Kaindl®
SCHLEIFTECHNIK

OPERATING MANUAL FOR CIRCULAR KNIFE SHARPENING MACHINE

RMS-CNC

Original operating manual

Please keep for further use!

Kaindl-Schleiftechnik REILING GmbH, Remchinger Str. 4, D-75203 Königsbach-Stein, Germany
Tel.: +49 7232/4001-0, Fax.: +49 7232/4001-30, Internet: www.kaindl.de, E-Mail: info@kaindl.de

CONTENT

EC-DECLARATION OF CONFORMITY

The manufacturer:

Kaindl-Schleiftechnik
Reiling GmbH
Remchinger Straße 4

75203 Königsbach-Stein
Germany

declares that the machine
descirbed hereafter:

Circular knife sharpening machine
Type: **RMS-CNC**

is conform to the following
EC-Instructions:

EC-Machine instruction (2006/42/EC)
EC-Low current requirement
(73/23/EC)
EC-Instruction EMV (89/336/EC)

Applied harmonised norms:

EN ISO 12100-1 and EN ISO 12100-2; EN ISO 13857; EN 563;
EN 61029-1, EN 60204 Part 1; EN 61000-6-1; EN 61000-6-2;
EN 61000-6-3; EN 61000-6-4

Changes in design, which affect the technical data listed in this manual and the directed use, therefore change the machine substancially, make this declaration of conformity invalid!

The documentation has been assembled by:

Reinhard Reiling

Kaindl-Schleiftechnik
Reiling GmbH
Remchinger Straße 4
75203 Königsbach-Stein

Königsbach-Stein, dated 12.04.2010

.....
Reinhard Reiling, General Manager

1. DUTY OF TAKING CARE BY THE USER

The **circular knife sharpening machine RMS-CNC** has been constructed under consideration of an endangering analysis and carefull selection of observed harmonized norms, as well as further specifications.

The RMS-CNC meets the stat of the art and grants a maximum of safety. The safety can only be achieved in daily work, when all neccessary steps are taken. It is the duty of taking care by the user to plan and control these steps.

The user has to take care that:

- the machine is used as directed (see chapter "Directed use")
- the machine is used in flawless workable condition, especially the safety installations are checked regularly for their function
- requested personal safety equipment for the operator is available and used
- the operation manual is always kept in a readable condition, complete and available near the machine
- all safety and warning instructions are not removed from the machine and kept readable

2. DEMANDS OF THE OPERATING PERSONNEL

Only persons who are familiar with this manual and safety advises and take notice, are allowed to work with the RMS-CNC.

3. TRANSPORT

The circular knife sharpening machine RMS-CNC is delivered in a wooden box on pallet. The gross weight of the machineis around 300 Kg. The transport is done with a pallet by lifting cart or fork-lift truck directly to the installation site.

Before the first start, check the machine for transport damages!

In case of a transport damage, immendiately contact the forwarding agency to protocol the damage.
Please pay attention: The deadlines for claims are quite short!

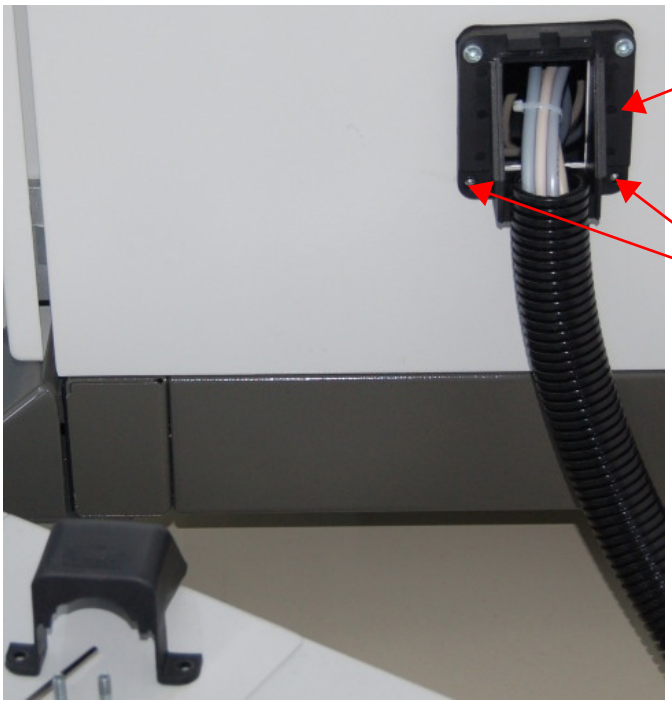
4. DIMENSIONS AND WEIGHT

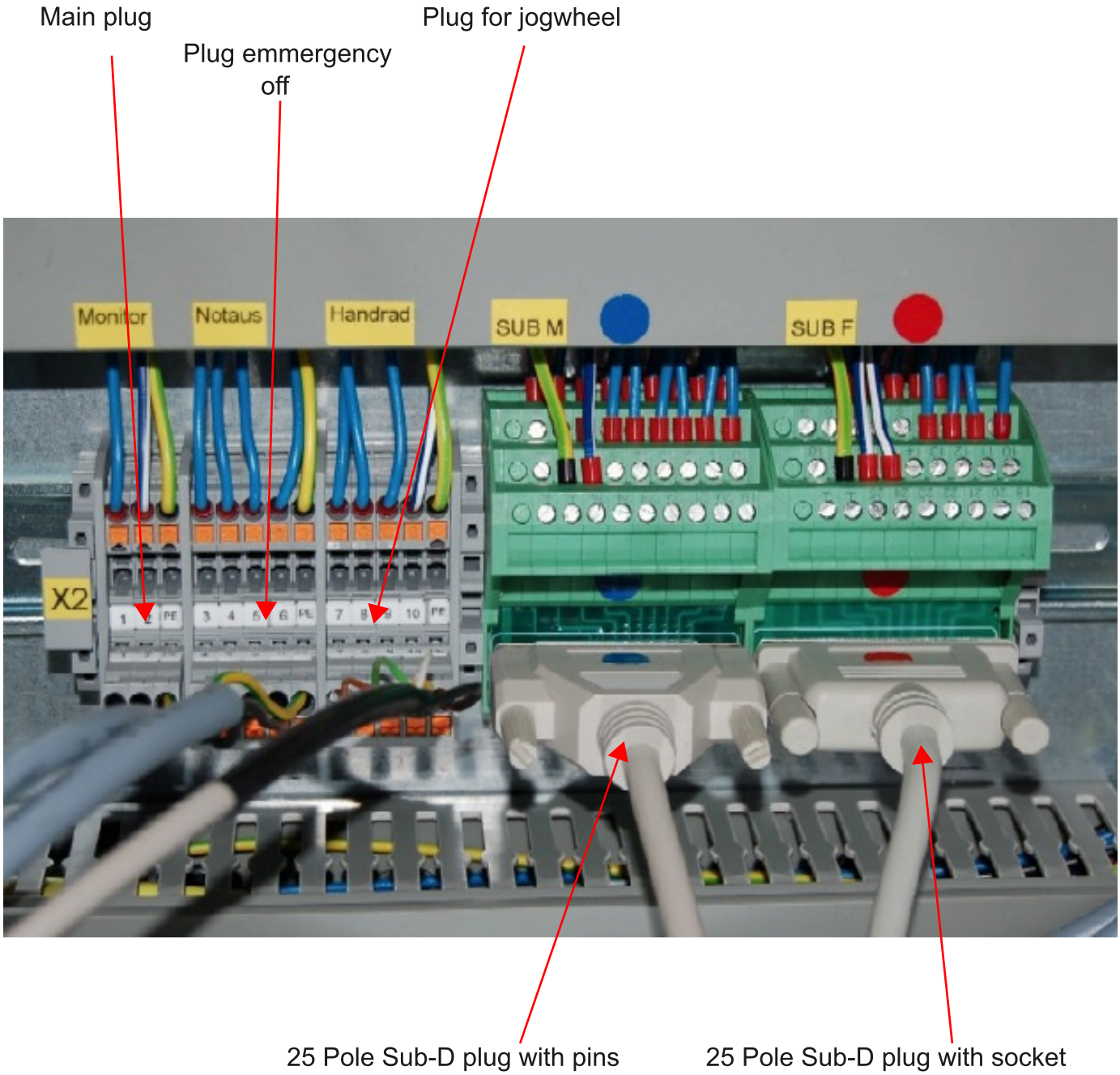
Dimensions L x W x H:	900 x 700 x 1540 mm
Weight net without control unit:	225 Kg
Weight net of the control unit:	37 Kg

5. SET UP AND CONNECTION OF THE CONTROL UNIT

Before placing the machine at its final position on the floor, screw in the machine feet from below. Please pay attention that the machine is alignment horizontal. Please check with a bubble level. Pay attention, that the space for the machine grants a vibration free operation.
Next to connect the control unit with the machine, therefore open the black cable panel on the right side of the machine.
For operating, unscrew the both screws below (M6) with a allen key (4 mm) and fold the cable panel cover upwards.
Now you can pull through the cables with the plugs and fix the cable conduit by closing the panal. By fixing the both screws the cable conduit is fixed tight and strain relieved.
After opening the front door, the plug connection is completed (see below).

The plug-in connectors are without risk of confusion





ADVISE:

Plugs are encoded and cannot be interchanged!
Sub-D connectors are color- and mechanically coded and cannot be interchanged!

6. ENVIRONMENTAL CONDITIONS FOR SET UP

Use the circular knife sharpening machine only in dry rooms.

Environmental temperature:	from +5 to +50° Celsius,
Humidity:	up to 90%; not condensing

7. SAFETY ADVISE

When handling with a circular- or profiled knife, maximum precaution is demanded. These knifes may as sharp as a razot knife. Careless handling can cause serious incised wounding.

Never plug or unplug a USB device (e. g. USB-stick) when software is running! The JOG-Wheel could be damaged!

