

CC newCOSMO

Instructions for use



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1 Welcome

Thank you for your purchase of this **CC newCOSMO dental machine**. The machine is delivered to you with pride and confidence. It was produced using the latest techniques and strict quality control.

These operating instructions were prepared to help you understand all functions of your new dental machine. It should also help you keep the machine in good conditions so that you may enjoy many hours of productive work.

You may find updates to this document at: **dentalportal.info** – search for **CC newCOSMO**

About this document

This document is designed and released for the following groups / individuals:

- End users
- Authorized resellers
- Authorized service technicians

Used symbols

Instructions

» Single or general instruction

1. Numbered action step

✓ Result

Additional symbols

🔗 Cross reference

- List (first level)
 - List (second level)

1. Numbered image labels

✓ Correct **or** Do this

✗ Incorrect **or** Do not let this happen **or** Don't do this



Information to make work more efficient



Important information without any danger for people or objects



Additional information

Structure of safety notes



SIGNAL WORD

Type and source of hazards

Further explanations and consequences when ignoring the hazard.

» Instructions to avoid the hazard.

The following signal words may be used:

DANGER

DANGER indicates a hazardous situation which will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which can result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which can result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which can lead to physical damage of the product or in the surrounding areas.

2 General safety instructions

DANGER

Incorrect operation of the machine

- » Before installing, maintaining and operating the machine, read all documents provided with the machine.
- » If it is unclear how to operate the machine in any way, do not use the machine and contact customer service.
- » Ensure that every user has access to the operating instructions.
- » Instruct every user on safe and proper machine handling.

Danger to life due to an electric shock



If you come into contact with electrically charged parts, you can suffer from an electrical shock. Water increases the risk significantly.

- » Do not remove the housing of the machine.
- » Only have qualified electricians work on any electric equipment.
- » Ensure that an operational Residual Current Device / Ground Fault Circuit Interrupter is installed on the electric circuit of the machine.
- » Run power cables so that they cannot be damaged by sharp edges.
- » Before switching on the machine, check power cables for damage.
- » Before unplugging the power cable, switch off the machine at the main power switch.



- » In the following cases, disconnect the machine from the electrical source immediately and prevent it from being restarted:
 - When machine connections or electric cables are damaged
 - When liquid is leaking
 - Before you check or run electric cables
- » Replace damaged cables with original manufacturer's spare parts.
- » Never perform any troubleshooting while the machine is operating.
- » Only have authorized service technicians repair the machine.

- » Do not touch the machine and especially the cables with wet or damp hands.
- » Check the environment of the machine and all accessible internal areas daily for leaked liquid and remove any liquids near or in the machine immediately.
- » Never put any machines or devices which are powered by electricity under the machine.
- » Do not put any objects onto the machine.

WARNING

Respiratory diseases when processing harmful materials

If you inhale harmful materials during their processing, your respiratory tracts may be damaged.

- » Always use a suitable air extraction system during dry machining.
- » Use a suction device with an extra-fine particle filter.
- » Avoid materials which damage your health.

Danger to health if using the wrong cooling lubricant

Some cooling liquids can be a serious threat to your health and / or the environment.

- » Only add the cooling lubricant Tec Liquid Pro to the cooling liquid. The mixing ratio is indicated on the bottle label.

Crushing hazard and risk of cutting injuries through moving machine parts

Through the moving axes and the rotating spindle you can suffer bruises and cuts.

- » Only use the machine when the working chamber door is completely closed and undamaged during machining.
- » Do not circumvent or deactivate safety devices of the machine.
- » Check the machine regularly for damage, especially the safety devices.
- » Have damaged safety devices repaired by customer service only.
- » Use only original manufacturer's equipment and original spare parts in the machine.
- » Keep children and animals away from the machine.
- » Do not remove the housing of the machine.

Service Mode: Risk of cutting injuries and bruises as well as hazards through ejected debris

If you operate the machine in any “Service Mode” with the working chamber door open, the risk of injury is increased significantly.

- » Operate the machine in “User” mode only unless you have been authorized by the machine’s manufacturer to use other modes.
- » Even if you are an authorized user, use the “Service Modes” only when necessary.



- » While in any “Service Mode”: Do not reach into the working chamber while the axes are moving or during machining.



- » While in any “Service Mode”: Everyone within reach of the machine must wear protective eye wear.

Hearing damage due to loud noise

If you are regularly exposed to loud machining noise, you may suffer from hearing loss and tinnitus.



- » If loud noise cannot be avoided, wear ear protection during machining.

Risk of injuries through loose pneumatic components under air pressure when connections are open

Loose pneumatic components can move extremely fast and unpredictably and may cause injury.

- » Before you run the pneumatic hoses, close the compressed air supply valve.
- » Before you check the pneumatic hoses and pneumatic connections, set the air pressure to a minimum value.
- » In case of defective machine connections and pneumatic hoses, disconnect the machine from the external compressed air supply and the electrical source.

- » Contact customer service if connections are damaged or defective.



CAUTION

Risk of injuries when opening or closing the working chamber door

When you open or close the working chamber door, the moving working chamber door may crush your fingers. Objects on the machine may fall and cause injuries or damage.

- » While the door is moving, keep both hands away from the machine.
- » Do not place objects on the machine.

Trip, fall and slipping hazards



- » Run cables in such a way that persons cannot trip over them.



- » Keep the working environment and installation site clean.

Risk of cutting injuries and burns

If you touch tools or sharp edges on blanks or the machine, you may suffer from cuts. If you touch the hot spindle body or hot tools, you may suffer from burns.

- » Wear gloves when you perform manual work at the machine or with blanks / tools.

Danger to health if handling the cooling lubricant incorrectly

- » Before using the cooling lubricant, read the safety data sheet that was supplied with the cooling lubricant.
- » When handling the cooling lubricant, always wear suitable protective clothing.
- » Always store the cooling lubricant in the original container.

Reduced ability to act with insufficient lighting

In case of an insufficient lighting your judgment and / or your precision may be reduced.

- » Ensure that the lighting in your working environment is sufficient.

Risk of injury in case of malfunctions caused by insufficient maintenance

If you do not maintain the machine as required, malfunctions may occur which can lead to injuries.

- » Take note of the intervals and conditions mentioned in the maintenance table in the operating instructions. Carry out the respective maintenance tasks accordingly.

Health risks through constant malpositioning if your working environment is not sufficiently ergonomic
Over the long run, an improper or one-sided positioning can be a risk to your health.

- » Set up an ergonomic work environment.
- » Ensure the seat height and monitor position is ideal and the lighting is sufficient.

3 Operating regulations

If you violate the following regulations, you may lose your entitlement to benefits.

NOTICE

Machine damage if you violate these regulations

If you violate the following regulations, your machine may get damaged and / or cause damage in the surrounding area(s).

- » Thoroughly follow all instructions and information in this section.

Intended use

The machine and the manufacturing software have been designed for the commercial creation of dental objects by specially trained persons. The objects require additional work before their use on patients.

- » Only process materials that you can select in the manufacturing software.
- » Only use the machine and manufacturing software in a commercial environment.
- » Before creating jobs, verify if the objects being prepared may be utilized at the place of use according to local and / or national regulations or other authorized organizations or entities (e.g. professional associations, health authorities). In particular, verify if the material is approved for the machined object type and if the object type is designed in accordance with applicable regulations. Neither the manufacturing software nor the machine will inform you about possible regulatory infringements, but will execute jobs in accordance with the preferences and materials set by the user.
- » Verify that each object type and each material in your jobs are authorized manufacturing materials. If mandated by local or national regulations, obtain relevant authorization from the responsible organizations or entities (e.g. professional associations, health authorities).
- » Only manufacture objects which correspond to the object types that you can select in the manufacturing software. While you can import / manufacture any other objects as well, neither the manufacturing software nor the machine are designed for these other objects and should not be used in this way.

- » Do not manufacture implants or parts of objects that are designed to have contact with implants. These parts include parts of two-part abutments which contain the connection geometry for the implant. Do not manipulate the connection geometry of prefabricated abutments (“prefab abutments”) and you must always check finished objects for accurate connection geometries (i.e. that connection geometries of finished jobs have not been damaged).

Controlling the machine through software

You control the machine through specially designed applications which are supplied with the machine.

- » Always use the latest program version that officially supports your machine.
- » Before installing or operating the machine, read the documentation for the applications.
- » Ensure that your CAM computer meets all system requirements.

Maintenance and cleaning

Maintenance and cleaning is part of standard machine usage.

- » Clean and maintain the machine as required. Only then can the machine reach a long service life.

Spindle

The spindle of your machine is a high-precision instrument.

- » Do not use unbalanced tools at high rotational speeds. Such an imbalance puts a great strain on the spindle’s ball bearings, which can cause the bearings to be damaged.
- » When working in the working chamber, do not apply manual pressure against the spindle.

Unattended operation

If the machine runs unattended, the risk of material damage is increased.

- » Only allow unattended operation of the machine to occur if the following conditions are met:
 - The national and local laws allow it.
 - The working chamber of the machine is completely clean.
 - Unauthorized users cannot access the machine.
 - The room in which the machine is located has an automatic fire detection system.

Transportation and storage

WARNING

Injuries caused by unsafe transportation

If you transport the machine unsafely, the machine may slip and cause injuries.

-  » **Always transport unpacked machines individually and do not stack them.**
- » Ensure that only trained personnel transport the machine to and from the installation site.
- » Ensure that the housing of the machine is completely closed.
- » Always transport the machine in an upright position.
- » Transport and position the machine with 2 people.
- » Before carrying an unpacked machine, install the carrying aid that was provided with the machine and ensure that all components are properly fixed. Do not use a different carrying aid.
-  » **Grab unpacked machines only at the handles of the carrying aid.** Do not tilt the machine when carrying it.

