (X, Y, Z) will take place.
 - The processing unit and the gripper system travel into their starting positions.

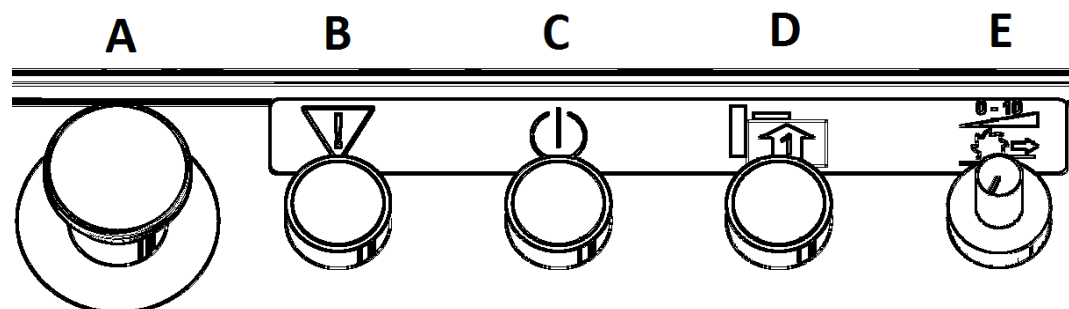


Fig.36- Front buttons

Turning on after pressing an EMERGENCY STOP button in an emergency situation

1. To restart the machine, the emergency stop button (A) must be disengaged and the <Control ON> button (C) must be pressed.
 - Axes move to their starting positions
 - The <Control ON> button (C) must light up again.
 - ✓ Now the machine is ready for operation again.

6.3 Equipping the processing unit

Equipping specifications for the drilling and groove cutting spindles:

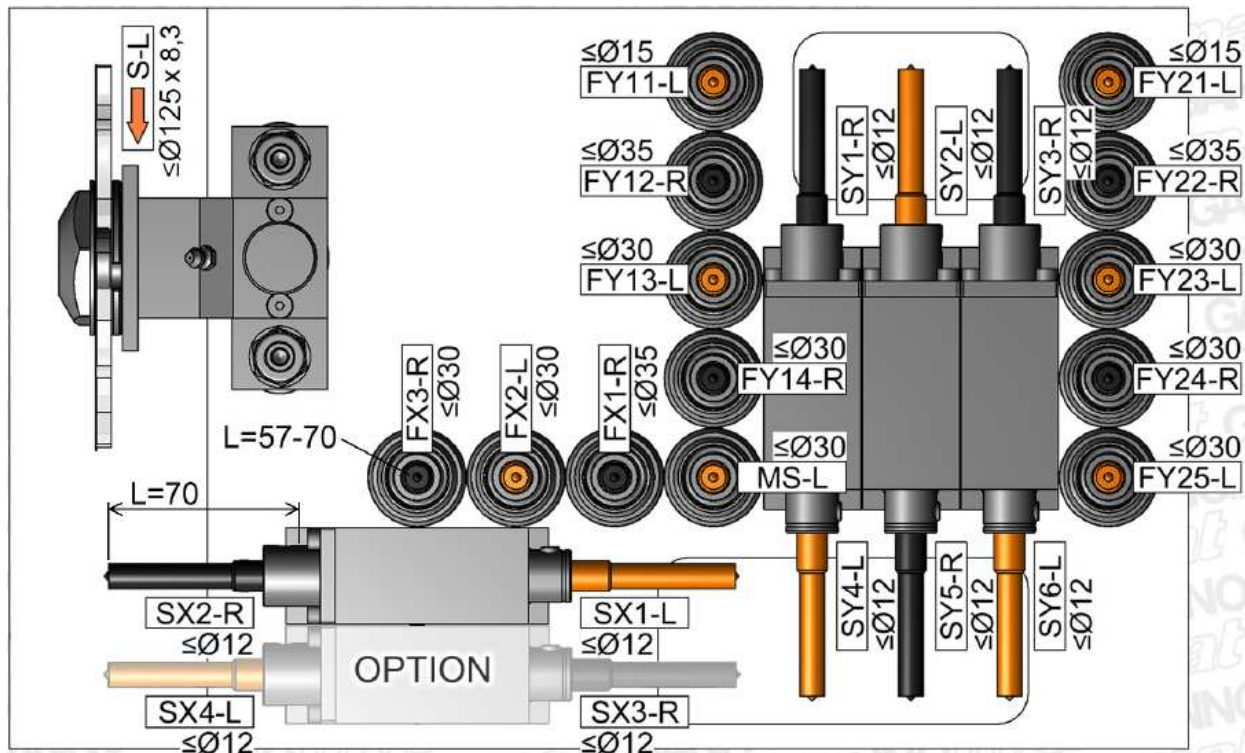


Fig.37- Equipping specs.



WARNING!

With a tool diameter > 12 mm diameter for drilling through with vertical spindles **FY11-L** and **FY21-L**, the drill through excess may be 8 mm maximum!
 For a machine with a counter-pressure device (optional), when drilling through with all other vertical spindles the drill through excess should be a maximum of 11 mm!

- If despite this warning the drill through excess is programmed larger than 8 mm or 11 mm, this can lead to damage to the clamping system and to the counter-pressure device.
- Danger of damaging the machine and of tool breakage



INFORMATION

If the drill-through dimension is programmed larger than 8 mm for a vertical spindle, a warning will be displayed on the screen automatically when loading a program, which refers to this chapter in the operating instructions.

6.4 Opening the machine program



Fig.38- Start menu

F1	Load program
F2	Fasten workpiece
F3	Tool equipping
F4	Load barcode (option)
F5	Save configuration
F6	Open program
F7	Save and close program
F8	Close program
F9	Program list for editing
F10	Refresh screen

Opening a machine program

1. Open a machine program with the <F6> key
 - The workpiece configuration menu starts when opening. If a workpiece has already been processed, the configuration settings are retained and the load procedure can start immediately.
 - When a workpiece is opened for the first time and no automation settings are defined for the configuration, the workpiece must be configured manually.
 - ✓ An opened workpiece is always opened in the workpiece configuration menu.