8. DIRECTED USE

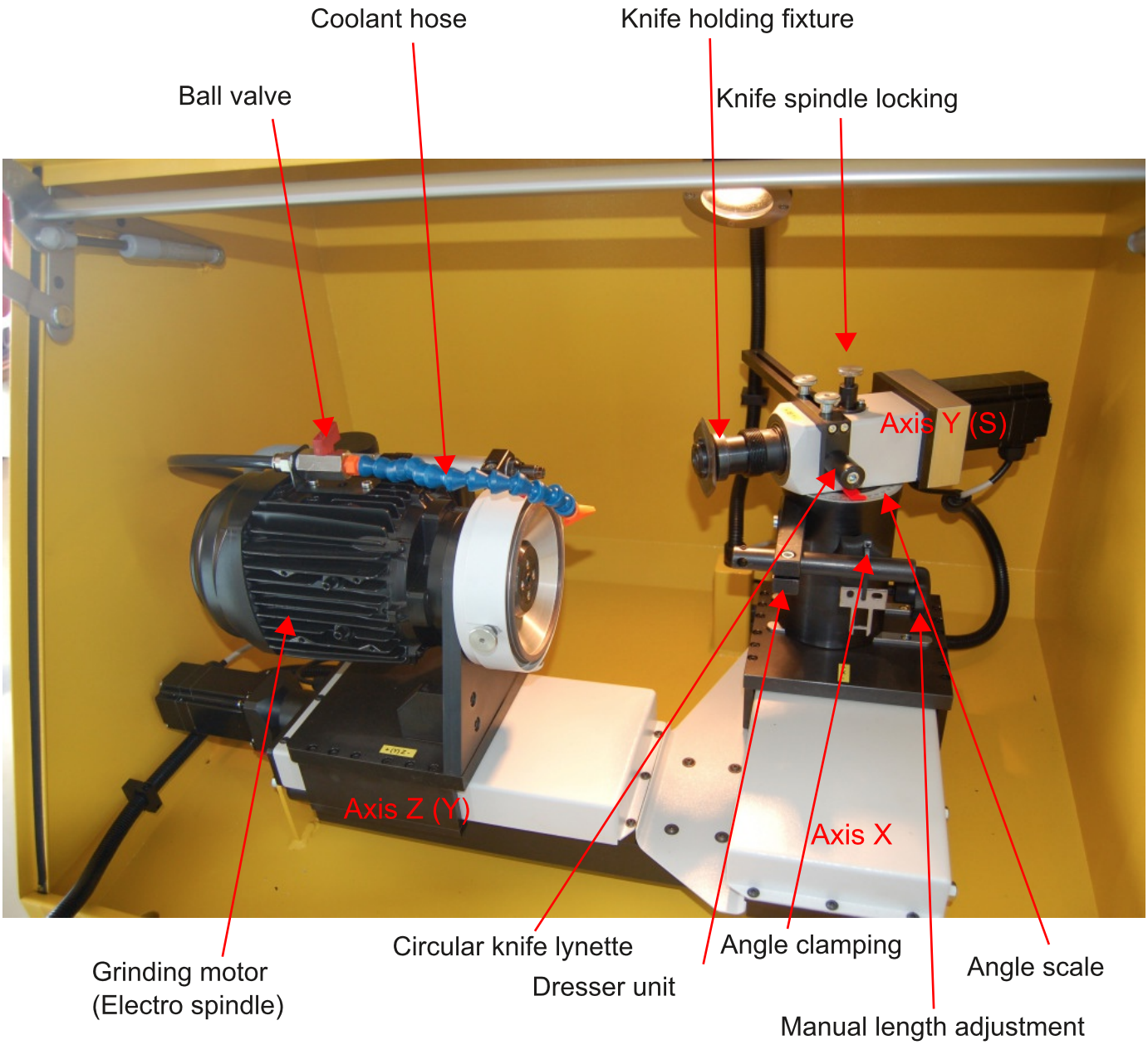
The circular knife and profiled knife sharpening machine RMS-CNC is exclusively destined for sharpening of circular knifes or profiled knifes with a max. dia. of 350 mm respectively a max. radius of 175 mm.

The programming of the grinding software is done as per DIN 66025 respectively by a provided sharpening programme. The sharpening is carried out by the electro spindle or with the air spindle for internal grinding.

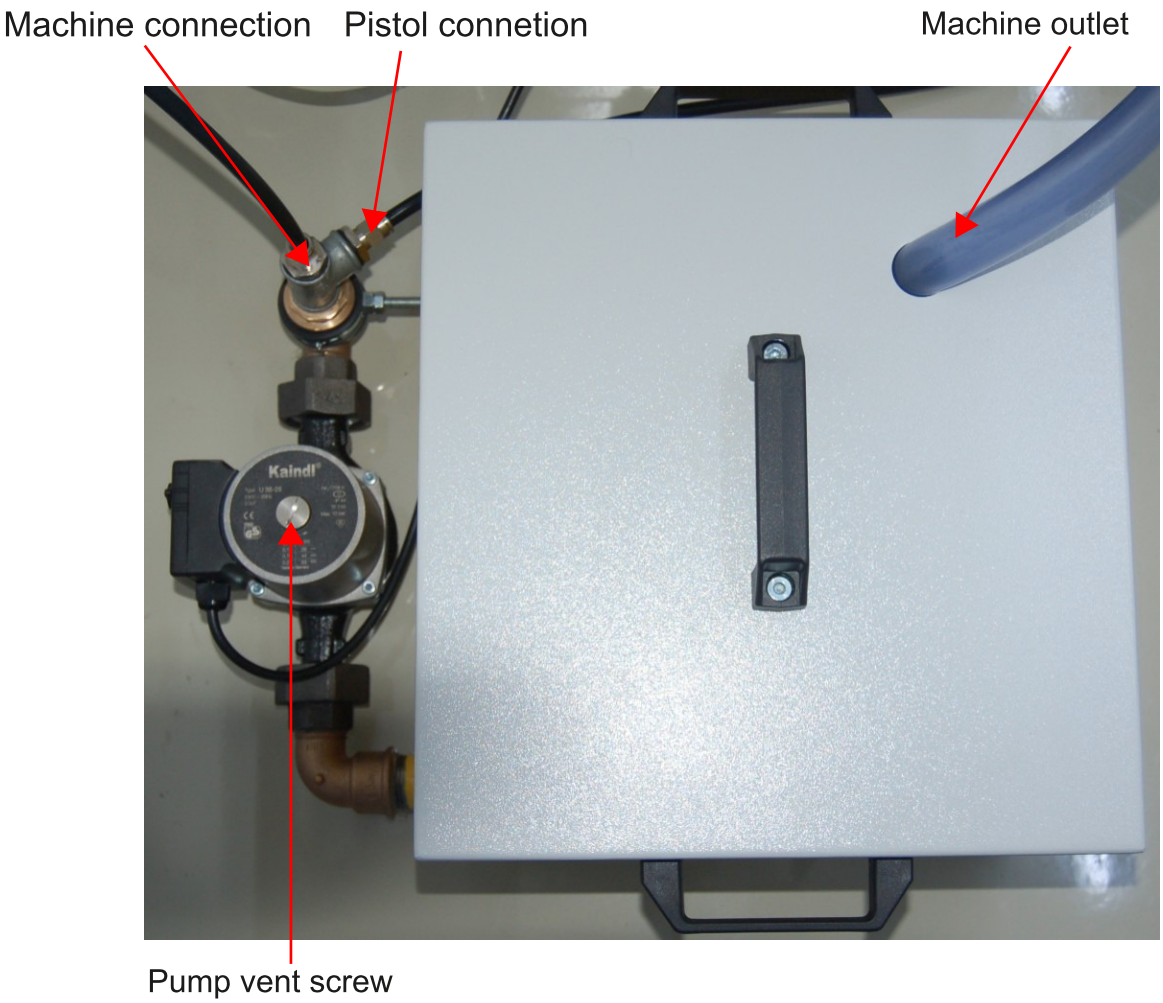
The directed use also includes reading and unterstanding the operation instruction, the programming instruction, as well as observing of all advised specified therein.

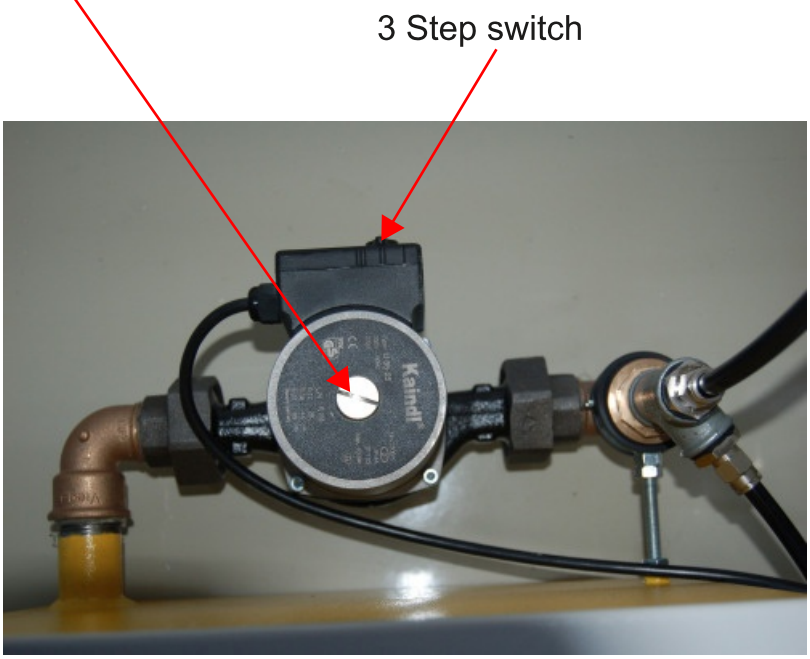
For all personal- and material damages, arising by not intended use, not the manufacturer, but the operator is reponsible.