NOTICE

Short-circuit hazard when the machine is too cold

If the machine is transported from a cold environment into a warmer environment, a short circuit may occur caused by condensate.

- » Before switching on the machine after transportation, ensure the following:
 - The ambient air has the allowed temperature.
 - The machine has the same temperature as the ambient air. This will take at least 48 hours.
 - The machine is completely dry.

 **The supplement about the carrying aid and transport lock is delivered with the machine. It is also downloadable at dentalportal.info/downloads.**

- » Ensure that the following conditions are met during the whole transport and / or storage period:

- Ambient temperature (storage / transport): between -20 °C (-4 °F) and 60 °C (140 °F)
- Relative air moisture: max. 80 %, non-condensing

Preparing transportation or storage

Before transporting or storing your machine, the following preparations are necessary:

1. Remove all blanks from the working chamber.
2. Remove all items from the blank magazine.
3. If the machine was used for wet machining:
 - a. Rinse the cooling liquid system.
 - b. Drain and clean the cooling liquid tank.
4. Clean the working chamber.
5. Clean the blank magazine.
6. Install the transport lock. For this, see the corresponding steps on the supplement.
7. Ensure that the housing of the machine is completely closed.
8. Switch off the machine at the main power switch.
9. Disassemble the machine components by following the installation instructions in reverse order.
10. If you need to carry the machine, install the carrying aid. For this, follow the corresponding steps on the supplement.
11. In case of overseas transport, take proper measures against corrosion.

Repackaging

To repack the machine after preparing its transportation or storage, the following steps are necessary:

1. If possible, use the original packaging. If the original packaging is not available, use a packaging of similar size and quality.

 **Original packaging is available from customer service.**

2. Pack the machine and its accessories securely.
3. Protect the packaging against slipping. If machines are properly packed and protected against slipping, they may be stacked.

4 Machine overview

With your CC newCOSMO you can process blanks of different materials to create high quality objects for the dental sector. You can find a list of the materials which you can process with the machine in the manufacturing software.

The machine is designed for wet and dry machining. During wet machining, the tools and blanks are constantly being cooled by cooling liquid. During dry machining, our anti-soiling concept reduces the soiling of sensitive machine parts.

□ Anti-soiling concept – on page 13

Front side of the machine

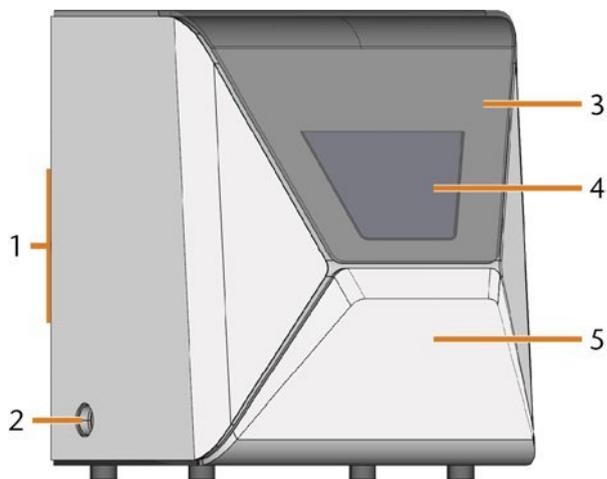


FIG. 1 – FRONT SIDE OF THE MACHINE

1. Connection panel & main power switch on the rear side
2. Suction opening for the air extraction system
3. Working chamber door
4. View window to the working chamber
5. Multi-purpose compartment

Rear side of the machine

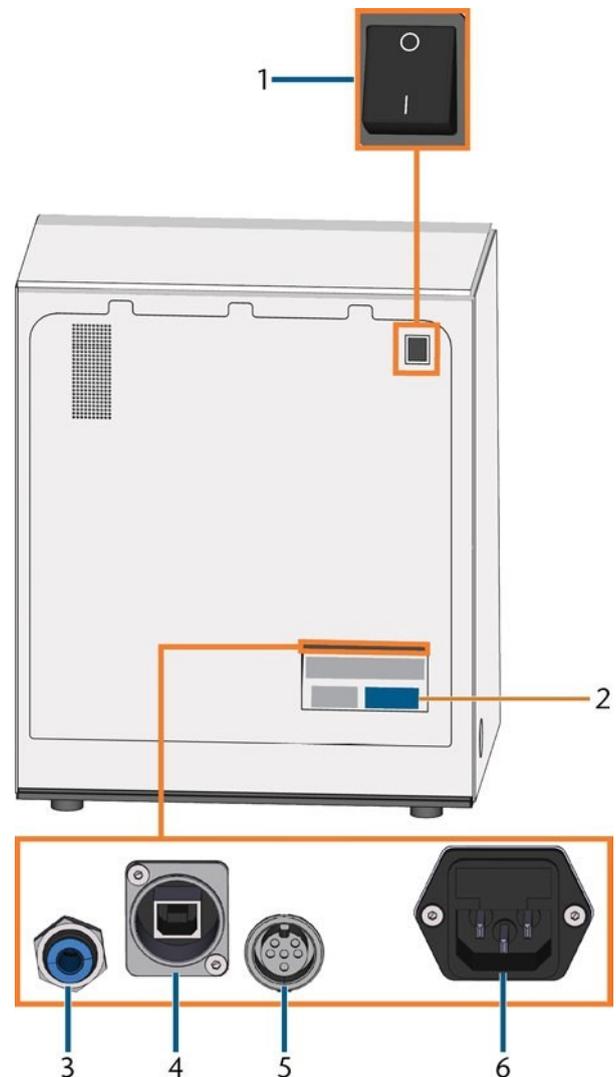


FIG. 2 – REAR SIDE OF THE MACHINE

1. Main power switch
2. Identification plate
3. Pneumatic connection
4. Network port (Ethernet RJ-45)
5. Suction unit data port
6. Power connection including glass fuse T6,3A L250V

Working chamber door

The working chamber door locks the working chamber and protects the user from injuries during operation.

The working chamber door is operated by electricity. You can open and close the door with DentalCNC. You *cannot* open the door when the machine is switched off or while the axes are moving.

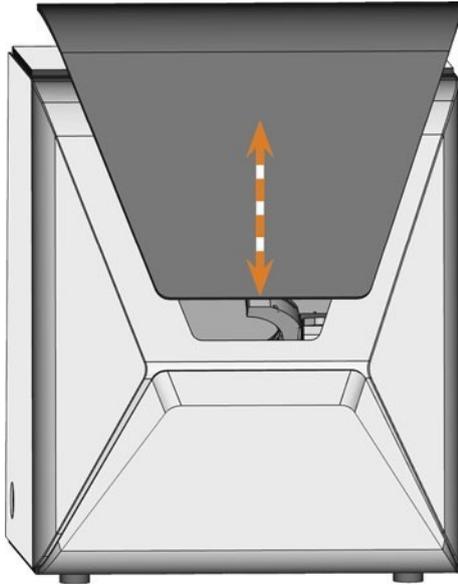


FIG. 3 – WORKING CHAMBER DOOR

Multi-purpose compartment

The multi-purpose compartment contains the following components:

- Cooling liquid tank
- Blank magazine
- Compressed air regulator

You can open the multi-purpose compartment via DentalCNC and close it manually.

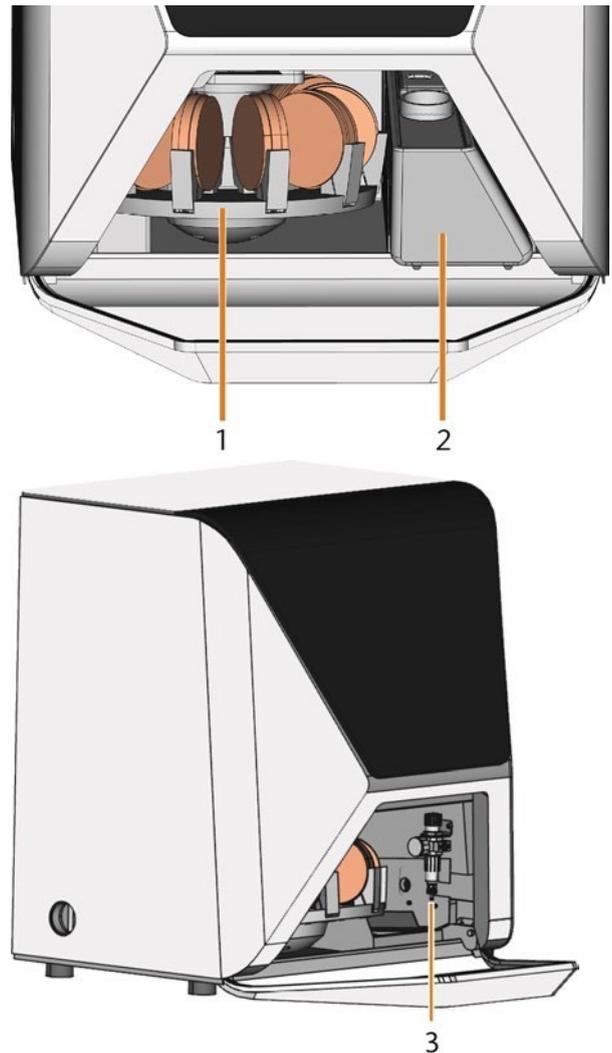


FIG. 4 – THE OPEN MULTI-PURPOSE COMPARTMENT (DISCS NOT INCLUDED)

1. Blank magazine
2. Cooling liquid tank
3. Compressed air regulator

Working chamber

You can mount blanks and insert tools into the working chamber. This is where the blanks are processed.