6.5 Creating a processing cycle

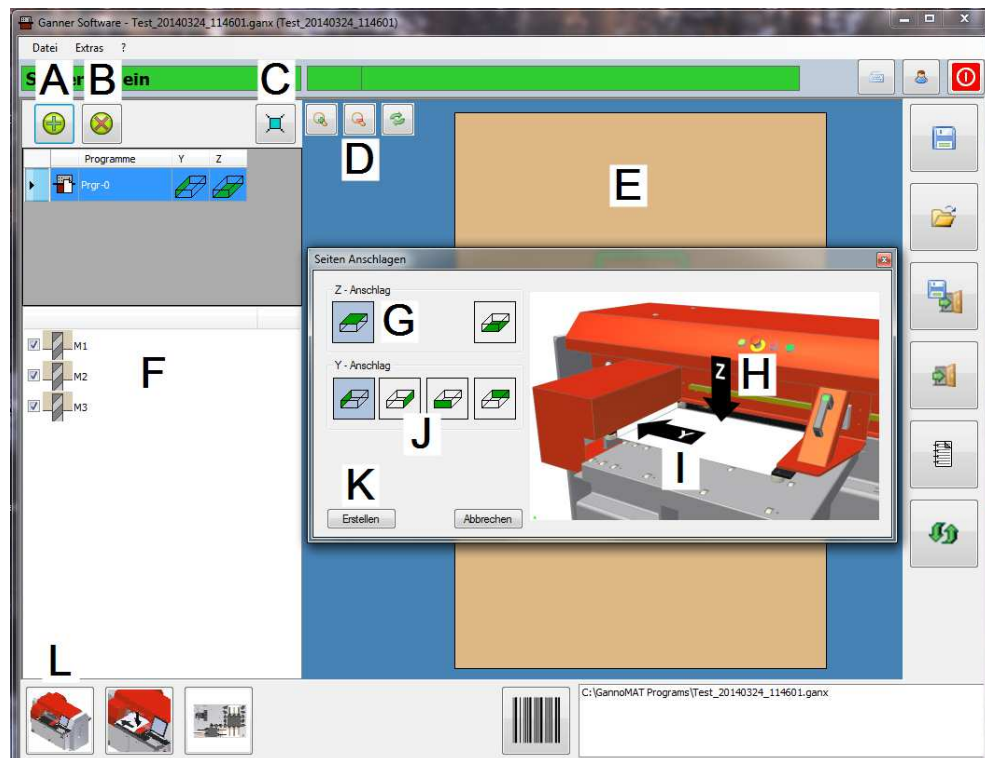


Fig.39- Create processing cycle

Defining a processing cycle

1. First, the workpiece will be loaded in the preview (E) with key (C). This view corresponds to the programming of the workpiece. The keys (D) are for enlarging, reducing and refreshing the preview.
 - Open the <Side stops> menu with the <A> button to create a processing cycle.
 - A marked processing cycle in field (F) is deleted with the (B) button.
2. In the >Side stops< menu, the reference surfaces of the programmed workpiece are allocated to the Z and Y-stop.
 - In the Z-stop selection menu (G), the flat sides of the supporting surface (H) are allocated.
 - In the Y-stop selection menu (J), the front sides of the stop surface (I) are allocated.
3. A processing cycle is created with the >Create< (K) button.
 - ✓ The (L) button switches to the work menu.