9. STRUCTURE OF THE RMS-CNC



10. DESCRIPTION OF THE COOLANT EQUIPMENT

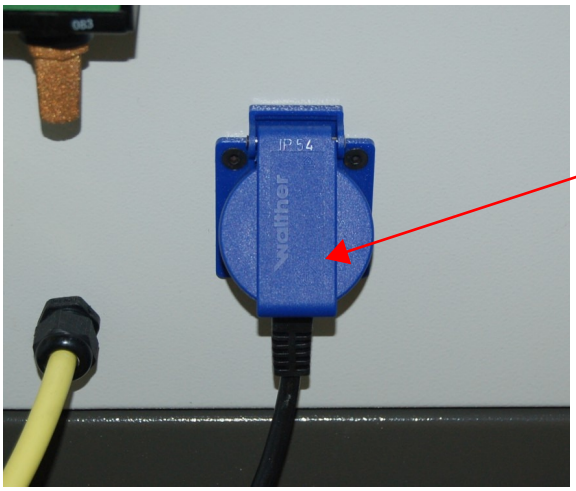




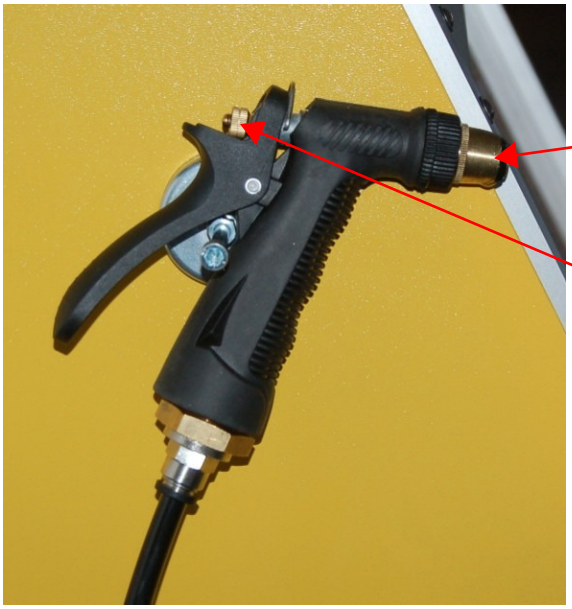
The coolant container must be filed 3/4 of its total volume with coolant. Subsequently, the pump must be vented.

The minimum filing height is the upper edge of the pump.

The coolant equipment is connection to the machine by means of the blue electrical socket. To vent the pump, open the pump vent screw.



Electrical socket for coolant equipment



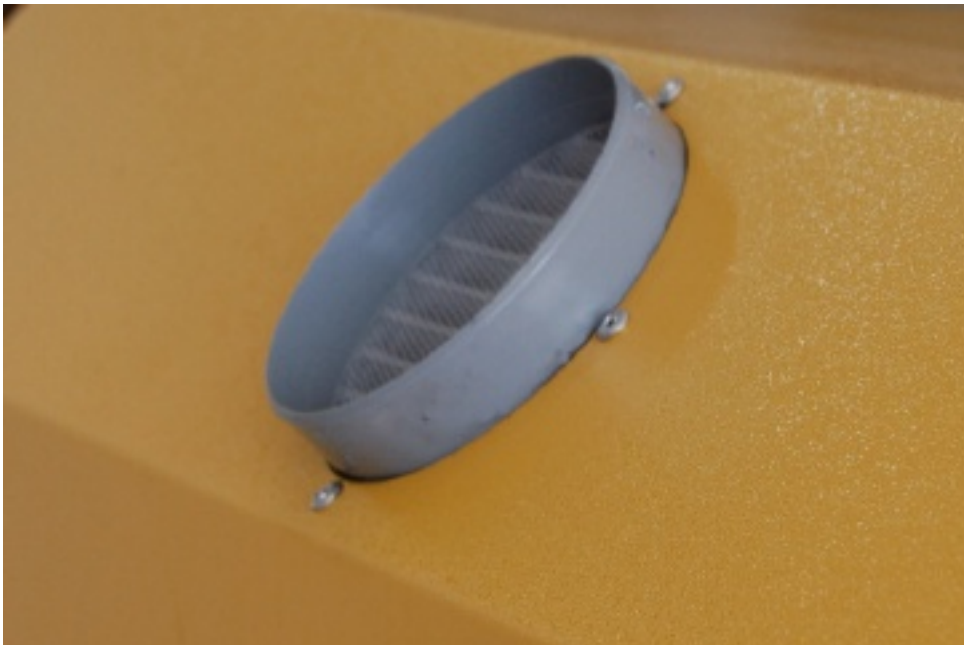
Nozzle adjustment by means of turning

Setting of the amount of fluid

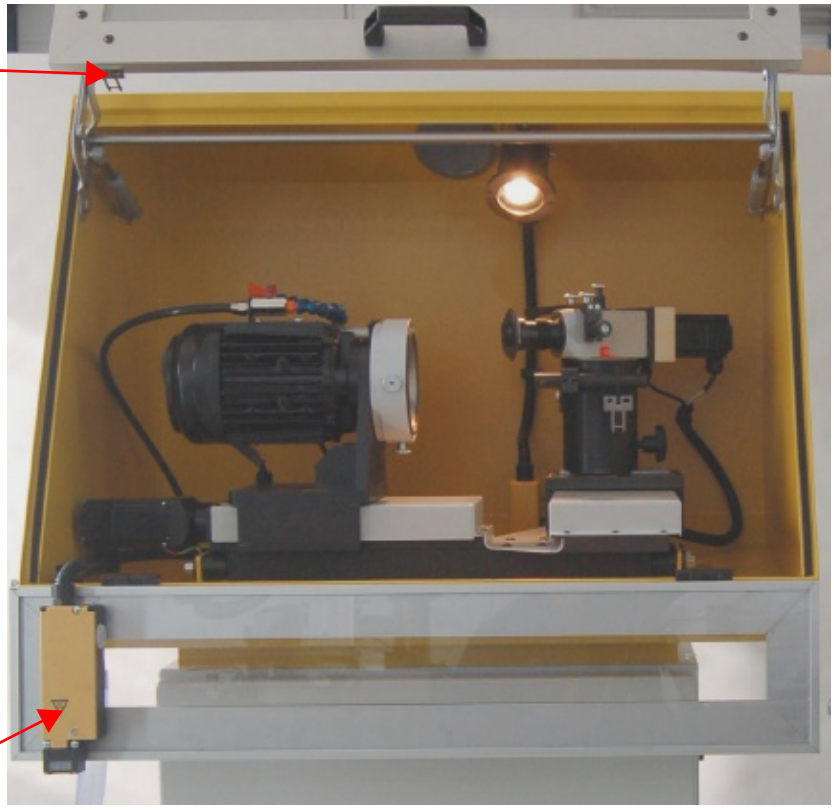
The coolant pistol is used to clean the machine, as well as to clean work pieces. The pistol only functions when the coolant pump is in operation. This must be actuated in manual operation using the F8 key, respectively it can also be switched off with the F8 key.

Basic information regarding cooling lubricants:
Please only use water-miscrible emulsions on a mineral oil basis. Synthetic products can cause serious damage to the paint coating. We do not accept any liability for such damages.
When testing cooling lubricants, please observe the provisions of the respective manufacturer. Please also observe the respective disposal regulations.

The standard equipment if the RMS-CNC includes an (Ø 100 mm) aerosol suction connection.



The RMS-CNC is equipped with two doors halves that lock during the automatic operation mode when the program is running.
If the door is open, switching between the operation modes manual to automatic or from manual to MDI is not possible, respectively, upon opening the door, the operation mode will switch back to manual.



11. HARDWARE COMPONENTS OF THE CNC-CONTROL

The IPC control is equipped with a touch screen, The buttons on the user interface are actuated by means of touching them.
The ICP control is equipped with a keyboard with touch pad in place of a mouse.
The USB 2.0 interface is used to secure the date of your CNC-Programs by mean of a USB stick.

Touchscreen

Digital JOG wheel
Manual operation = JOG wheel
Automatic = feed overdrive

USB 2.0

Touchpad

Emergency off push button

!!! When the CNC software is running, never insert or remove a USB device (e. g. USB stick). This could destory the JOG-Wheel!!!

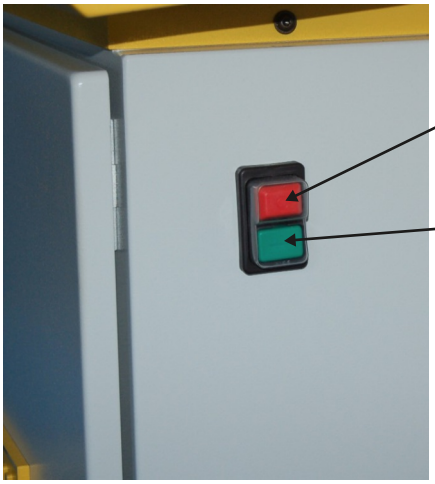
12. TECHNICAL DATA

Grinding area of circular blade:	from Ø 50 to Ø 350 mm
Grinding area of punch blade:	from 50 to 175 mm radius
Grinding motor (E-spindle):	1 ~ 230 V / 50-60 Hz, 0,37 KW, 2790 r/pm
Connected load with controls:	1 ~ 230 V / 50-60 Hz, 1,2 KW
Number of numerical axes:	3
Suction connection:	Ø 100 mm
Dimensions L x W x H:	900 x 700 x 1540 mm
Machine weight without controls:	225 Kg
Calculated sound pressure level:	< 70 dB/A
Controls:	IPC Steuerung with 15" Touchscreen
Operating system:	Ubuntu 6.06 LTS "Drapper Drake" with RT Kernel
CNC software:	EMC2 Version 2.3.5
Net control weight:	37 Kg
Coolant pump:	
Motor:	1 ~ 230 V / 50 Hz
Output Level 1:	0,028 KW
Output Level 2:	0,045 KW
Output Level 3:	0,063 KW
Protectiob class:	IP65
Flow rate:	16 to 35 l/min

Subject to technical modifications!

13. TURNING ON THE MACHINE

Turn on the machine on the right on the lower console by actuating the green switch. The machine illumination switches on and the control boot the operating system.