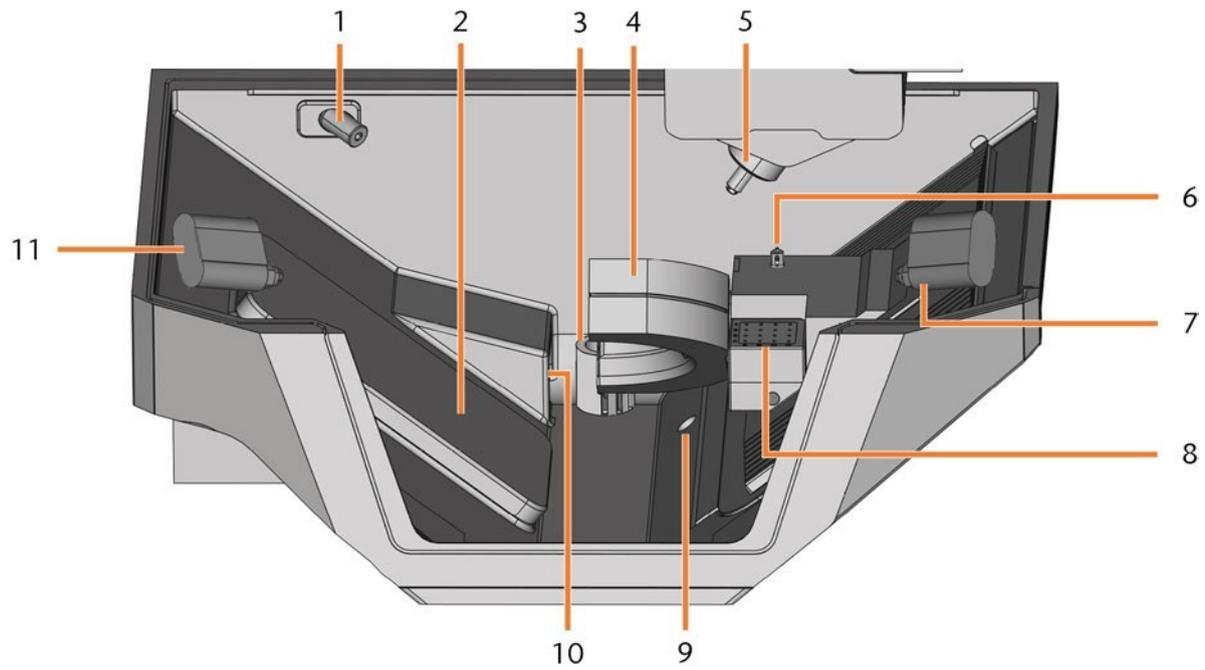


FIG. 5 – WORKING CHAMBER

1. Webcam
2. Blank changer flap
3. Outlet for the cooling liquid
4. Blank holder; Rotational axis A
5. Spindle
6. Measuring key
7. Right ion jet
8. Tool magazine
9. Emergency overflow
10. Air extraction opening
11. Left ion jet

Colors of the working chamber lighting

! If the working chamber lighting is insufficient, provide additional lighting.

The machine illuminates the working chamber in different colors. The color will change depending on the state of the machine. You will find the colors and respective machine status in the following table:

Color	Status
White	The machine is ready for operation. You can open the working chamber door.
Blue	The machine is operating. The working chamber door is locked.
Red	A machine malfunction has occurred. The working chamber door

CAM computer

To operate the machine, you must use a computer running Windows® (“CAM computer”) and specially designed software (“manufacturing software”). The manufacturing software consists of the following components:

- DentalCAM | A CAM application for creating and calculating virtual blanks (“jobs”).
- DentalCNC | A CNC application for machining jobs and maintaining the machine.

To create and design the dental objects you also need a CAD application (sold separately by specialist dealers).

Anti-soiling concept

The anti-soiling concept decreases the soiling and wear of sensitive machine parts.

NOTICE

Machine damage when dry machining without an air extraction system

When dry machining, an operational external air extraction system must be installed. Otherwise, the machine will get soiled over time and become defective.

» Always use a correctly installed and operational external air extraction system during dry machining.

The anti-soiling concept consists of:

Dry machining

- The external air extraction system | An external suction unit creates a vacuum in the working chamber and extracts machining debris from it.
- Air that is emitted into the working chamber | Blows machining debris away from the spindle and other machine parts.
- The internal vacuum sensor | Constantly monitors the vacuum in the working chamber.
- The ionizer | The ionizer electrically discharges machining debris of certain materials to reduce their distribution in the working chamber.

Wet machining:

The cooling liquid keeps machining debris away from sensitive machine parts.

! The anti-soiling concept does not replace the regular cleaning of the machine. Without regular cleaning, the machine life decreases significantly.

Sound emission

The actual sound emission of the machine varies heavily depending on the manufacturing material and the machining conditions.

» If the machine is exceptionally loud, check the following operating conditions:

- Cleanliness of the blank holder
- Condition of the tools
- Quality of the blanks

» If loud noise cannot be avoided, wear ear protection during machining.

Sound measurement

Measuring conditions:

- Processed material: IPS e.max (block, C14)
- Tool status: new
- Measured value: sound pressure level (distance: 1 m)
- Measurement according to ISO 3746, survey method 3

Established sound emission:

Operating condition	A-weighted sound pressure level	A-weighted sound power level
Processing	69.8 dB(A)	80.6 db(A)
All other operating conditions (tool change, movement of the axes etc.)	<70 dB(A)	–

Location of the identification plate & serial number

The identification plate of the machine contains identifying information such as the serial number. You can find the identification plate and machine serial number at the following location: □ Rear side of the machine – on page 10

Axes

This machine has 5 axes: 3 linear and 2 rotary axes.

Linear axes

The spindle moves along these axes.

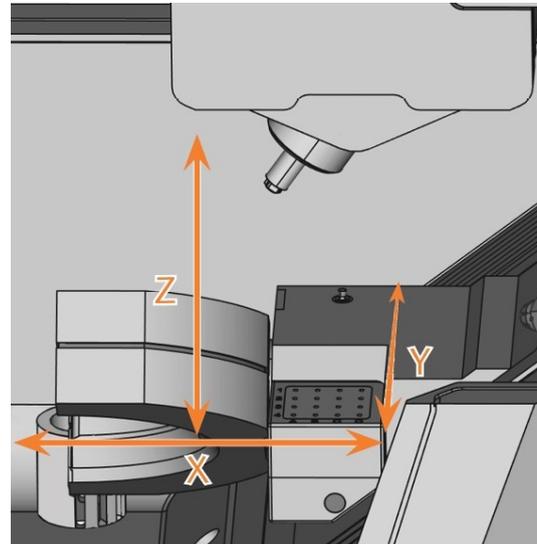


Fig. 6 – CC NEWCOSMO: LINEAR AXES

Rotary axes

The blank holder rotates about these axes.

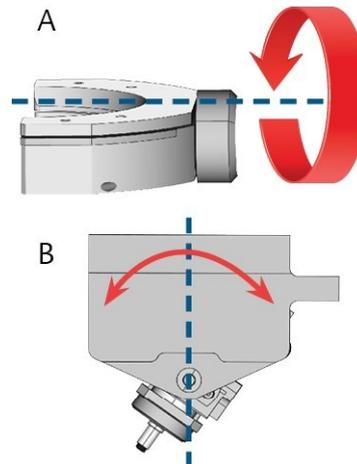


Fig. 7 – CC NEWCOSMO: ROTARY AXES

Technical data

Base system

- **Dimensions: (W/D/H):**
 - Footprint: approx. 580 x 380 mm (22.8 x 15.0 in)
 - Housing fully closed: approx. 580 x 600 x 700 mm (22.8 x 23.6 x 27.6 in)
 - Housing fully open: approx. 580 x 720 x 880 mm (22.8 x 28.4 x 34.7 in)
- **Weight: approx. 149 kg (328 lbs)**
- **5-axis mechanism**
- **Rotational axis A: 360°**
- **Rotational axis B: ± 35°**
- **Working chamber**
 - Complete housing of the working chamber
 - Working chamber lighting with different colors to indicate the machine state
 - Webcam for video transmissions to customer service
 - Automatic cleaning and drying system ("DirectClean Technology")
- **Permitted ambient temperature / air moisture:**
 - Ambient temperature (storage / transport): between -20 °C (-4 °F) and 60 °C (140 °F)
 - Ambient temperature (operation): between 10 °C (50 °F) and 32 °C (90 °F)
 - Relative air moisture: max. 80 %, non-condensing
- **External compressed air supply required**
 - Air pressure (min./max.): 6 bar (90 psi) / 8 bar (120 psi)
 - Recommended air pressure: approx. 7 bar (100 psi)
 - Air consumption (ionizer deactivated): approx. 50 l/min at 6 bar, 65 l/min at 8 bar (1.8 cfm at 90 psi, 2.3 cfm at 120 psi)
 - Air consumption (ionizer activated): approx. 100 l/min at 6 bar, 110 l/min at 8 bar (3.5 cfm at 90 psi, 3.9 cfm at 120 psi)
 - Air purity according to ISO 8573-1:2010
- **External air extraction system required**
 - Minimum extraction capacity: 3,500 l/min at 220 hPa (123.6 cfm at 3.2 psi)
 - Machine constantly monitors the extraction capacity

Spindle SFR 400P

- Synchronous spindle rotating up to 80,000 rpm
- Nominal power under continuous operation (S1): 440 W
- Nominal power under uninterrupted periodic operation (S6): 600 W
- Peak power (P_{max}): 800 W
- Hybrid ceramic ball bearing
- 4-fold bearing
- Pneumatic collet chuck Ø 3 mm
- Cone cleaning
- Sealing air

Standard blank holder

- Min. / max. height of the disc rim: 9.8 mm / 10.5 mm
- Supports designated blockholder
- Supports designated abutment holders

Block holder

- For mounting blocks with round shafts
- Maximum number of blocks per job: 6
- Maximum block dimensions: 40 x 20 x 20 mm (L/D/H)

Tool magazine

- Removable (1 provided)
- Maximum tools in magazine: 16
- Maximum tool length: 40 mm
- Automatic tool change with compressed air monitoring
- Automatic tool length measurement and tool breakage monitoring via a measuring key