6.6 Loading the machine program

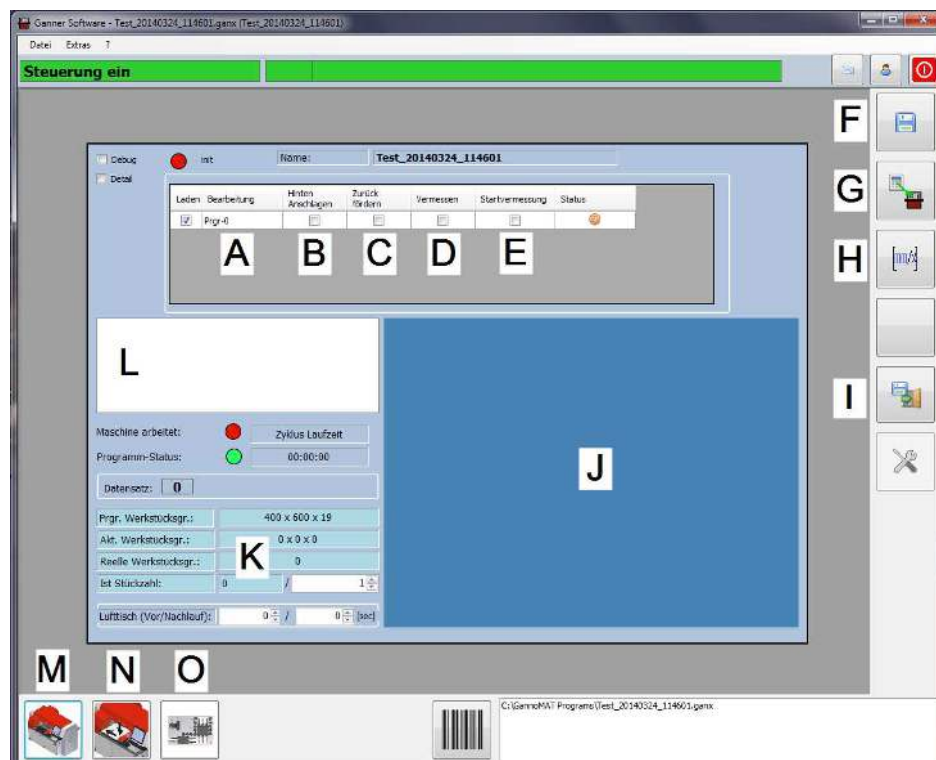


Fig.40- Load program

Loading the machine program

- Select the processing type.
 - (A) At least one processing cycle must be available. If no processing cycle is available, a processing cycle must be created with the button (N) (see chapter 6.5, pg. 59).
 - The workpiece is generally stopped from the front. The stop will be changed to from behind with the selection (A).
 - The workpiece is generally forwarded by the machine. The workpiece is returned to the output stop by selecting (C).
 - Using the workpiece length measuring sensor, the length of the workpiece is measured when selecting (D) and all workings referenced to this edge are corrected by the measured length error.
 - In order to compensate for a possible workpiece insertion error or an angular error in the workpiece cut, the start edge of the workpiece can be measured again and possibly corrected by selecting (E).
- ✓ If all selection options have been made, the processing cycle is loaded with the button (G) and is ready for processing.

Further information.

- If errors occur during the loading process, this will be listed in this field (L) (e.g. a missing tool).
 - When the loading process has successfully completed, the control lamp >Machine working< lights up green and in the preview (J) the processing direction of the workpiece is illustrated.
- ✓ It should be noted that the workpiece stops need to match the processing direction of the workpiece.

Changing the tooling

- The >Tooling< menu will be opened with the button (O) to possibly carry out another tool change.
 - ✓ See chapter 5.3, Tool change, on pg. 41.

Information field

- Further useful information is output in field (K).
 - The >Programmed workpiece size< corresponds to the X-Y-Z details in the programming.
 - The >Current workpiece size< corresponds to the details of how the workpiece was defined in the processing cycle.
 - The >Actual workpiece size< corresponds to the workpiece size measured by the measuring sensor with the workpiece lengths in the Y-direction.
 - In the >Actual quantity< field, the number of processing cycles processed is displayed and the required number of processing cycles necessary can be predefined.
- All changes made will be saved with button (I) and the work menu is closed.
- All changes made will be saved with button (F). The work menu remains open.
- You can reach the >Feed menu< with button (H). The feed speeds for the vertical and horizontal drilling spindles and for the groove cutting spindle can be set there.

**CAUTION****Wrong workpiece dimensions!**

This can lead to significant damage to the workpiece, to the tool spindles, the clamping system and the unit guides. It can also lead to misalignment of the machine calibration and to a machine standstill.

- When loading the machine with a workpiece, it must also be ensured that the actual processed workpiece size matches the programmed workpiece size.
- Incorrect details of workpiece length, width and height are to be prevented at all costs.

**Caution****Incorrect workpiece dimensions**

Possible consequences include significant damage to the workpiece, workpiece spindle, clamping system and the unit guides; maladjustment of the machine calibration; machine down time and expensive repair work.

- When loading the machine with a workpiece, always ensure that the actual workpiece size corresponds with the programmed workpiece size.
- Incorrect specification of the workpiece length, width and height must not be made.

**CAUTION****Incorrect programming!**

This can lead to significant damage to the workpiece, to the tool spindles, the clamping system and the unit guides. It can also lead to misalignment of the machine calibration and to a machine standstill.

- For milling contours across the entire workpiece thickness, it must be ensured that no workpiece residue enters the suction system.
- For larger recesses (holes, pockets, etc.) workpiece residues must be completely machined away in the programme sequence.
- Incorrect details of workpiece length, width and height are forbidden.