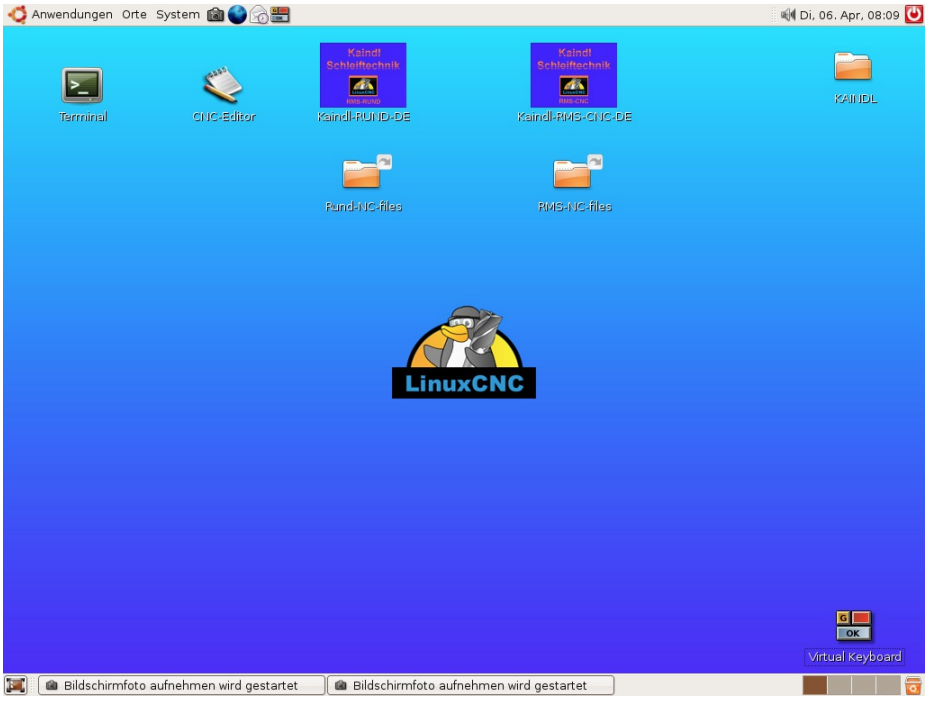
NOTE: Always end the controls correctly before turning off the machine!

After the controls boot, you see the start-up display. Two machine configurations are available:

1. Kaindl-ROUND: is a two axes configuration for grinding of circular blades or inner cylindrical grinding.
2. Kaindl-RMS-CNC: is a three axes configuration for grinding of punch blades.

NOTE: Every configuration has its own independent program folder

The CNC software EMC2 is started by tapping the respective image.



14. GRAPHIC USER INTERFACE TKEMC

TKEMC has been adapted by us accordingly to the machine. The menus and functions are described here in after.
Help menu > access the Help, as well as brief instructions regrarding the keyboard functions and the individual menus, as well as the G- and M-Codes.
After the software has started, the machine must be switched on with the F2 key.
The exis identification and the illustration of the actual values are depicted in yellow, which indicates the missing reference of the axes.

MACHINE REFERENCING

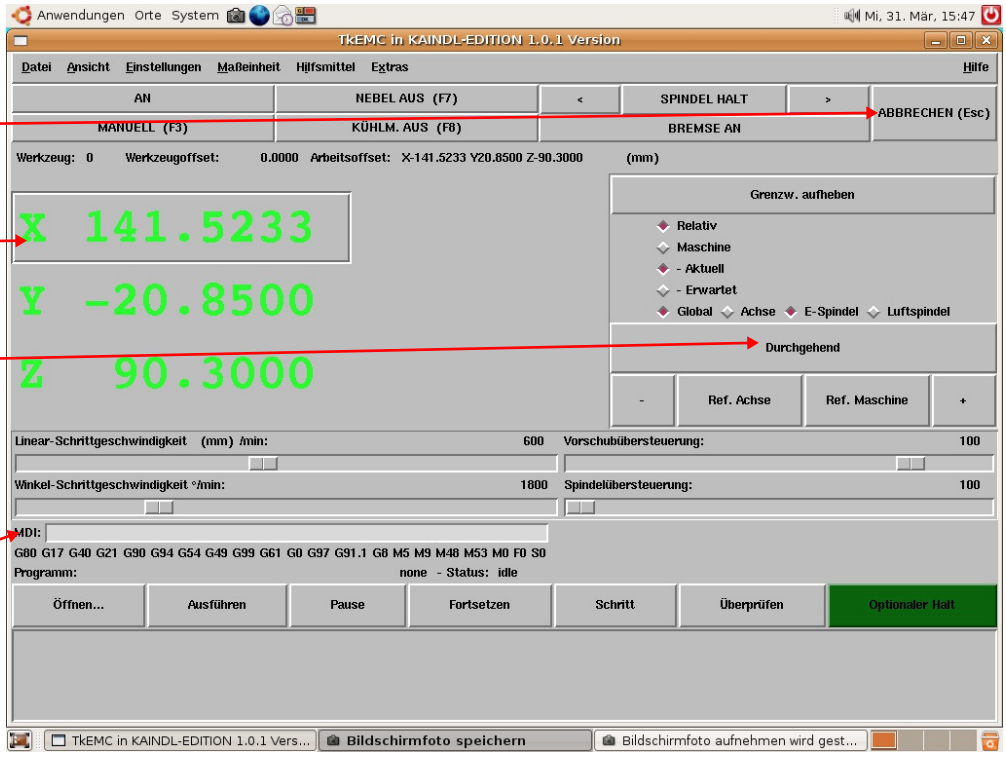
By pressing the button "**Ref.Maschine**", the machine is referenced and it provides the notification "homing sequence already in progress", which is acknowledged with **OK**.
After the reference sequence, the axis identification and actual values are depicted in green. Working with the automatic and in MDI is not possible without valid reference points.

Program termination or termination upon any move

selected axis

Increment selection for jogwheel

MDI entry line



15. DESCRIPTION OF THE MENU TKEMC

There are many useful functions and aides in the TKEMC menus, which facilitate your work, respectively the search for error diagnosis. The relevant functions are described here:

Menu File

File > Open	Opens a CNC program
File > Edit	Opens the TKEMC interal editor to edit the CNC program
File > Reset	Resets the open CNC program (program reset)
File > Close	Ends TKEMC

Menu View

View > Tool table	Opens the view of the tool table, respectively for editing
View > Parameter file	Opens the EMC.VAR to view, respectively for editing
View > Diagnosis	Opens diagnosis window (only for manufacturer)
View > Backplot	Opens the backplot view, which depicts the spatial movement sequences however, the depictions are linear. These is no illustration of round axis.

Settings Menu

Settings > Calibration	Not for users
Settings > Debug	Not for users
Settings > Font	Serves for the individual setting of the font type

Menu Measuring unit

Measuring unit > Auto	The measuring unit of the machine configuration is valid
Measuring unit > inch	All measurements are in inches
Measuring unit > cm	All measurements are in cm
Measuring unit > mm	All measurements are in mm (default)

Tools Menu

Tools > HAL-Scope	Serves to check the RT functions (RT = Real Time)
Tools > HAL-Meter	Serves to check various signals

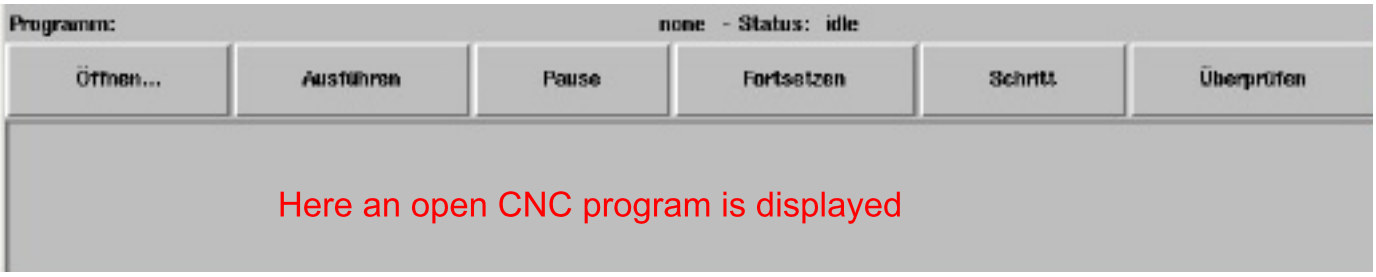
Menu Extras

Extras > Set Coordinates	Opens a dialogue window to set the NPV (G54 - G59.3)
Extras > HAL Signals	Not for users
Extras > Configure HAL	Not for users

16. FUNCTIONS FOR THE CNC PROGRAM SEQUENCE

The functionality of the program sequence is almost self-indicating.

Open	Opens the dialogue for selection of an existing CNC program
Execute	Starts the selected CNC program
Pause	Stops the running CNC program with which ...
Continue	Starts the stopped CNC program
Step	The CNC program is processed line for line and stops after each line unitl the next line of the program is started with continue.
Verify	Verification of the syntax of an open CNC program
Optional stop	Actuating this key defines whether a program stop is executed with M1 or not.