Cooling liquid system for wet machining

- **Cooling liquid:**
 - Drinking water
 - Emulsion of water and the cooling lubricant TecLiquid Pro
- **Integrated cooling liquid tank**
 - Maximum amount of cooling liquid: 3.4 l (3.6 qt)
 - Integrated filter
 - Removable
 - Dishwasher-safe
- **Flow sensor for monitoring the flow of the cooling liquid**

Blank changer

- 10 slots for discs and block holders (mixed equipping possible)
- Frame-less equipping ("Direct Disc Technology")
- Fully automatic blank change

Ionizer

- For electric discharging of machining debris to allow easier cleaning
- For dry machining only
- 2 ion jets

Connections

- **Pneumatic connection: 6 mm push-in fitting**
- **Power connection: 100 – 240 V AC, 50/60 Hz, max. 750 W, including glass fuse T6,3A L250V**
- **Network port**
 - RJ-45
 - Speed: 10BASE/100BASE-TX/1000BASE-T (Auto-sensing)
- **Data port for suction unit or switching unit**
- **Hose connection (Ø45 mm) for external air extraction system**

5 Installing the machine

Checking the scope of delivery

» **Unpack the machine and ensure that you have received the following items:**



1



2



3



4



5



6



7



8



9



10



11



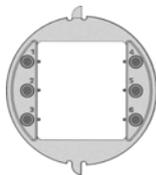
12



13



14



15

1. 1 x Machine CC newCOSMO
2. 1 x Spindle service set
3. 1 x Power cable
4. 1 x Ethernet network cable (type: straight)
5. 1 x Pneumatic hose
6. 1 x Torque wrench (1.8 Nm) (for mounting blocks)
7. 1 x Hex key (2.5 mm)
8. 1 x Crevice nozzle (for cleaning the working chamber)
9. 1 x Interdental brush (for cleaning the nozzle plate)
10. 1 x Cleaning brush
11. 1 x Drill bit (2.8 mm) for tool positions
12. 1 x Tool magazine insert
13. 1 x Calibration set: 1 micrometer, 6 blanks for manufacturing test and calibration specimen
14. 1 x Measuring pin
15. 1 x Block holder

Not depicted:

- **This document**
 - **1 x Carrying aid for transporting the machine**
 - **1 x Transport lock in the working chamber**
 - **1 x Supplement about removing the carrying aid and transport lock**
- » **Keep the packaging of the machine, the carrying aid and the transport lock for future transports.**

Choosing the installation site

The installation site must meet the following criteria:

- Firm and even surface, must be able to carry the weight of the machine (149 kg (328 lbs))
- Minimum required space (W/D/H): 730 x 820 x 920 mm (28.7 x 32.2 x 36.2 in)
- Ambient temperature (storage / transport): between -20 °C (-4 °F) and 60 °C (140 °F)
- Ambient temperature (operation): between 10 °C (50 °F) and 32 °C (90 °F)
- Relative air moisture: max. 80 %, non-condensing
- Machine requires an external air extraction system. Minimum extraction capacity: 3,500 l/min at 220 hPa (123.6 cfm at 3.2 psi).
- Machine requires an external compressed air supply. Air consumption (ionizer deactivated / activated):
 - 50 l/min at 6 bar, 65 l/min at 8 bar (1.8 cfm at 90 psi, 2.3 cfm at 120 psi)
 - 100 l/min at 6 bar, 110 l/min at 8 bar (3.5 cfm at 90 psi, 3.9 cfm at 120 psi)
- Machine location must be dust-free
- Alternating current source with 100–240 V AC, 50/60 Hz
- An operational Residual Current Device / Ground Fault Circuit Interrupter on the electric circuit of the machine
- Access to the internet and local computer network via cable

Distances to maintain

NOTICE

Damaging of the machine if safety distances are not maintained
 If you do not maintain the safety distances, the movable parts of the housing can collide with obstacles when being opened and get damaged. If the ventilation openings are covered, the machine may overheat and get severely damaged.

» Ensure that the following safety distances are always maintained.

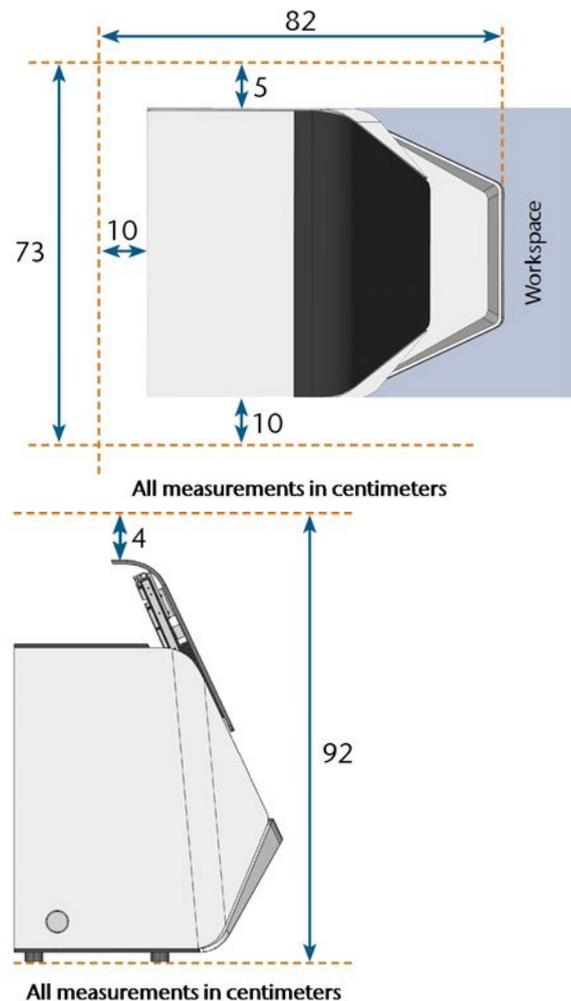


FIG. 8 – DISTANCES TO MAINTAIN

Machine installation (schema)

! You can either use the switching unit including the control cable or the data cable of supported suction units. The data cable must be provided by the manufacturer of the suction unit.

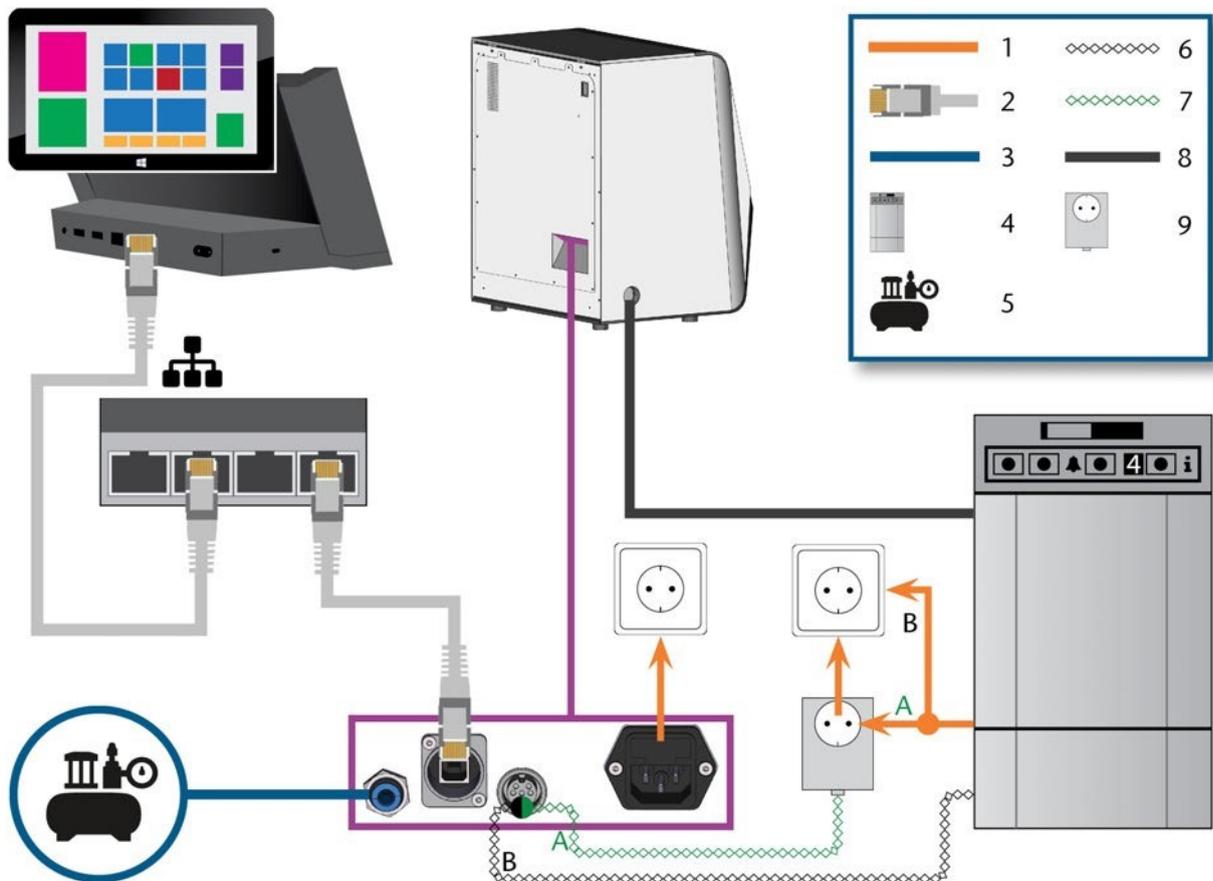


FIG. 9 – MACHINE INSTALLATION (SCHEMA)

1. Power connection
2. Ethernet network cable
3. Pneumatic hose
4. Suction unit
5. External compressed air supply
6. Data cable of supported suction units (optional)
7. Control cable of the switching unit (optional)
8. Suction hose
9. Switching unit (optional)

Installing the pneumatics

WARNING

Risk of injuries through leaking compressed air and lashing pneumatic hoses

Open or loose pneumatic connections can cause severe injuries.