6.7 Inserting a workpiece, starting and removing

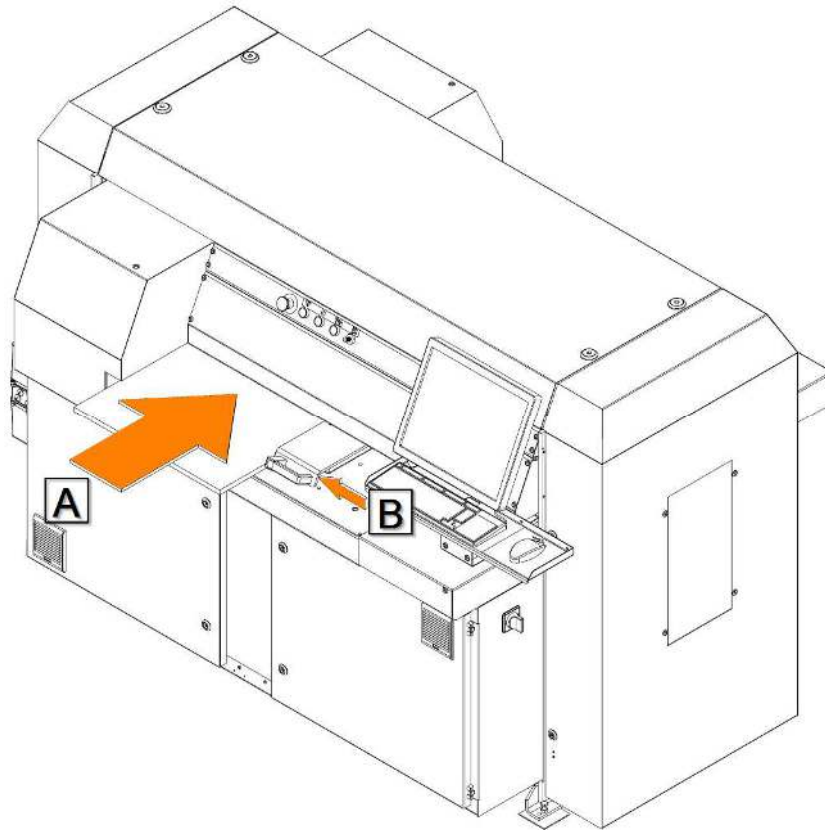


Fig.41- Processing a workpiece

Insert workpiece

1. Insert workpiece into the machine in direction (A).
 - The workpiece must lie on the roller stop and against the front stop.
2. Place the side stop on the workpiece in arrow direction (B).
 - The >Control On< button must be lit.
 - A processing cycle must be loaded. The corresponding start button (front or back) must be lit blue.
3. Now a processing cycle can be started.
 - On activation of the start button the workpiece will be pre-clamped with the workpiece transport device. The start button will start blinking. This pre-clamping is a safety function and serves to prevent fingers from being crushed.
 - Processing is started by pressing the start button again.
4. After processing has finished, the workpiece will be moved into the removal position and can then be removed.
 - ✓ If a further processing cycle is available per workpiece, then this will be carried out at the next start. Please observe how and where to position the workpiece for the next processing cycle.



Danger!

Crushing of hands when inserting and removing workpieces.

Crushing of fingers.

- Never reach under the front or rear trap protection.
- Press the emergency stop button in dangerous situations.
- Never reach between the workpiece and the guide rollers when processing the workpiece.

**Caution****Incorrect workpiece dimensions**

Possible consequences include significant damage to the workpiece, workpiece spindle, clamping system and the unit guides; maladjustment of the machine calibration; machine down time and expensive repair work.

- When loading the machine with a workpiece, always ensure that the actual workpiece size corresponds with the programmed workpiece size.
- Incorrect specification of the workpiece length, width and height must not be made.

6.8 Turning the machine off

Turning off in an emergency

1. If there is an emergency, one of the emergency stop buttons on the machine must be pressed.
 - All movement of the machine is stopped, the routing unit, the saw unit and the vertical drilling spindles are reset, the horizontal drilling spindles remain forward, the gripper system and workpiece clamp open!
 - The control lamp on the button (C, see fig36, pg.56) >Control ON< goes out.
 - ✓ The power to all outputs of the control is cut off by the emergency stop device.

Turning the machine off

1. Quit all sub-menus and return to the main menu.
2. The user software and the operating system are closed with the button (A).
 - The PC is shut down.
3. Once the monitor is black, turn off the machine using the main switch.



Fig.42- Shut down main menu

7 Maintenance instructions



Danger

Crushing points and electrical voltage

Severe to fatal injuries of persons can be the consequence.

- The machine has to be disconnected electrically and pneumatically from the supply lines during maintenance.

7.1 Pneumatic maintenance unit

Water separator

- The condensation from the compressed air collects in the water separator (D). Dirt and condensation impair the machine's functionality.

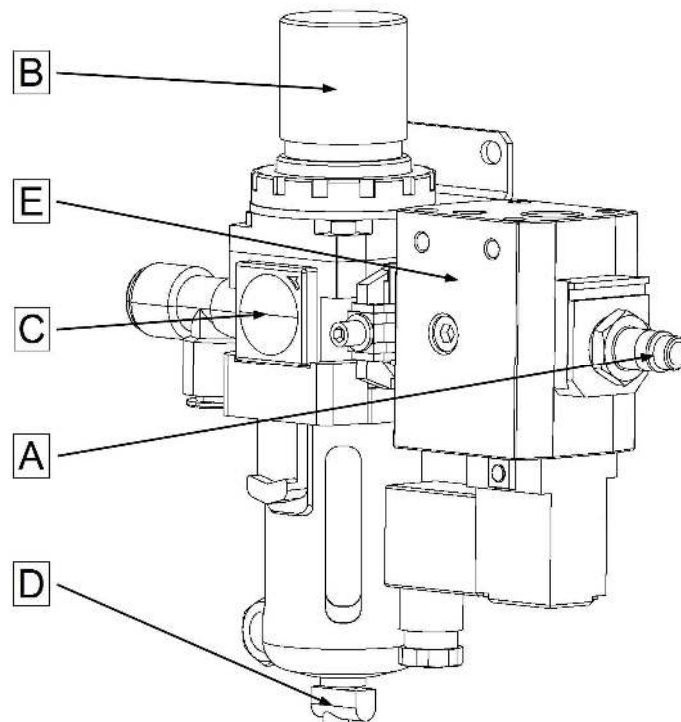


Fig.43- Maintenance unit

The water separator is located on the front left side of the machine (V, see fig.2, pg.13).

Drain condensation

- Regularly drain the condensation from the drain valve of the water separator.

Replacing the filter

- Carry out regular maintenance and replacement of the pneumatic circuit filter according to the filter manufacturer's specifications.

7.2 Central lubrication of axle drives



Abb.44 – Central lubrication of the axle drives

Automatic lubrication unit of the axle drives

- All axle drives are supplied with grease in regular intervals by the automatic central lubrication.
 - The fill level needs to be checked regularly.

Refilling the central lubrication unit

- The lubrication unit is located in the rear, next to the pneumatic maintenance unit.
- Refill through the screw cap (A).
 - Observe the lubrication recommendation.
 - We recommend the following lubrication greases:

Lubricant:

Low-viscosity grease is used according to:	DIN 51526
Base:	Lithium soap-based (00 or GP 000)
-	Oil viscosity min. 40 mm ² /s
Consistency NLGI:	DIN 51502, class 00 or 000
Recommended greases:	OMV-Fuchs - Signum EPZ OKS – 428