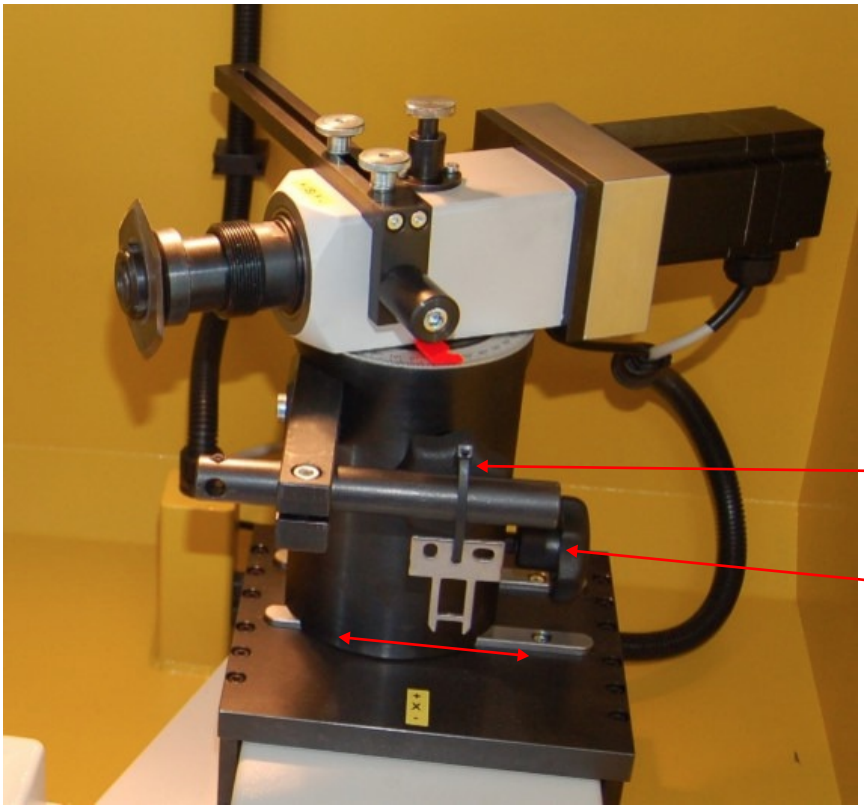


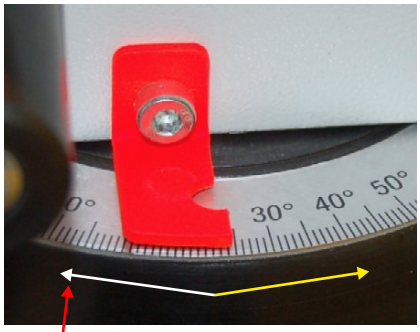
17. OPERATION

ALIGNMENT OF THE CIRCULAR- OR PROFILED KNIFE

By opening the star head screw (1), you can set the grinding angle. For less than 120 mm, the blade angle is set counter-clockwise; over 120 mm, in a clockwise direction.

By opening the star head screw (2), you can move the entire take-up stand in the Z direction and re-clamp.





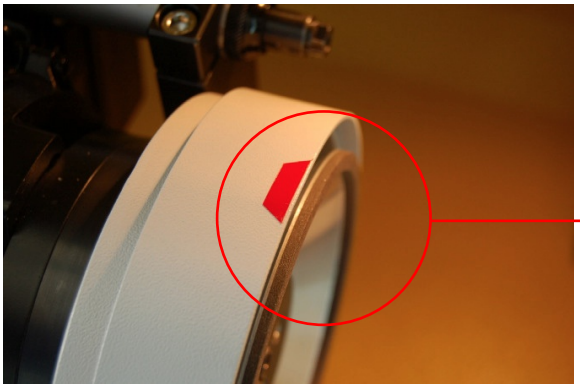
Clockwise

(1) Angle setting

(2) Take-up stand adjustment

Please ensure that your circular blade, respectively punch blade always operates within the grinding area in order to ensure the angle preservation across the entire blade. The grinding area is marked in red (see photo).

With regrads to 3 axes configuration:
After clamping the work piece, a reference run with the Y axis must be executed!



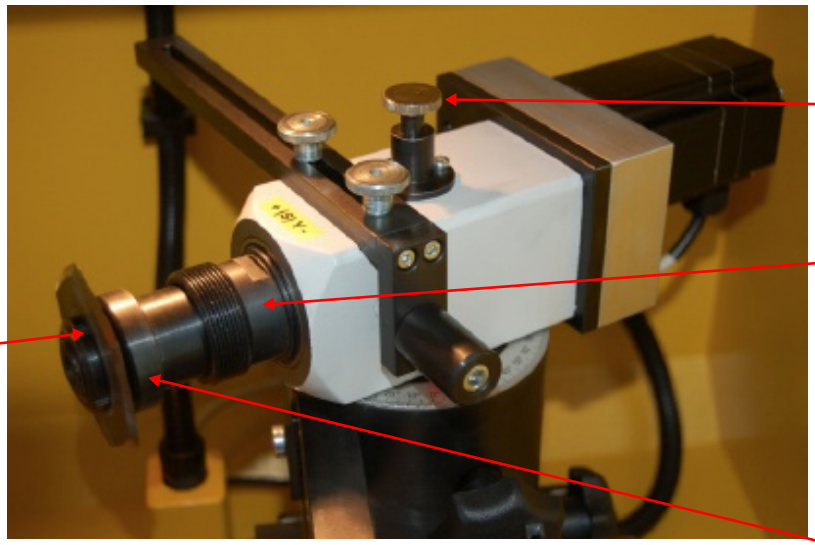
Grinding area

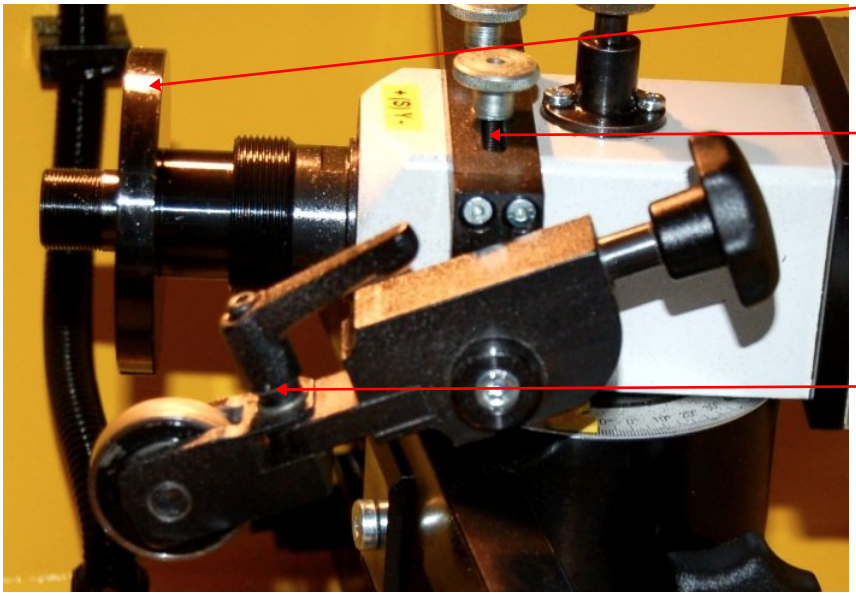
18. FIXATION OF A CIRCULAR- OR PROFILED KNIFE

Centre the circular blade or punch blade with respective reduction ring on the clamping flange. Clamp the circular blade with the included disk or clamping nut in the clmaping flange.

NOTE: when loosening or tightening the clamping nut, you must keep the grinding spindle locking mechanism pressed.

ATTENTION! Risk of injury when tightening or lossening the blade!!!





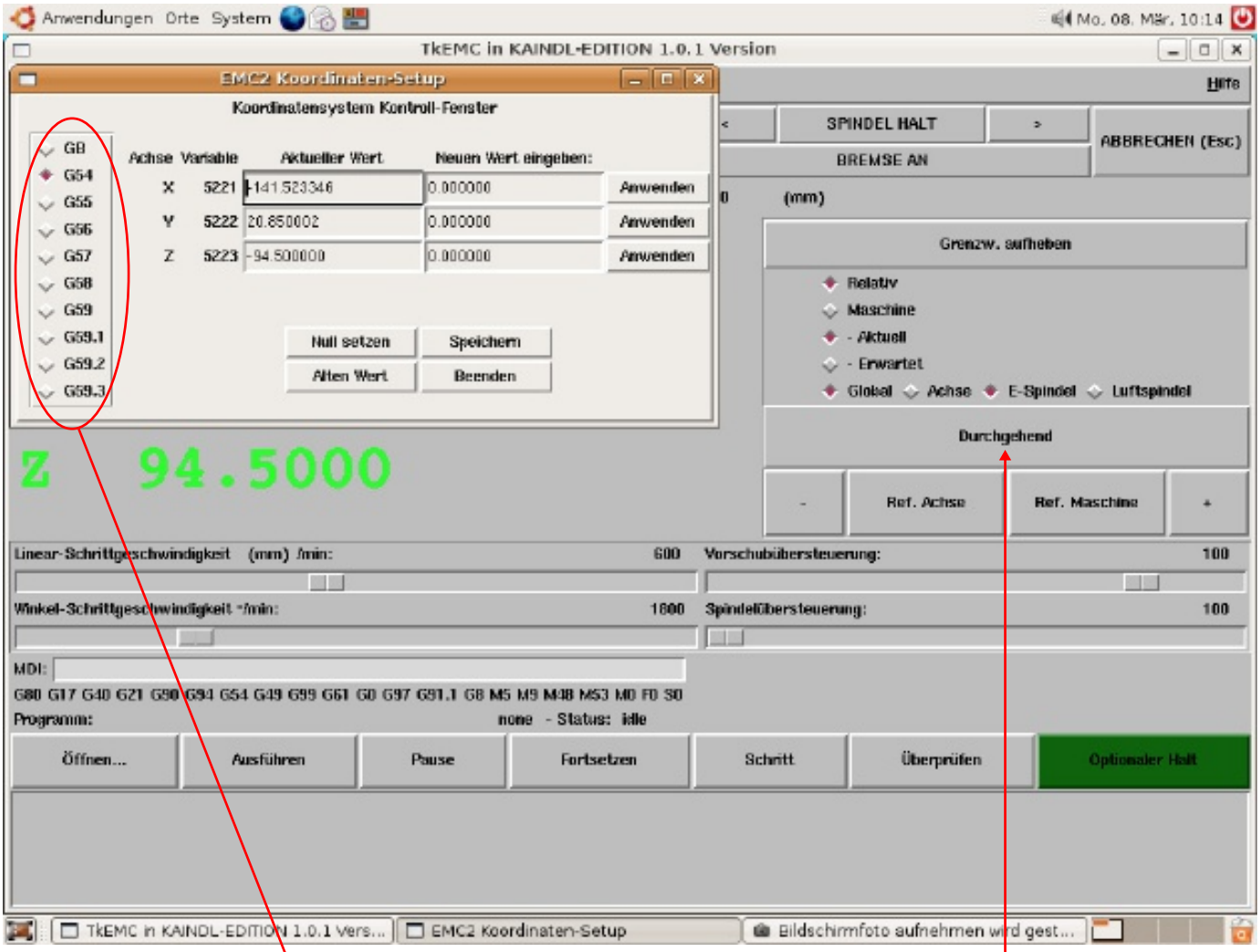
The support mounting piece is only used for circular blades.