- » **Ensure that** during installation and maintenance **of the pneumatic hoses and of the compressed air regulator compressed air is not conducted through the hoses and connections.**
- » Before **conducting compressed air through the hoses and connectors, verify that the hoses are securely inserted into the correct connectors and that they are not damaged. This also applies to the compressed air regulator.**
- » **Do not conduct compressed air through damaged hoses and connectors.**

NOTICE

The spindle may suffer bearing damage and electrical damage if the compressed air is contaminated

The incoming compressed air must be dry and oil-free according to ISO 8573-1:2010 because the compressed air regulator only serves as an indicator for contaminated air.

Air purity according to ISO 8573-1:2010



- » **Ensure that the compressed air meets the above requirements.**
- » **Only connect the machine to the compressed air supply if the compressed air regulator is properly installed.**

The machine requires the compressed air for the following tasks:

- **For the opening and closing of the collet chuck during tool changes.**

- **For the spindle sealing air which prevents foreign bodies from entering the spindle.**
- **For the sealing air in the working chamber that keeps machining debris away from sensitive machine parts.**
- **For the ionizer.**

Air consumption (ionizer deactivated): approx. 50 l/min at 6 bar, 65 l/min at 8 bar (1.8 cfm at 90 psi, 2.3 cfm at 120 psi)

Air consumption (ionizer activated): approx. 100 l/min at 6 bar, 110 l/min at 8 bar (3.5 cfm at 90 psi, 3.9 cfm at 120 psi)

Overview compressed air regulator

The machine is connected to the external air supply via a compressed air regulator. You can use this regulator to monitor and regulate the pressure of the incoming air.

The compressed air regulator is pre-installed in the multi-purpose compartment. It is located to the right of the cooling liquid tank.

The regulator has the following connections:

- 1/8" internal thread, fitted with male compressed air connector to connect the external compressed air supply
- 6 mm push-in fitting to connect the machine.

You need to remove the tank before you can access the compressed air regulator (□ *Exchanging the cooling liquid and cleaning the tank – on page 33*).

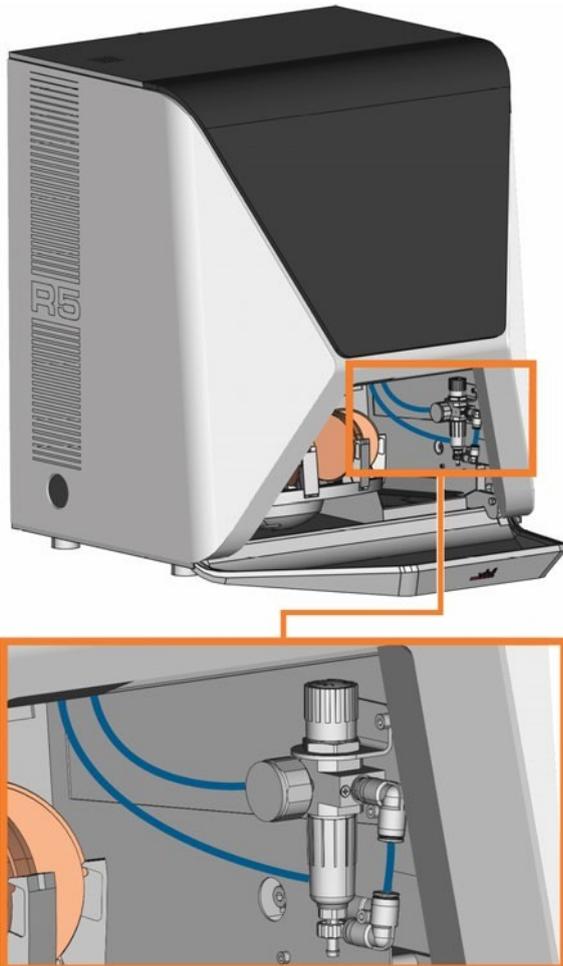


FIG. 10 – THE LOCATION OF THE COMPRESSED AIR REGULATOR

Installing the pneumatic hose

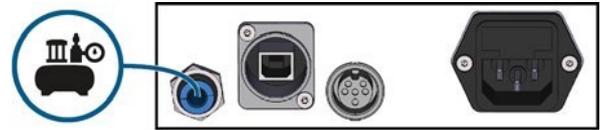


FIG. 11 – INSTALLING THE PNEUMATIC HOSE

1. Close the external compressed air supply valve.
2. Connect the provided pneumatic hose to your external compressed air supply system.
3. Connect the other end of the hose to the pneumatic connection at the connection panel of the machine.
4. Thoroughly verify that all external pneumatic hoses are properly seated in their corresponding connections and that the hoses and connectors are undamaged.
5. If all hoses and connectors are properly installed and undamaged, open the external compressed air supply valve.

Adjusting the air pressure with the compressed air regulator

Setting the air pressure is only necessary if the air pressure shown by the pressure gauge does not lie between 6 bar (90 psi) and 8 bar (120 psi).

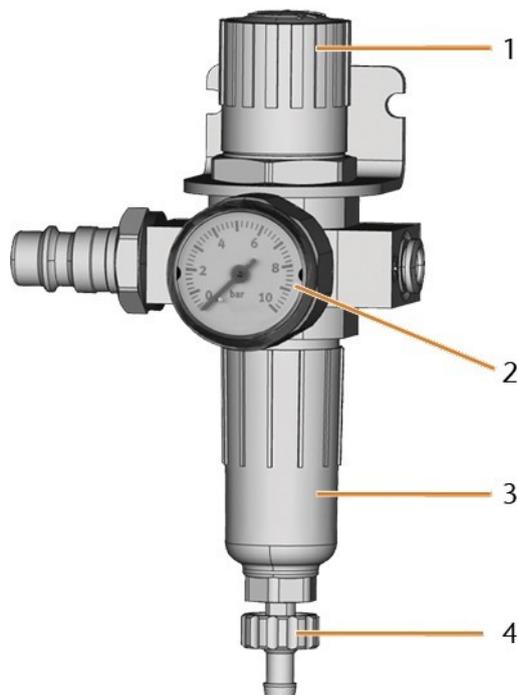


FIG. 12 – COMPRESSED AIR REGULATOR: REGULATING AND MONITORING THE AIR PRESSURE

1. Rotary knob for pressure regulation
2. Pressure gauge for monitoring the outgoing air pressure
3. Bowl of the water separator
4. Discharge screw

- 1. Pull the rotary knob on top of the compressed air regulator slightly upwards.**
 - 2. Turn the rotary knob in the desired direction until the pressure lies between 6 bar (90 psi) and 8 bar (120 psi) (recommended: 7 bar (100 psi)):**
 - Turn it towards "+" to increase the pressure
 - Turn it towards "-" to decrease the pressure
 - 3. Push the rotary knob down again.**
- ✓ **The knob is locked and cannot be changed inadvertently.**

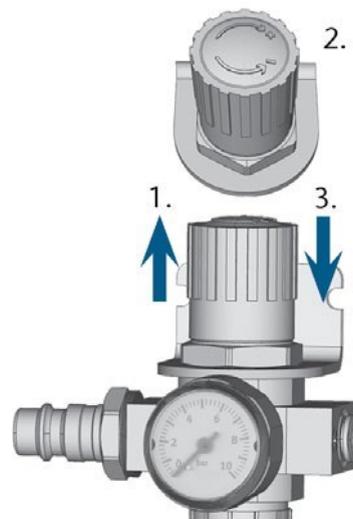


FIG. 13 – SETTING THE AIR PRESSURE

Installing the air extraction system

Components of the air extraction system:

Component	Source	Required?	Prerequisite
Suction device incl. suction hose	Customer service, specialist dealers	Yes	–
Switching unit	Customer service*	No	Suction unit data cable <i>not</i> used
Data cable of supported suction units	Manufacturer of the suction unit	No	Supported suction unit; switching unit <i>not</i> used
Hose connection	Customer service	If the suction hose does not fit	–

*The switching unit is not available worldwide.

Requirements for the suction unit

» Use a suction device with the following properties only:

- Designed for the commercial use in the dental sector
- Equipped with a filter of the filter class M
- Suitable for the operating site of the machine
- Equipped with safety devices which protect you from static discharges (e. g. through an anti-static suction hose)
- Minimum extraction capacity: 3,500 l/min at 220 hPa (123.6 cfm at 3.2 psi)

Installing the suction unit

You can install the suction unit as follows:

1. Read the documentation for the suction unit. Follow the operating and safety instructions at any time.
2. Check if the connection of the suction hose has an outer diameter of 45 mm. If the diameter is different, either adjust the hose or use the optional hose connection.
3. Insert the suction hose of the suction unit into the opening for the air extraction of the machine. Ensure that the suction hose is properly seated.

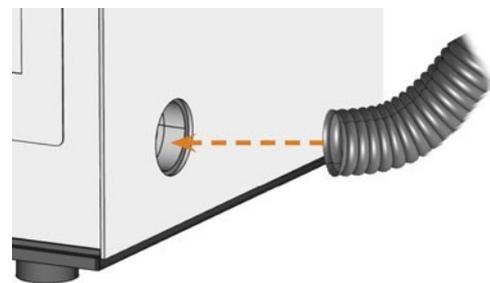


FIG. 14 – INSERTING THE SUCTION HOSE INTO THE MACHINE

4. If you want the machine to automatically switch the suction unit on and off, choose 1 of the following options:
 - Install the switching unit (extra equipment). The switching unit is not available worldwide.
 - Connect a data cable provided by the manufacturer of the suction unit to the suction unit data port of the machine. The operating manual of the suction unit should contain additional details.
5. Continue with the installation of the suction unit as described in the documentation of the unit.