7.3 Drill head lubrication

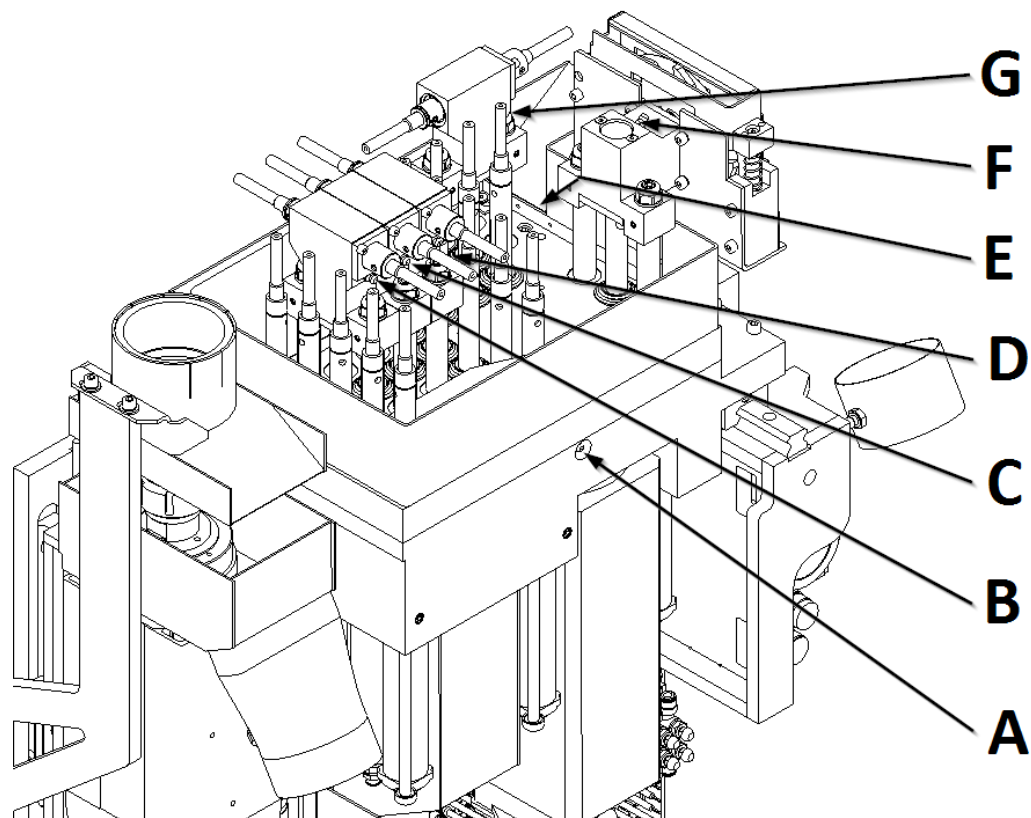


Fig.45- Drill head lubrication

Maintenance note

1. The re-lubrication interval of the drill head is 1000 operating hours.
 - In single shift operation, this corresponds to a lubrication interval of approx. 35 working weeks.
2. Lubrication of gearboxes (A and E)
 - Add around 5 cm³ of oil to the lubrication nipple (A) on the right side of the gearbox.
 - Add around 5 cm³ of oil to the lubrication nipple (E) on the back side of the gearbox.
3. Lubrication of the horizontal drill spindles (B, C, D And G)
 - Add around 1 cm³ of oil underneath the chucks with bearing flange.
4. Lubrication of the saw unit (F)
 - Add around 1 cm³ of oil underneath the gearbox housing.

The manufacturer recommends:

Klüber Isoflex Topas NB52

Alternatively:

OKS 422

7.4 Linear guides

Warning advice for linear guide carriage

1. All guide carriages of the machine are initially lubricated by the manufacturer. The re-lubrication interval for all guide carriages under normal operating conditions is 2,000 km.
 - This is a lifetime lubrication, except for the guide carriage in figure 46 and 47.
 - The guide carriage must be re-lubricated every 3 years, otherwise the service life is reduced.
2. If a re-lubrication interval is reached in spite of this, 0.5 or 0.7 cm³ grease are required per guide carriage.
 - Lubrication points see Fig. 46, pg. 67 items A, B and Fig. 47, pg. 68 items C, D, E, F.

Lubricating grease according to:	DIN 51 825 K2K
NLGI consistency:	according to DIN 51 818, Class 2
Recommended greases:	HIWIN – G05 Klüberlub – GL-261 Mobil – Mobilux EP1 Fuchs Lubritech – Lagermeister BF2 Lubcon – TURMOGREASE CAK 2502



IMPORTANT

Use of the wrong grease

leads to destruction of the carriage.

- Under no circumstances may grease be used with a proportion of solid lubricant (such as MoS₂ or graphite).