After clamping the circular blade, place the mounting piece on the back of the blade. Adjust the mounting piece so that it is placed correctly on the back on the cutting edge and respectively fits closely on the angle and rotates accordingly. Respective of the blade type, you can adjust the angular value of the mounting piece head at your direction. The mounting piece servs to support the circular blade and allows the circular blade to provide a burr-free grinding.

19. SAMPLING OF THE WORKPIECE AND ZERO POINT SETTING

The work piece is probed with the digital hand wheel in the manual mode in all 3 (2) axes. The axis selection for adjustment with the hand wheel is executed by touching the respective axis display on the touch screen.
The axes are then reset to zero with the function "**Set Coordinates**" in the Extras Menu by pressing the button "**Apply**" (for work pieces G54 is provided). Subsequently, press the buttons "**Save**" and "**End**" and your work piece is reset to zero.

NOTE: **The digital hand wheel can be occupied with various increments and does not function with "Continuous".**
Increments available for selection: 0.001 ; 0.005 ; 0.01 ; 0.05 mm, per lock-in position on the jogwheel.



NPV selection

Press here for increment selection

20. GRINDING OF A CIRCULAR- OR PROFILED KNIFE

If you do not have an especially unique circular blade, respectively punch blade, you can use the included diaglogue CNC programs, which are very easy to operate. You must only complete the **red area** directly behind the =.

```
(Circular blade grinding program for the Kaindl-RMS-Round Machine)

(Dialogue)
#1=0.2          (total removal in mm)
#2=0.02         (feed in mm)
#3=20           (work piece speed in rpm 1-30)
#4=10           (radio operated work piece speed in rpm 1-30)
#5=5            (retraction amount in Y)
#6=50           (feed intake mm/min)
#7=5            (feed pause in sec.)
#8=15           (radio operated time in sec.)

(Calculations)
#20=[#1/#2]
#30=0
#<_ZUST>=[#2-[2*#2]]
#<_VS>=#6
#<_AVS>=#6
#<_RZM>=#5
#<_PZ>=#7
#<_AZ>=#8

(Program)
G90
G54
M3S#3
G0 X0
G0 Y#<_RZM>
M8
G1 Y0 F#<_AVS>
o100 Sub
G91
G64
G1 Y#<_ZUST> F#<_VS>
G4 P#<_PZ>
o100 End Sub
o110 Sub
G91
G64
G4 P#<_AZ>
o110 End Sub
o200 While [#30 lt #20]
o100 Call
#30=[#30+1]
o200 End While
M3S#4
o110 Call
G90
G0 Y#<_RZM>
M9
G0 X0
G61
M5
M2
```

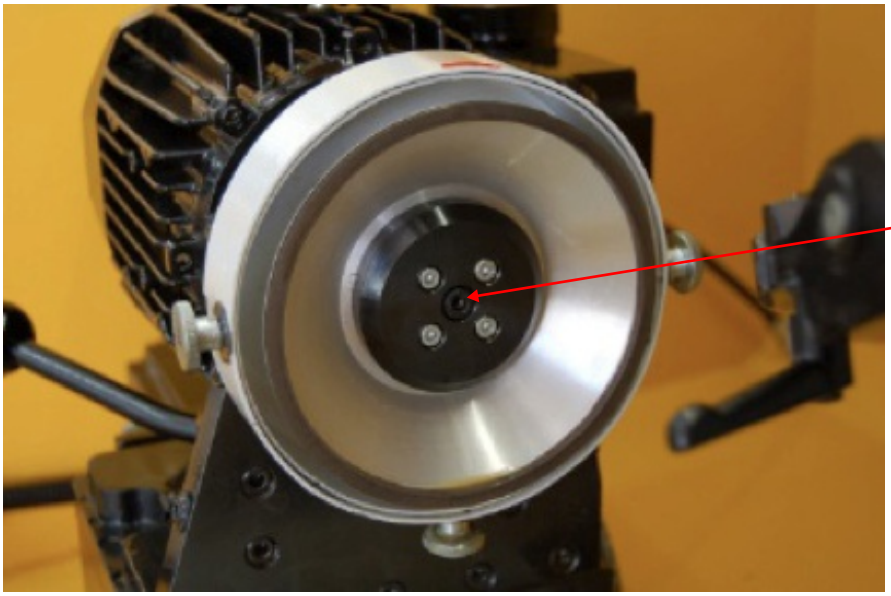
You may set the dialogue with other measurements and save with a different name of your choice (up to 256 characters). The file extension for CNC programs must be **.nge.**

NOTE: LINUX FUNDAMENTALLY DIFFERENTIATES UPPER SND LOWER CASE SPELLING!

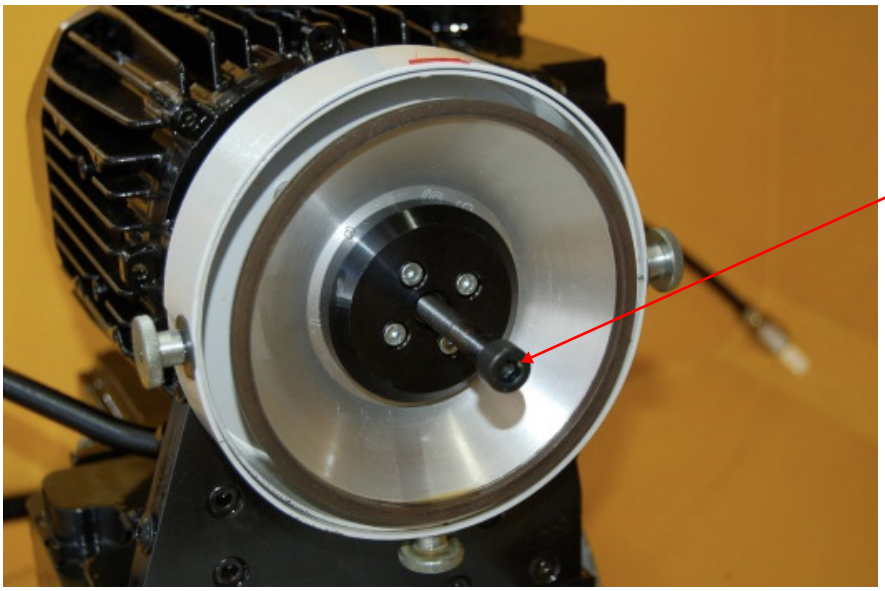
You can learn more about the topic programming (DIN 66025) in the programming instructions.

21. CHANGE OF THE GRINDING WHEEL

Before changing the wheel, remove the mounted wheel for circular- or profiled knifes!



Loosen the allen screw M6 and remove the screw entirely



Use the forcing screw M8 to press the grinding wheel away from the shaft

Use the included allen key SW 5 for the allen screw M6 and remove the screw entirely.

Now use the included allen screw M8 and use it to press the grinding wheel, including the intake, away from the motor shaft.

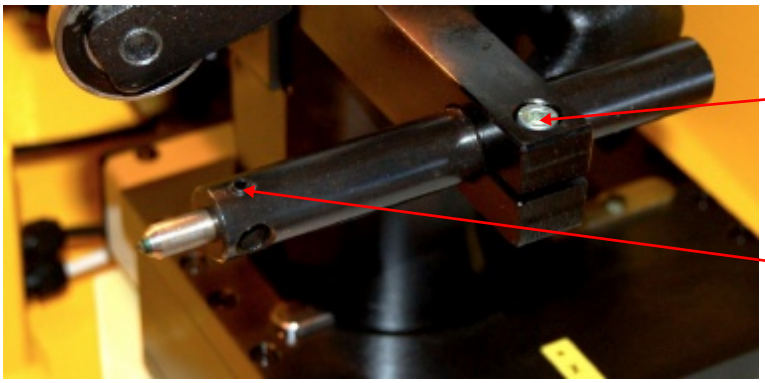
Place the new grinding wheel on the motor shaft and ensure that the driving pin on the grinding wheel flange is placed in the groove of the motor shaft.

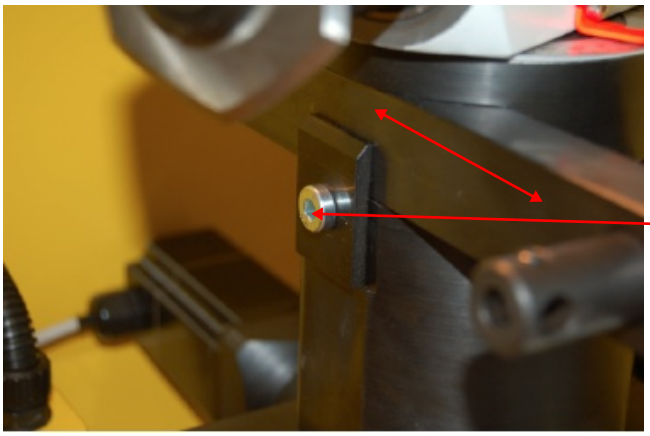
Now, retighten the grinding wheel with the allen screw M6 and tighten firmly.

22. DRESSING OF THE CORUNDUM WHEELHEAD

You may also use the coruncum grinding tools with the RMS-CNC. These grinding tools must be adjust before use in order to achieve the optimal ture running of the grinding tools and to ensure the best possible grinding results. The dressing of the grinding tools is executed by means of a dressing device. A dressing diamond is attached.
With the respective adjustment program, it is possible to provide for other shapes in the grinding wheel e. g. radii, prism shapes etc.
We have provided sub-programs for straight dressing, radii dressing, prism shape dressing. After the dressing and according to the allocation, all of these sub-programs update the NPV for the work piece and the NPV for the grinding wheel.

A radius on the grinding wheel is absolutely neccessary for grinding a serrated edge with a circular blade and grinding can be easily executed with the indication of the division in the respective program.