Connecting the suction hose with the optional hose connection

If you cannot connect the suction hose of the suction unit directly to the machine, install the hose connection as follows:

1. Obtain the hose connection from customer service.
2. Turn the thread of the hose connection counter-clockwise until the connection is completely open.

If the thread gets detached from the hose connection, place it onto the connection again and turn it clockwise once so that it is screwed to the connection again.

3. Insert the suction hose of the suction device completely into the hose connection on the side of the thread.

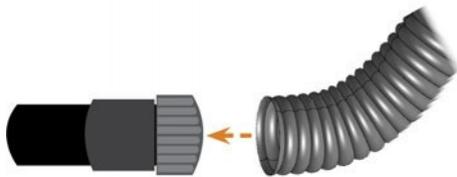


FIG. 15 – INSERTING THE SUCTION HOSE INTO THE HOSE CONNECTION

4. Turn the thread of the hose connection clockwise as far as you can.
- ✓ The suction hose is firmly attached to the hose connection.
5. Insert the hose connection into the opening for the air extraction system of the machine. Ensure it is firmly connected.
- ✓ The installation of the suction hose with the optional hose connection is complete.

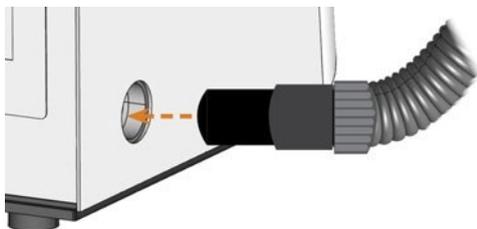


FIG. 16 – INSERTING THE HOSE CONNECTION INTO THE OPENING FOR THE AIR EXTRACTION SYSTEM

Installing the switching unit

If you want the machine to automatically switch the suction unit on and off, but a data cable is not available, you can use the optional switching unit. The switching unit is not available worldwide.

1. Connect the power cable of the suction device to the switching unit.
2. Connect the control cable of the switching unit to the suction device data port at the connection panel of the machine.
3. Plug the switching unit into a power socket.

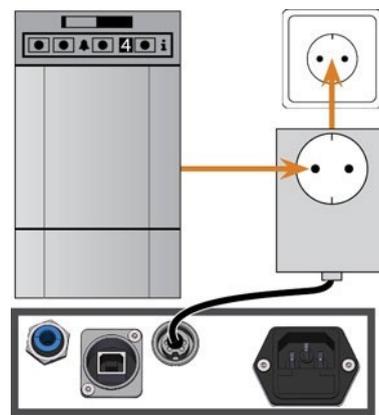


FIG. 17 – CONNECTING THE SWITCHING UNIT TO THE SUCTION DEVICE AND THE MACHINE

Establishing the electric connection

NOTICE

Damaging of the machine through heavy voltage fluctuations

Heavy voltage fluctuations can disrupt the control unit and can cause system failures.

- » Plug the machine's power cable in a dedicated current circuit or ensure that no devices are connected that can cause heavy voltage fluctuation when switched on.
- » If heavy voltage fluctuations cannot be avoided, install a suitable device which protects the machine from heavy voltage fluctuations.

NOTICE

Short-circuit hazard when the machine is too cold

If the machine is transported from a cold environment into a warmer environment, a short circuit may occur caused by condensate.

- » Before switching on the machine after transportation, ensure the following:
 - The ambient air has the allowed temperature.
 - The machine has the same temperature as the ambient air. This will take at least 48 hours.
 - The machine is completely dry.

The machine requires a continuous power supply for proper operation.

1. Plug the provided power cable into the power connection at the connection panel of the machine.
2. If power failures occur regularly at the installation location or if there are frequent voltage fluctuations, install an online Uninterruptible Power Supply (UPS).

! If a power failure occurs during job execution, the tool may break and the blank may be destroyed.

3. Insert the plug of the cable into a socket that is protected by a Residual Current Device / Ground Fault Circuit Interrupter.

Integrating the machine into the network

The following diagram visualizes how commands are sent to the machine using our network technology:

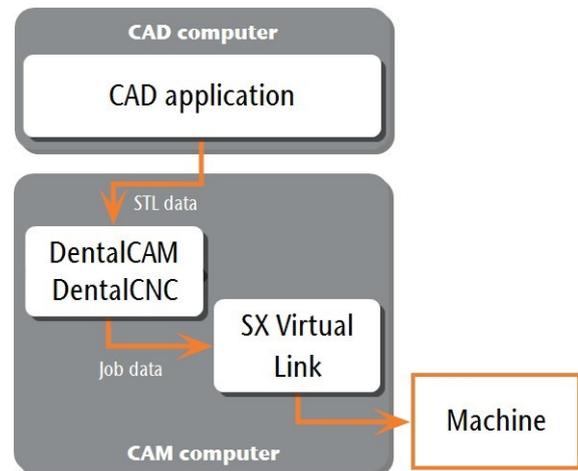


FIG. 18 – DIAGRAM: HOW COMMANDS ARE SENT OVER THE NETWORK

SX Virtual Link is similar to a device driver that transfers data between DentalCNC and the machine. Upon installation of the components, you start with configuring the machine.

Connecting the CAM computer

The machine requires a continuous network connection to the CAM computer for proper operation.

You can connect the machine to the CAM computer via an Ethernet cable. For integrating the machine into your network, you may require the assistance of your IT specialist.

- » Ensure that your network is working without disruptions. Network failures will lead to aborted jobs and unusable machining results.
 - » Do not contact customer support for setting up your network or troubleshooting network issues. Customer service will only help you with machine-related issues.
 - » If you want to control multiple machines with 1 CAM computer, use our multi-machine control feature. See the documentation for the manufacturing software.
1. Plug the Ethernet cable into the network port at the connection panel of the machine.
 2. Plug the other end of the Ethernet cable into the network port of the CAM computer. *Do not* use a router, hub or switch to connect the 2 units at this point.
 3. Continue with configuring the machine's network settings (see below).

Configuring the machine's network settings

For the network connection to work, you need to save some network parameters in your machine.

1. Ensure that the CAM computer is *directly* connected to the machine via an Ethernet cable. Otherwise, the machine may obtain incorrect network settings and may become unreachable.

! If this happens, an on-site visit by customer service may be necessary: What to do if the machine is unreachable – on page 29

2. Switch on the machine at the main power switch.
3. Start the CAM computer.
4. Wait until the CAM computer and the machine have started up.
5. Install the manufacturing software as described in the corresponding documentation.
6. Switch to the Device Server Setup application window. This software launches during the installation of the manufacturing software.



FIG. 19 – THE DEVICE SERVER SETUP START WINDOW

7. If Device Server Setup is not running, start it manually:
 - a. Open Windows® Explorer.
 - b. Open the DentalCAM & DentalCNC installation folder.
 - c. Open the USB folder.
 - d. Open the Silex folder.
 - e. Start Dssetup.exe.
- ✓ The Device Server Setup application starts up.
8. (Optional) Change the language of the application:

- a. **Select the Language icon in the bottom right corner.**
 - b. **Select the button which is labeled with the desired language.**
9. **Select the Device Server Configuration button.**
 10. **Select the Configure using the setup utility (Recommended) button.**
 11. **If Windows® asks you whether Device Server Setup may make changes to your computer, select [Yes].**
 - ✓ **A dialog window opens asking you whether you want to add the application to the exception list of the Windows® firewall.**
 12. **Select [Yes].**
 - ✓ **A window titled Welcome to the Device Server Setup opens.**
 13. **Select [Next].**
 14. **Read the User License Agreement, and if you agree, select [Yes].**
 - ✓ **A list with all detected devices displays.**

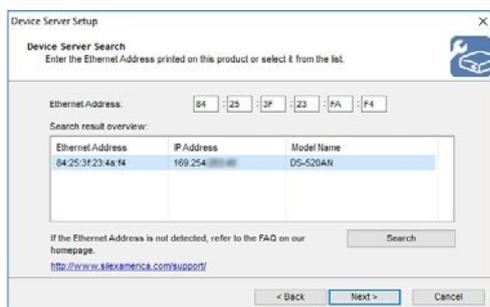


FIG. 20 – SELECTING THE DEVICE FROM THE LIST

15. **If more than 1 device is listed, switch off all other machines and non-required network devices.**
16. **Mark the correct entry.**
 - ! **Even if there is only 1 device listed, select this device from the list to properly mark it (□ Fig. 20– see above). Otherwise, the next configuration step may fail.**
17. **Select [Next].**
18. **Specify the IP address of the machine:**
 - a. **If a DHCP server is available in your network, activate the Get IP Address automatically option. Select [Next].**

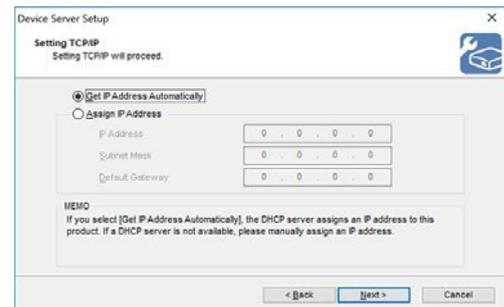


FIG. 21 – CONFIGURING THE MACHINE SO THAT IT RECEIVES ITS IP ADDRESS FROM A DHCP SERVER

- b. **If no DHCP server is available, activate the Assign IP Address option and enter the parameters manually. Select [Next].**
 - **IP Address: Enter an IP address that your CAM computer can reach. In many cases, only the last segment after the final dot may (and must) differ from the IP address of your computer.**
 - **Subnet Mask: Specify which IP addresses the machine can reach without a router. For many local area networks, 255.255.255.0 is the correct value.**
 - **Default Gateway: Enter the IP address of the desired router or access point.**



FIG. 22 – MANUALLY CONFIGURING THE IP ADDRESS OF THE MACHINE

- ✓ **Device Server Setup lists the network configuration that you have specified so far.**
19. **If the network configuration is correct, select [Execute]. Otherwise, select [Back] and correct the parameters as necessary.**
 - ✓ **Device Server Setup is complete. The application asks you if you want to install additional software (SX Virtual Link).**
 20. **Activate Yes. Select [Next].**
 - ✓ **The SX Virtual Link installation program launches.**
 21. **In the installation program window, select the desired language from the list.**

22. Follow the installation program. In the final step, select Start.
 - ✓ The installation program installs SX Virtual Link and the machine device driver. When the installation is finished, you will receive a corresponding message.
23. If the installation program asks you to restart the CAM computer, do so. Otherwise, select [Finish].
 - ✓ The CAM computer reboots or the installation program closes.
24. Continue with configuring SX Virtual Link and DentalCNC (see below).