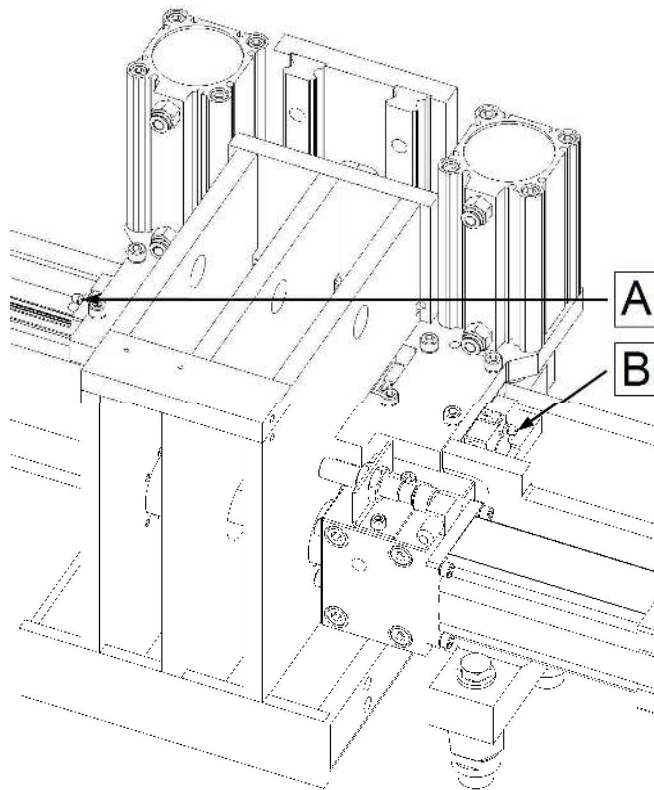


Fig. 46– Lubrication - gripper

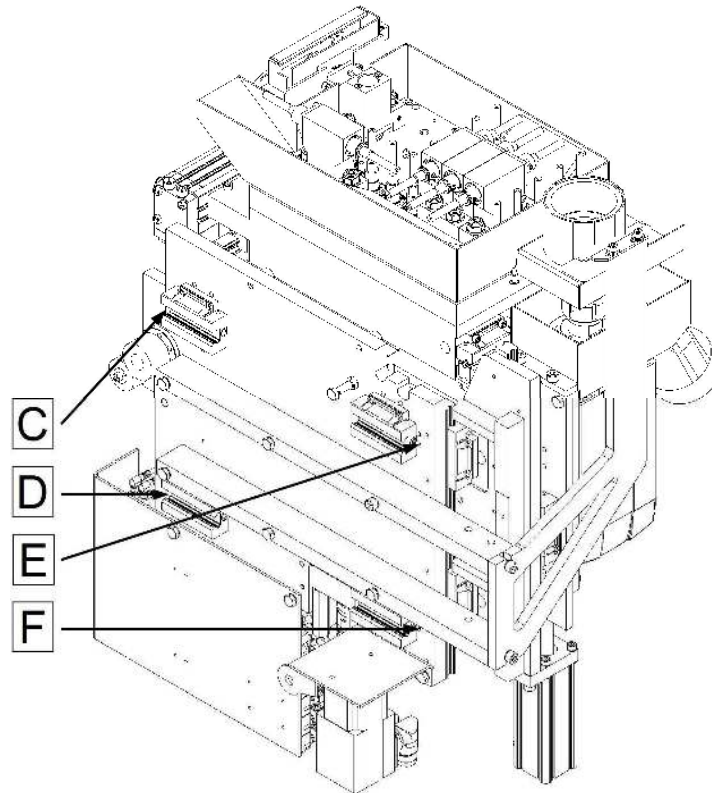


Fig.47- Lubrication - processing unit

7.5 Cleaning

Regular cleaning is a prerequisite for a proper and fault-free operation.



The block reference screws of the Z-axis (C, see Fig. 48, pg.69) must be checked daily and cleaned if required to ensure the processing precision of the machine.



Regular cleaning of the routing unit (A) and the drill head (B, see Fig. 48, pg.69), to prevent damage to the routing unit, to the drill spindles and the grooving unit.

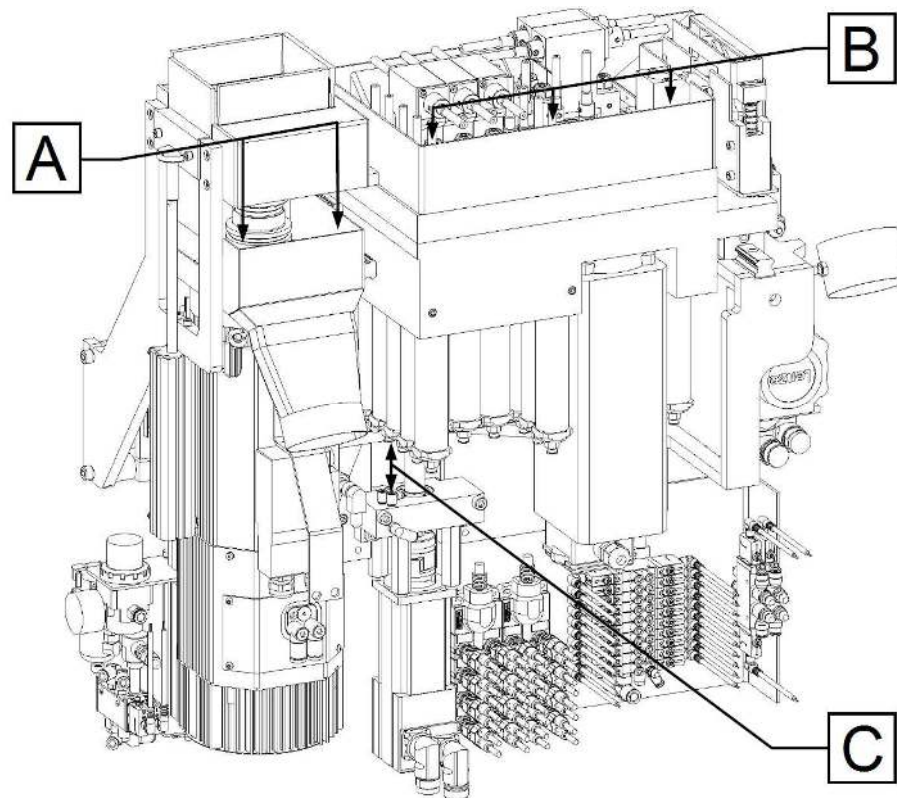


Fig. 48– Cleaning Z-reference, drill head, routing unit

7.6 Checking the pneumatic connections

To avoid leak losses, check the pneumatic line connections regularly for proper fit and seal.

7.7 Cleaning and maintenance of the HSK tool holder (option)

7.7.1 Daily checks and cleaning

- The conical surfaces of the tool holder (in Fig.49, on pg.70 illustrated in black) and the seat of the tool holder, as well as its contact surfaces (in Fig.49, on pg.70 illustrated in grey) must be very clean and may not show any traces of dust, grease, coolant, oil, metal parts, or traces of oxide or lime.
- At the end of each workday, the conical surfaces and the stop surfaces must be cleaned with the cone wipers and a clean, soft cloth.
- After cleaning with ethyl alcohol, spray the conical surface with KLÜBER LUSIN PROTECT G 31 and distribute evenly with a clean and dry cloth. Allow the product to dry before renewed use of the tool holder.