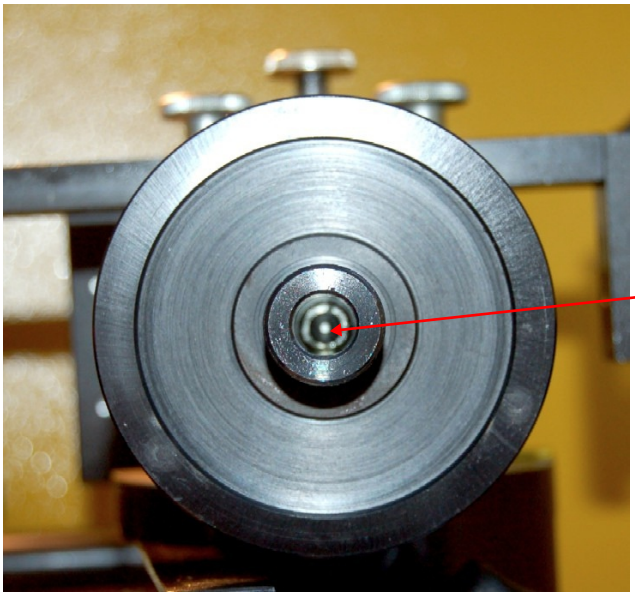


The dressing position is always selected depending on the work piece and open spaced and is probed with the jogwheel during manual operation.
Save in the **Extras menu** with > **Set Coordinates** as **NPV G55**. Principally, it is possible to access dressing intervals from a CNC program.
E. g. the dressing sub-program **1000.ngc** is accessed with "**o1000Call**".

Naturally, you can also create your own special dressing programs and make these accessible. You can learn more about this topic in the programming instructions.
1000.ngc = Sub-program for plan dressing (NPV G55)
1001.ngc = Sub-program for inner abrasive device dressing (NPV G56)

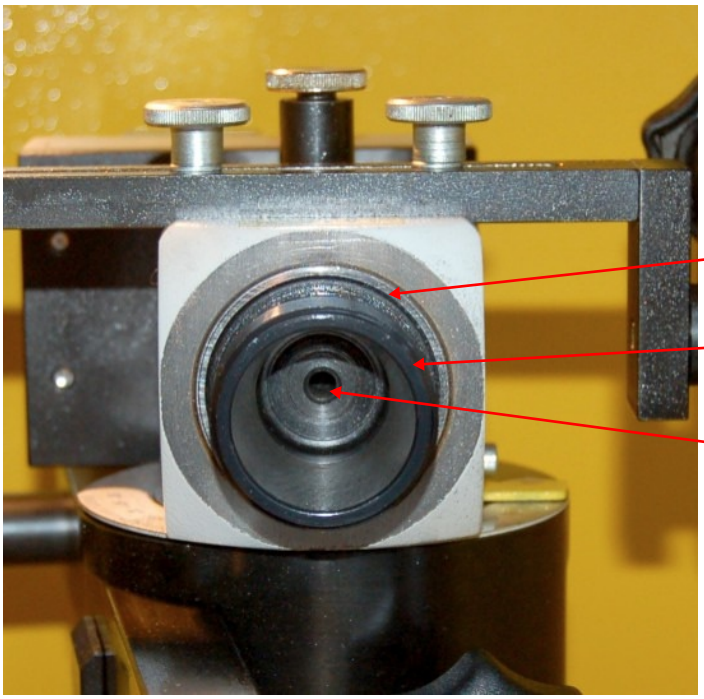
23. SUPPORT OF CIRCULAR KNIFE AND SHAFT OR KNIFE MOTOR

The RMS-CNC grinding wheel is equipped with a ER32 collet system, which allows for the ultisation of collets with a clamping diameter up to 22 mm, as well as the intake of various clamping flanges and special clamping flanges directly in the collet cone.



In order to exchange the intake, remove the allen screw M6 with the included allen key SW 5.

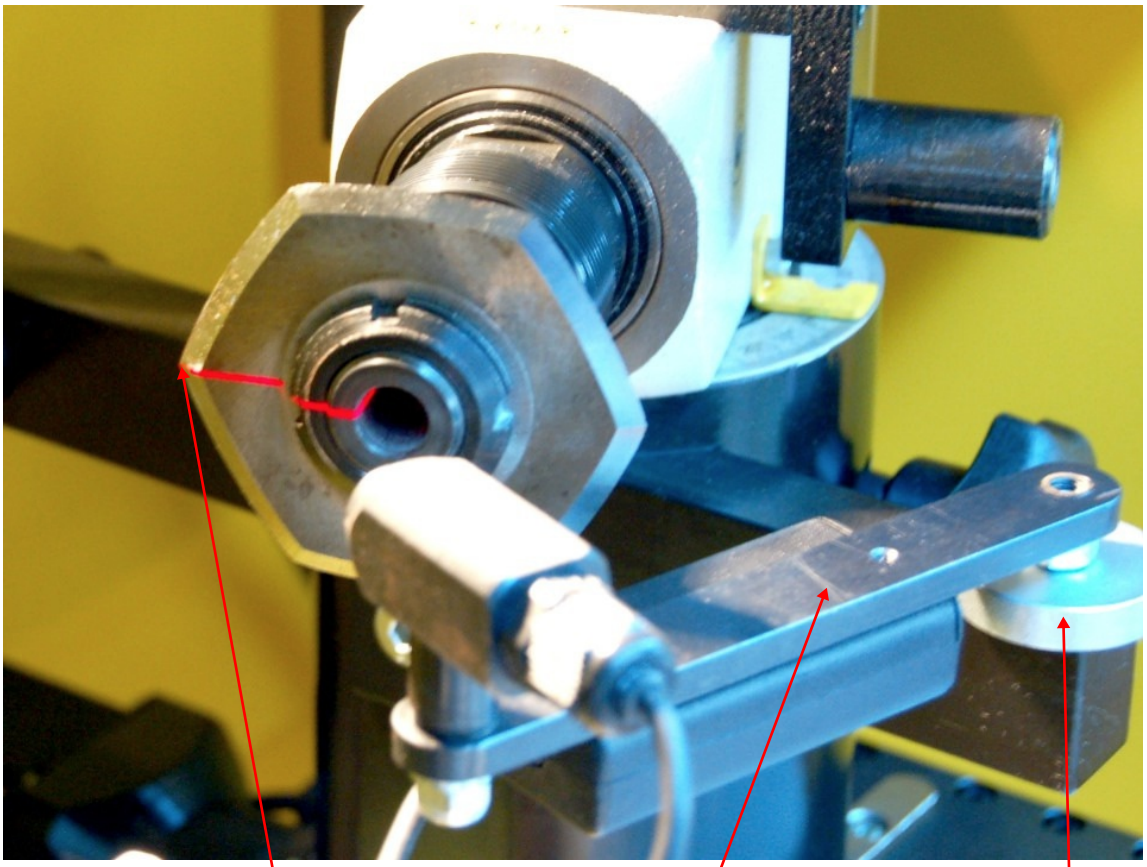
Use the included allen screw M 8 and utilising it, press the intake out of the cone.



24. LASER INSTRUMENT FOR ALIGNMENT OF THE PROFILED KNIFES

A laser instrument is included in the scope if delivery, which is attached to the dressing device by means of a magnetic base and which indicates the centre height of the grinding spindle as a line; it is useful for the alignment of the punch blade.
The alignment mark is also important for the utilisation of the included CNC program **Kantmesser_Dia.ngc.**

The alignment of the blade is executed in the manual mode by means of the hand wheel and with the previously described function "**Set Coordinates**", the zero point is adopted (G54).



Set laser line on knife corner

Laser instrument

Magnetic base

25. SPARE PARTS LIST

The current spare parts list is available on request.

26. WIRING DIAGRAM

You can find the wiring diagram of your machine in the inside of the control cabinet door.

27. ABRASIVE DEVICES

Item. No. 10896	White corundum cup wheel grit 60 (125 x 40 x 20 mm W10/E10)
Item. No. 10897	White corundum cup wheel grit 80 (125 x 40 x 20 mm W10/E10)
Item. No 10898	White corundum cup wheel grit 100 (125 x 40 x 20 mm W10/E10)
Item. No 15856	Diamond dressing wheel D356 100 x 20 x 20 mm for dressing resin-bonded CBN grinding wheels
Item. No 15857	Silicon carbide dressing wheel grit 80 (100 x 30 x 20 mm) for dressing of resin-bonded diamond grinding wheels
Item. No 15855	Sharpening stone 100 x 40 x 15 mm for sharpening of resin-bonded grinding wheels after dressing.
Item. No. 11315	CBN grinding wheel B 126
Item. No. 11317	Diamond grinding wheel D 126
Item. No 99999	Single grain dressing diamond for dressing corundum wheels

28. MAINTENANCE

The circular blade grinding machine RMS-CNC requires no special maintenance. Check regularly check the oil level of the air spindle in the maintenance unit. Condensed water in the tank have to be drained regularly. Occasionally, please check the power cord and power plug for damages, as well as the cooling system for tightness. The cooling liquid has to be checked up as per the guidelines of the supplier.

29. CLEANING AND GRASING

To ensure full functional reliability of the circular blade grinding machine RMS-CNC, it must be cleanded on a regular basis (depending on the type and scope of use). Remove grinding dust dust with coolant and brush from the machine, remove stubborn dirt accumolation with commercial machine cleaning agents (do not use aggresive agents). In order to prevent corrosion, provide smooth surfaces, as well as bonzed machine parts with a film of oil.

30. REPAIRS

Repairs on the RMS-CNC and its mechanical assedblies may only be performed by us at the Kaindl facility or by persons authorised by us to execute such repairs.
The replacement of wear-and-tear parts remains unaffected.

The replacement of electrical spare parts may only be executed by a professional electrican!

31. DISPOSAL OF THE MACHINE WITHIN THE EU

Upon free delivery to our facilities, Kaindl-Schleiftechnik Reiling GmbH will execute the correct professional disposal of old machines according to the respective valid regulations of the European Electric and Electronic Waste Equipment Directive.