Configuring SX Virtual Link & DentalCNC

1. Ensure the following:
 - An Ethernet cable must be installed. From now on, you can use a hub, router or switch to connect the computer and the machine.
 - The machine's network settings must be configured.
 - SX Virtual Link is installed.
2. If SX Virtual Link is not installed, open the installation program in the DentalCAM & DentalCNC installation folder: USB\Silex\Utility\VirtualLink\Cosetup.exe.
3. Open the SX Virtual Link application window:
 - The software should already be running – select the arrow on the right side of your task bar to open the system tray. In the system tray, select the SX Virtual Link icon.

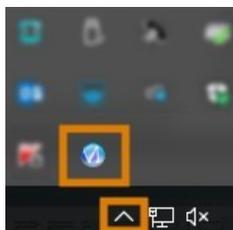


FIG. 23 – SELECTING THE ARROW AND THE SX VIRTUAL LINK ICON

- If the SX Virtual Link icon is not in the system tray, start the application via the start menu. You should find it in the Silex Device Server group.

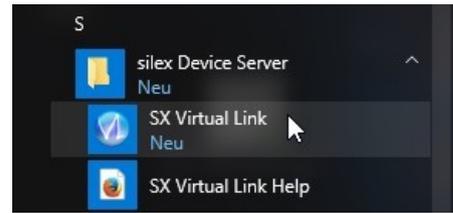


FIG. 24 – STARTING SX VIRTUAL LINK VIA THE START MENU

- ✓ The SX Virtual Link application window displays. If SX Virtual Link is able to find the machine in the network, it is listed in the application window. Otherwise, a corresponding image and message display.

i It may take a while before the device becomes available. During this time, Communication error is displaying after the device name.

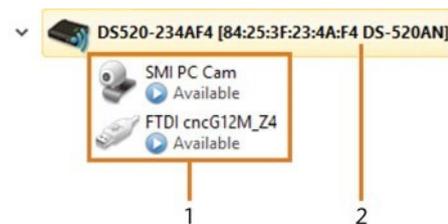


FIG. 25 – MACHINE WAS FOUND IN YOUR NETWORK

1. The internal devices of the machine
2. The superior list entry for the machine

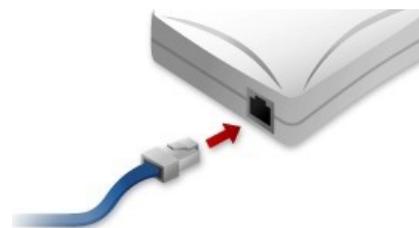


FIG. 26 – MACHINE COULD NOT BE FOUND IN YOUR NETWORK

4. If the machine could not be found, check if the CAM computer is properly connected to your machine and that the machine is switched on and started. You may want to try restarting the machine.
5. In the SX Virtual Link window, right-click on SMI PC Cam.
6. From the context menu, select Properties....

7. **Switch to the Disconnect tab.**
 8. **Activate the Allow auto-disconnect when a Request Use is received check box.**
 9. **From the Auto-disconnect timeout drop-down list, select 10.**
 10. **To save your settings, select [OK].**
 11. **Right-click on SMI PC Cam.**
 12. **From the context menu, select Connect.**
 13. **Repeat steps 5–12 for the other SMI PC Cam entry.**
 14. **In the SX Virtual Link window, locate the device whose name starts with FTDI. Repeat steps 5–12 for this device**
- ✓ **Green check marks indicate that the connections have been established.**



FIG. 27 – THESE GREEN ICONS INDICATE SUCCESSFUL CONNECTIONS

15. **In the SX Virtual Link application window, select the depicted icon.** 
- ✓ **The Options window opens.**
16. **In the Options window, activate the following options:**
 - Launch SX Virtual Link at Windows startup
 - Don't show SX Virtual Link main window on program launch
 - Hide the main window if the close button is clicked
 17. **Deactivate the Automatically connect newly discovered USB devices option.**
- ! **If you do not deactivate this option, you will need to determine the port in DentalCNC every time you start the machine.**
18. **To save your settings, select [OK].**
 19. **Start DentalCNC.**

20. **Open the DentalCNC Application settings. For this, select the following icon in the main icon bar:** 
 21. **Open the General settings. For this, select the following icon in the lower icon bar:** 
 22. **Select the following icon next to the Port number input field:** 
- ✓ **If DentalCNC is able to determine the port number, the number displays in the Port number input field. The machine references.**
23. **In the SX Virtual Link application window, locate the Ethernet address of the machine. It displays behind the device name.**



FIG. 28 – THE ETHERNET ADDRESS OF THE MACHINE (MARKED ORANGE)

24. **Enter the Ethernet address into the Machine Ethernet address input field in DentalCNC.**

Example: **84:25:3F:23:4A:F4**

! **Double-check your entry.**

25. **Press <ENTER>.**
- ✓ **From now on, DentalCNC will connect and disconnect the machine.**
26. **Activate the Launch application at Windows start up option.**
- ✓ **From now on, DentalCNC will launch with Windows®, which is required to automate the connection process.**
27. **Close DentalCNC.**
- ! **If you do not close DentalCNC now, your changes may not be saved.**
28. **In the SX Virtual Link application window, right-click on SMI PC Cam.**
 29. **From the context menu, select Disconnect.**
 30. **Right click on the entry starting with FTDI.**
 31. **From the context menu, select Disconnect.**
- ✓ **The 2 check marks no longer display in the SX Virtual Link application window, which indicates that the machine is disconnected.**

32. Start DentalCNC.

- ✓ DentalCNC establishes the connection to the machine. The 2 check marks display again.

i Although DentalCNC now establishes the connection, SX Virtual Link is still required for the connection to work.

33. Continue with removing the transport lock from the working chamber (see below).**Removing the transport lock**

Before operating the machine for the first time, you must remove the transport lock. The transport lock prevents the spindle from getting damaged during transport.

1. Ensure the following:
 - The network connection to your machine has been properly configured.
 - The machine is connected to the electrical source.
 - The CAM computer is connected to your machine.
2. Switch on the machine at the main power switch.
- ✓ The machine references.
3. Start DentalCNC. Wait until the connection to the machine has been established.
4. Open the working chamber door by selecting the depicted icon in the Machining view in DentalCNC. 
5. Open the blank holder by selecting the depicted icon in the Machining view in DentalCNC. 
6. Remove the transport lock as shown in the supplement.

Useful things to know about the network configuration**Useful things to know about the network configuration**

While the network connection to your machine should work automatically, there are some useful things that you or your IT specialist should know.

What to do when devices are in use in SX Virtual Link

If SX Virtual Link displays that 1 or more devices are in use, another computer running SX Virtual Link has taken control of them.

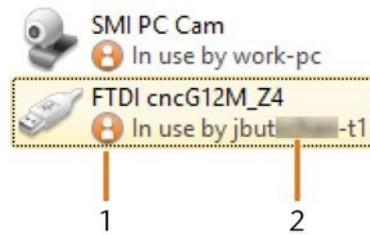


FIG. 29 – DEVICES THAT ARE IN USE BY OTHER COMPUTERS

1. “In use” icon
2. Name of the computer that is using the device

You can send a use request to the computer that is currently connected to the device. If the request is accepted, your computer can connect to the device.

1. In the SX Virtual Link application window, right-click on the corresponding device.
 2. From the context menu, select Use request.
- ✓ The request displays in a pop up window on the receiving computer. If the request is accepted, your computer will connect to the device after a short amount of time.

What to do if the machine is unreachable

If the network settings that are saved in the machine are incorrect, your IT specialist may try the following to connect to the machine:

1. Access the router to which the machine is connected.
2. Determine the IP address of the machine via the router's configuration menu.
3. Configure the machine's network settings via the web server (see below).
4. If this is not possible, ask customer service to reset the machine's network settings through hardware access.

Network configuration via the machine's web server

The machine features a web server which allows for network configuration and network diagnostics.

You can access the web server as follows:

1. Ensure that SX Virtual Link is connected to your machine.
2. In the SX Virtual Link application window, right-click on the entry for the desired machine. If required, use the Ethernet address to identify the machine.



FIG. 30 – THE ETHERNET ADDRESS OF THE MACHINE (MARKED ORANGE)

3. **From the context menu, select** Display the Web Page.
 - ✓ **The default web browser launches and automatically connects to the machine's web server. You are prompted to enter a password.**
4. **Enter the password and press <ENTER>. If you never set a custom password, just press <ENTER>.**
 - ✓ **The start page of the web server displays.**

Resetting the network configuration to factory defaults

In case of network problems, you can try resetting the machine's network configuration to default settings.

! **After the reset, you will have to reconfigure the machine's network settings.**

1. **If you still have access to the machine's web server, do as follows:**
 - a. **Log in to the web server.**
 - b. **In the left column, select** Settings Initialization **from the** Maintenance **section.**
 - c. **Select** [Yes] **twice.**
 - d. **Wait 30 seconds.**
 - e. **Restart the machine.**
2. **If you do not have access to the web server, contact customer service.**

6 Operation: Preparing jobs

Before you can machine blanks, you need to prepare the machine. The corresponding jobs must have been transferred to DentalCNC where they display in the job list.