Only use cone wipers and a soft, clean cloth for cleaning the conical surfaces and the stop surfaces.

- The use of agents that damage the surface, such as steel wool, metal brushes, abrasive cloths, acids or other aggressive agents is forbidden!

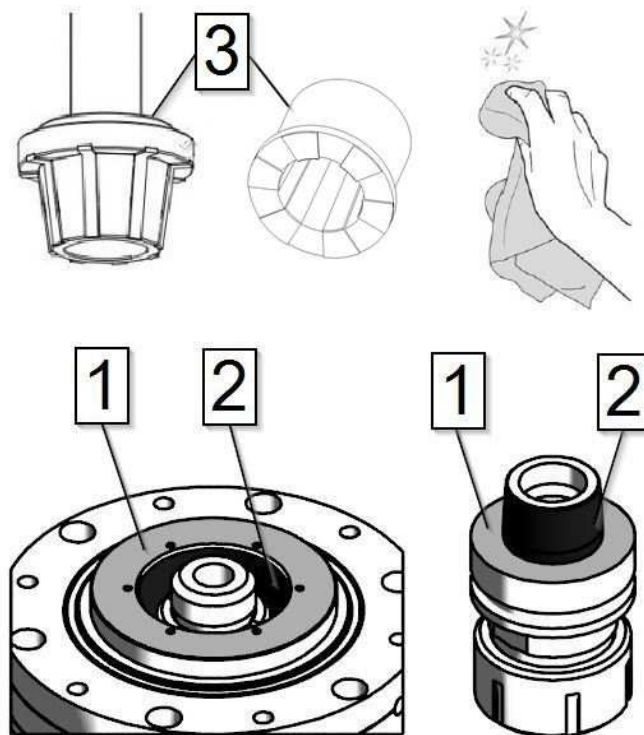


Fig.49– Cleaning the HSK mount

1	Stop surfaces (illustrated in grey)
2	Conical surfaces (illustrated in black)
3	HSK cone wiper

Protection of the cone seat in the spindle shaft



Do not direct any jets of compressed air into the inside of the spindle shaft if the tool holder is missing!

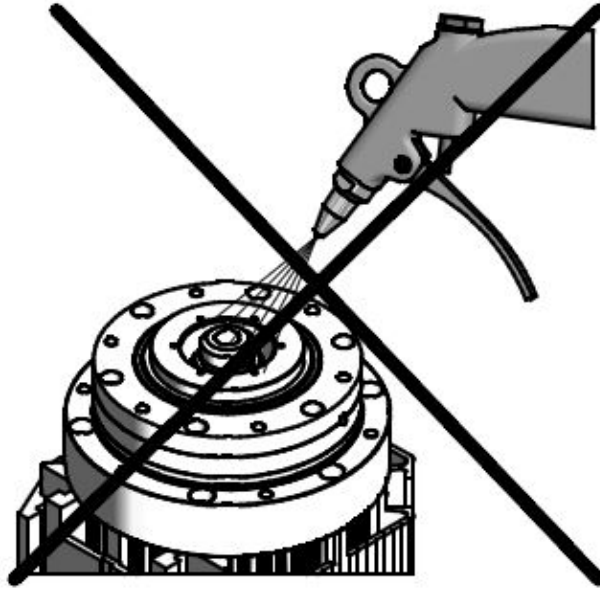


Fig.50– Protection of the HSK mount



Insufficient cleaning prevents the tool holder from being correctly positioned, which can have serious consequences for the safety of the user, for the wear and tear of the electro-spindle and the tool holder and for the precision and effectiveness of the processing.



The seat of the tool holder in the spindle shaft must always be protected against the ingress of impurities.

- Either provide a cap, or place a tool holder cone!



At the end of processing, always remove the tool holder from the electro-spindle to avoid bonding. Instead insert a new clean tool holder at room temperature to protect the inside of the electro-spindle from the external environment.

Internal overpressure

The pneumatic circuit for internal overpressure prevents ingress of damaging particles into the electro-spindle. The supplied air flows through the lights of the front labyrinth in the area of the spindle nose.

- For stationary spindles, check if uniform air discharge takes place around the spindle shaft (overpressure). If this is not the case, check the efficiency of the pneumatic circuit and the arrangement of the connections.



Overpressure air must always be available, even with the stationary electro-spindle and machine switched on. It must also be available during the maintenance and cleaning phases of the machine to prevent the ingress of dust into the interior.



The pressure regulator factory setting is 4 bar and is set on regulator (A) (see Fig.51, pg.72)!

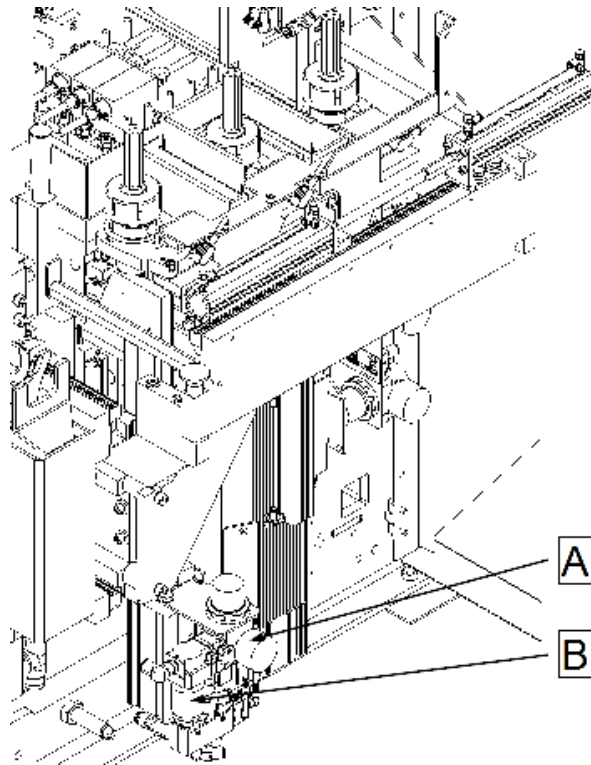


Fig.51- Tool changer regulator and filter position

Automatic cleaning of the tool holder cone

The air stream for the cleaning of the cone automatically activates itself during the tool change.