32. WARRANTY

The warranty period is **12 months** as of the date of delivery and applies to **one-shift operation** acording to the intended use of the machine. The warranty includes the replacement of defective parts and assemblies including the necessary work time. Replacement can also contain remanufactured, used parts and assemblies.

Excluded from any guarantee are:

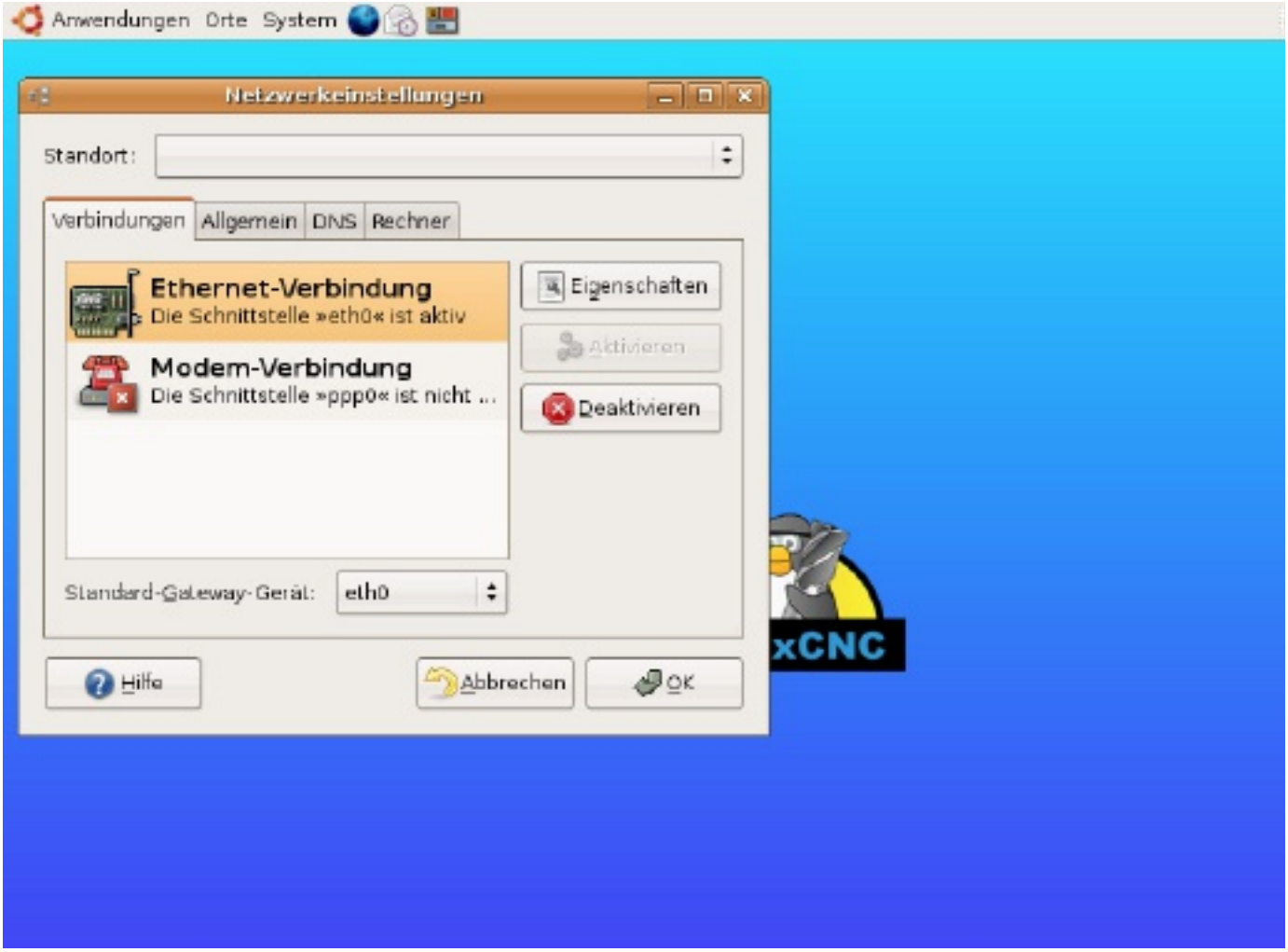
- Parts subject to wear and tear due to normal operation
- Transport damages
- Damages due to improper use of the machine
- Damages due to programming error and program parameter errors
- Damages due to use of force
- Damages and subsequent damages due to negligent conduct on the part of the operator or breach of the safety provisions

Please notify us of the machine serial number for claims made under warranty.

Return shipments of machines require our prior approval. We reserve the right to invoice the transport costs for unauthorised returns. Unrestricted, replaced or exchanged parts under warranty become our property.

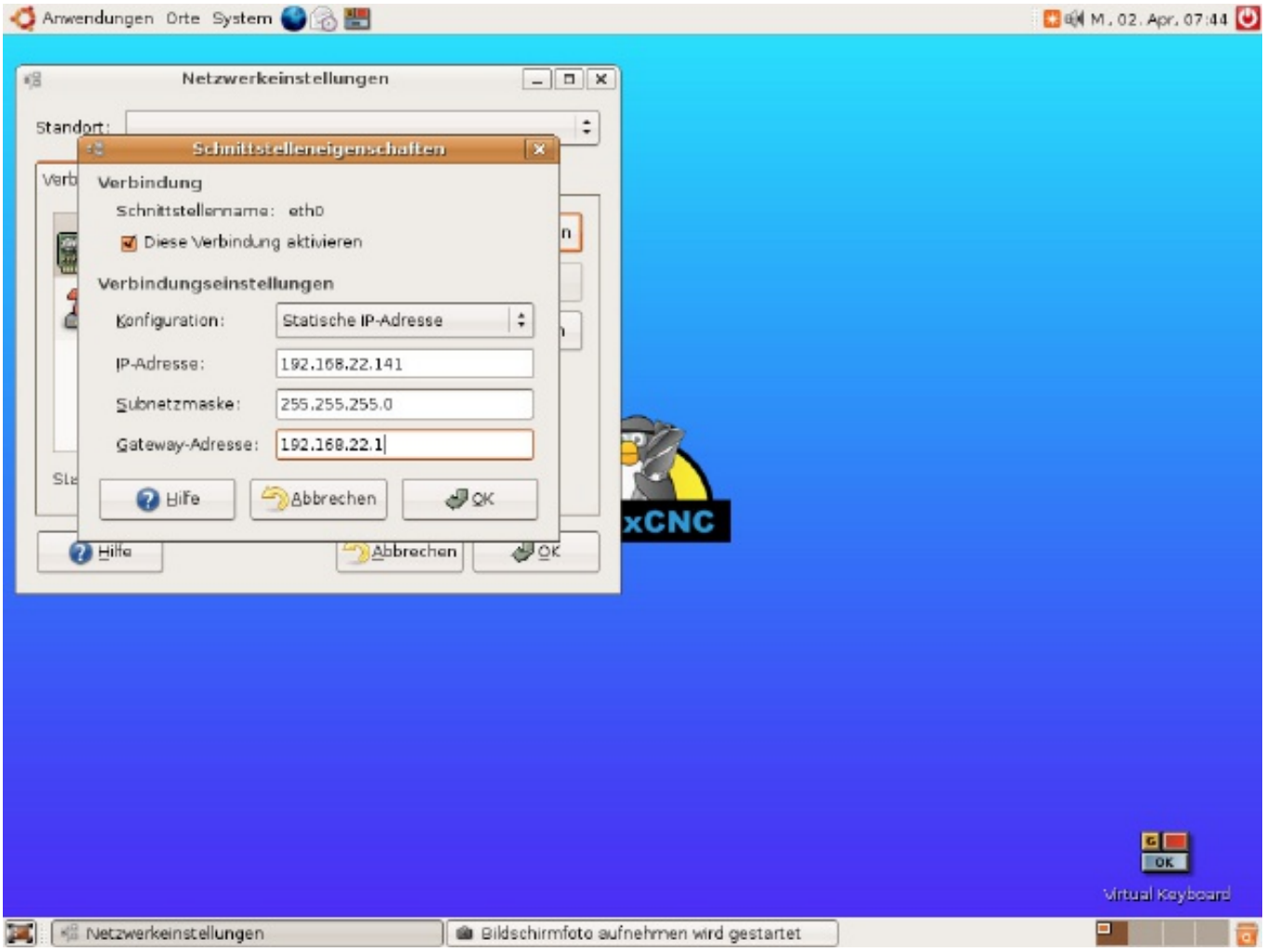
33. NETWORK MODULATION OF THE CONTROL UNIT

The standard setting is DHCP.
The IP adress is obtained from a DHCP server in the nerwork (usually a router, which provides this function.
Naturally, you can manually allocate a firm IP adresse to the controls.
At the top of operating system menu, click on "**System > Administration > Network**" in order to navigate to the screen displayed below.



You can access the settings for the network connection using the button "**Properties**" (Ethernet connection).
Here, you can execute the settings for the IP adress, Gateway (router address) etc.

Illustration below depicts the maskfor entry of the firm IP address in your network.



If you want a firm allocation of the IP address through the DHCP server, you must acquire the MAC address.

You can acquire the MAC address of your controls utilising the menu "**Applications > Accessories > Terminal**" and by entering the command "**ifconfig**" and by confirming with Enter.

You then receive all network setting in text form, including the MAC address.

33. REMOTE SERVICING

The IPC controls can be maintained remotely via the internet.
As previously described, you must allow your controls acces to your network, which is provided with internet access.
For this purpose, you require a form IP address for the controls (firm IP through DHCP or manually allocated) and you must configure your router accordingly so that we can access the controls. The IP address of the **Port 500** of your router must be enabled in order to realise the connection via internet and VNC.

NOTE: Without your permission to the controls and your presence, we are unable to connect to the controls. You must confirm such connection requests manually.

Before we execute remote maintenance, we will request your IP address via telephone, which you have in the Internet. (You can find the current IP address of your router in the Internet from the router itself).

Via remote maintenance, we can help you quickly and unbureaucratically with problems regarding the operating system, configuration of EMC2, securing of your data, etc.