- This procedure protects the coupling surfaces from impurities. It is necessary to periodically check the surface conditions of the coupling and the degree of cleanliness.



The air stream for the cleaning must be activated during the whole time the jaw chuck remains open.

7.7.2 Monthly lubrication

The HSK jaw chuck must be greased monthly in order to make sure it performs well for the entire service life.

- Use METAFLEX grease paste No. 70-8508.

In the process, lubricate between the segments and the ejector of the HSK jaw chuck.

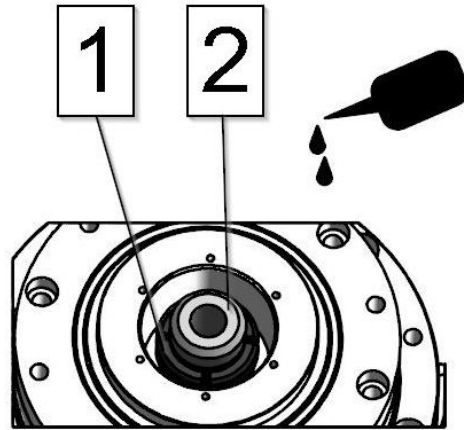


Fig.52– Lubrication of the HSK mount

1	Segments (illustrated in black)
2	Ejector (illustrated in grey)

Excessive grease is detrimental!

After application of the grease specified above and as described above, manually carry out some tool changes (see chapter 5.3.5, on pg.46), so that the grease can be evenly distributed. Then remove the tool holder from the spindle shaft and clean any visible grease residue with a clean cloth. Keep back chips or other processing residues that could contaminate the chuck jaw, the conical surfaces and the stop surfaces. These areas must be kept as clean as possible, so that the safety of the user and the processing precision are guaranteed and the wear of the spindle and the tool holder cone are reduced.



Only use the above mentioned types of grease. Other products are not compatible with the grease used by the manufacturer for the first lubrication.

- If incompatible greases are mixed, or they are used multiple times after each other for the same chuck jaw, harmful substances are produced which impair the chuck jaw function and resulting in serious safety issues.

7.7.3 Other checks and maintenance

Monthly checks of the connections

- Check electrical lines as well as signal cables for integrity.
- Check whether the connector is well attached.
- Check that the pipes don't leak and check the connections of the cooling circuits and the compressed air circuits.

Replacing the filter and air purity of the pneumatic circuit

- Carry out regular maintenance and replacement of the pneumatic circuit filter according to the filter manufacturer's specifications. (Filter B, see Fig.:51, pg.72)



IMPORTANT

Supply compressed air with a purity according to ISO 8573-1, Class 2 4 3 to the electro-spindle, i.e.:

- class 2 for fixed parts:
size of solid particles < 1 µm;
- Class 4 for moisture:
dewpoint < 3 C (37.4 F);
- Class for all oil:
oil concentration < 1 mg/m³

If this specification is not complied with, the product can suffer damage. The guarantee does not apply if harmful substances are found during repair.



One example for a possible implementation of the above named specifications in accordance with the following instructions:

- If a circuit of lubricated air is present in the machine, this circuit is insulated from the dry air that is destined for the electro-spindle by check valves.
- The filters used (pre-filter 5 µm, de-oiler filter 0.1 µm) are installed as close as possible to the electro-spindle.
- Maintain the filter regularly according to the manufacturer's specifications and replace it when it is used and losing its effectiveness (guideline value: every 6/12 months).
- At the end of a working day, the pneumatic system must be drained so that automatic cleaning of the filter can be carried out.
- If you think that the filter has an effectiveness of < 100%, it is important that the tool machine is supplied with correspondingly treated air.

The machine should be supplied with compressed air with a purity according to ISO 8573-1 and with Classes 7 6 4.

- Class 7 for fixed parts:
size of solid particles < 40 µm;
concentration of the solid particles < 10 mg/m³;
- class 6 for moisture:
dewpoint < 10 C;
- class 4 for all oil:
oil concentration < 5 mg/m³

Checking the HSK mount insertion force

The axial force (insertion force) exerted by the clamping system on the tool holder is guaranteed as constant by the manufacturer for a minimum duration of 2,000,000 tool change cycles.

1 cycle tool change = clamped tool / unclamped tool / clamped tool.



Nevertheless, it is recommended to check the insertion force regularly with a measuring device.

- According to the manufacturer's specifications, the insertion force should be 11 kN.

8 Shutting down and disposal

8.1 Shutting down

PREPARING THE SHUTTING DOWN

1. If the machine is shut down, it has to be disconnected from all power supplies. For transport, the transit supports need to be reattached:
 - Transit support of the moveable processing unit has to be mounted.
 - ✓ The machine parts can now be transported.

8.2 Disposal



Disposal

Taking the machine apart

Non-biodegradable products such as oils, greases, rubber, PVC, resins and so forth may not contaminate the environment.

- These operations have to be carried out by experts while observing valid laws.

Disposal

1. All electronic components need to be disposed of properly.
 - Industrial PC, all components in the control cabinet, all buttons, sensors and switches in the machine, all motors.
2. All oils and greases need to be disposed of properly.
 - Linear guide carriages, oil fillings of all gear boxes.
3. All glues need to be disposed of properly.
 - High pressure pump, hose lines and glue nozzles.