Starting the machine

NOTICE

Short-circuit hazard when the machine is too cold

If the machine is transported from a cold environment into a warmer environment, a short circuit may occur caused by condensate.

- » Before switching on the machine after transportation, ensure the following:
 - The ambient air has the allowed temperature.
 - The machine has the same temperature as the ambient air. This will take at least 48 hours.
 - The machine is completely dry.

You usually start the machine as follows:

1. Ensure that the machine is properly installed.
 2. Switch on the machine at the main power switch.
 3. If the machine controls the suction unit, switch on the unit and select the necessary extraction level.
- ✓ The suction unit is not running. If it is, either the switching unit or the data cable of supported suction units is not properly installed.
- i** If you control the suction unit manually, you will switch it on immediately before job execution.
4. Start the CAM computer.
 5. Start DentalCNC.
- ✓ The following happens:
 - a. The machine references.
 - b. The working chamber is illuminated in white.
 - 6. If the machine didn't reference because the working chamber door is open, confirm the respective dialog on the CAM computer.
- ✓ After the machine has referenced, it is operational.

Starting the machine with a tool in the collet chuck

Under some circumstances like a power outage, there can be a tool in the collet chuck of the spindle when you start the machine. You need to remove the tool from the collet chuck before you can use the machine.

CAUTION

Danger of cuts and burns when touching tools with your bare hands

If you handle tools on the cutting surface, you may be injured. As the tool may be very hot, you may also suffer from skin burns.

- » Only touch tools at their shank.
- » When handling tools, wear protective gloves.

NOTICE

Machine damage if you do not remove the tool

If the tool remains in the spindle after you have confirmed the message, it will collide with machine parts such as the measuring key and severely damage them.

- » Always follow the instructions below when you start the machine with a tool in the collet chuck.

1. Start the machine.
 - ✓ DentalCNC displays that there is a tool in the collet chuck. The working chamber door opens.
2. Hold the tool in the collet chuck in place.
3. Confirm the current message.
 - ✓ The following happens:
 - a. The collet chuck opens.
 - b. The current dialog window closes.
 - c. A dialog window opens.
4. Remove the tool from the collet chuck.

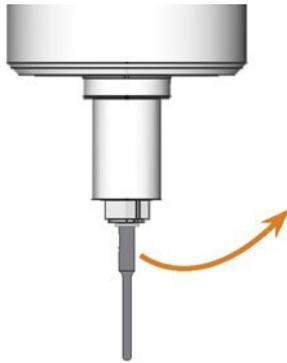


FIG. 31 – REMOVING THE TOOL FROM THE COLLET CHUCK

5. Confirm the current message.

- ✓ The working chamber door closes. The machine is ready for operation.

Switching off the machine

DANGER

Danger of an electric shock if unplugging the power cable before switching off the machine

If you unplug the power cable while the main power switch is still in “ON” position, residual voltage in the power cable may cause you to suffer from an electric shock.

» Before unplugging the power cable, switch off the machine at the main power switch.

To switch off the machine, do the following:

1. Ensure that the working chamber is clean.
2. Switch off the machine at the main power switch.
3. (Optional) Unplug the power cable.
4. (Optional) Switch off the main power switch of your workstation / facility.

Opening & closing the working chamber door

NOTICE

Damaging of the machine by operating the working chamber door inappropriately

The working chamber door is operated by electricity. If you manually open or close the working chamber door, you can damage the machine.

- » Manually open or close the working chamber door only in case of an emergency.
- » Before you manually open or close the working chamber door, read the respective information in the chapter *Operation: Executing jobs*.

- » To open or close the working chamber door, select the depicted icon in the Machining view in DentalCNC.

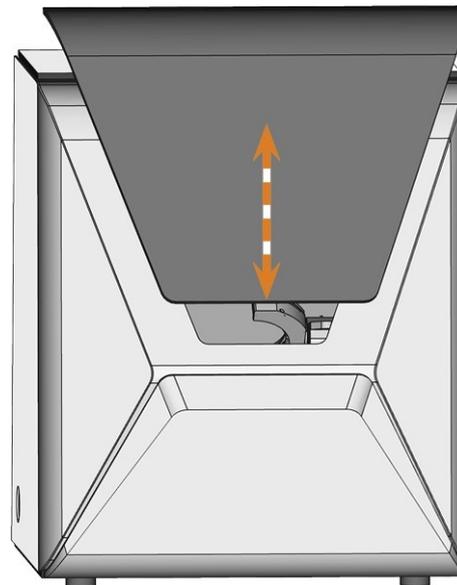


FIG. 32 – OPENING & CLOSING THE WORKING CHAMBER DOOR

Opening & closing the multi-purpose compartment

NOTICE

Damaging of the machine when operating the multi-purpose compartment

If you open the multi-purpose compartment manually, if you do not maintain it properly or if you do not remove leaked cooling liquid, the machine may get damaged.

- » Only open the multi-purpose compartment manually in case of an emergency.
- » Check regularly if the area below the cooling liquid tank is dry and remove leaked cooling liquid immediately.

i When you operate the blank changer with DentalCNC, the multi-purpose compartment opens and closes automatically.

1. To open the multi-purpose compartment, select the depicted icon in the Machining view in DentalCNC.



- ✓ The multi-purpose compartment flap swings downwards.

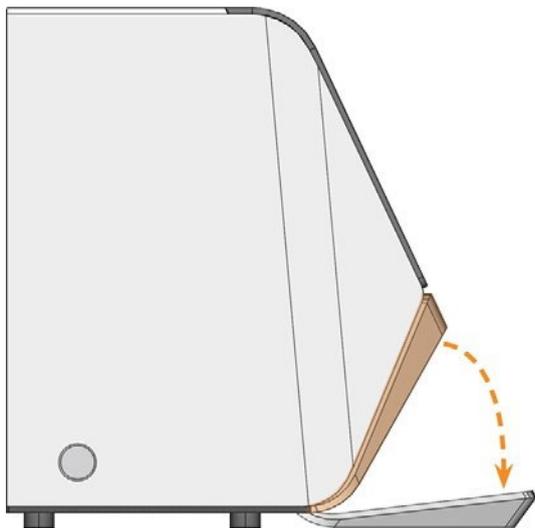


FIG. 33 – OPENING THE MULTI-PURPOSE COMPARTMENT

2. To close the multi-purpose compartment, push the flap upwards until it is locked in place or select the depicted icon in the Machining view in DentalCNC.



Exchanging the cooling liquid and cleaning the tank

NOTICE

Damages caused by wet machining with unsuitable cooling liquid

Wet machining without suitable cooling liquid can damage the machine, tools and blanks.

- » Before you execute a job, ensure that the cooling liquid is clean and the liquid level is sufficient.
- » Only use cooling liquid that meets the requirements listed below.
- » If you use a cooling lubricant: Only add the cooling lubricant Tec Liquid Pro to the cooling liquid.
- » Exchange used cooling liquid according to the maintenance table. Clean the cooling liquid tank before refilling it.
- » If you use a cleaning agent to clean the tank, ensure that no residues of it remain in the tank.

The machine needs cooling liquid that meets the following requirements:

- Drinking water – for some blank types, you *must* add cooling lubricant (see below)
- No added chlorine
- No distilled water
- No carbonated water

Without sufficient cooling liquid in the tank, wet machining is not possible. You can find the appropriate interval in the maintenance table. Of course, you can exchange the cooling liquid at any time.

You need to exchange the cooling liquid in the following cases:

- The change interval in the maintenance table has been exceeded.
- The cooling liquid is soiled.

Everytime you exchange the cooling liquid, you must also clean the tank.

Before every job, you also have to check the strainer basket and empty it if required.

Cooling lubricant

When processing titanium blanks:

» Add the cooling lubricant Tec Liquid Pro to the cooling liquid. The mixing ratio is indicated on the bottle label.

i Tec Liquid Pro is available from customer service.

Emptying the strainer basket

You can empty the strainer basket into a collecting container as follows:

1. Lift the cover off the tank.
2. Use the recessed surfaces at the sides of the strainer basket to pull it upwards.

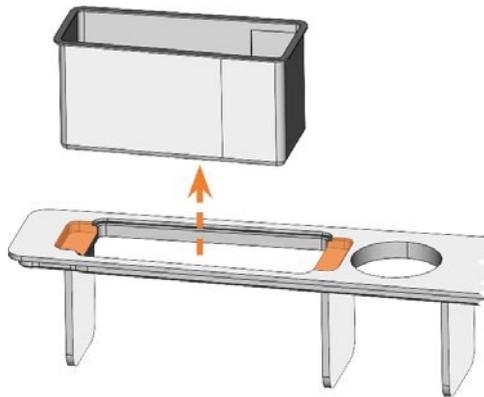


FIG. 34 – REMOVING THE STRAINER BASKET (RECESSED SURFACES COLORED ORANGE)

3. Tap out the strainer basket into the collecting container. You can use water or compressed air to further clean the strainer basket.
- ✓ The strainer basket is completely void of machining residues.

Exchanging or filling in the cooling liquid

You can fill in or exchange the cooling liquid as follows:

1. To exchange the liquid and clean the cooling liquid tank, have the following items readily available:
 - Collecting container that can hold approx. 10 l
 - Cleaning brush
 - Water for cleaning the cooling liquid tank
2. Ensure that sufficient cooling liquid is available.

3. Close the working chamber door.

4. Open the multi-purpose compartment.

5. Pull the cooling liquid tank out of the compartment in the direction indicated by the arrow (□ Fig. 35 – see below).

! When you tilt the cooling liquid tank, the cover will not prevent the cooling liquid from leaking.

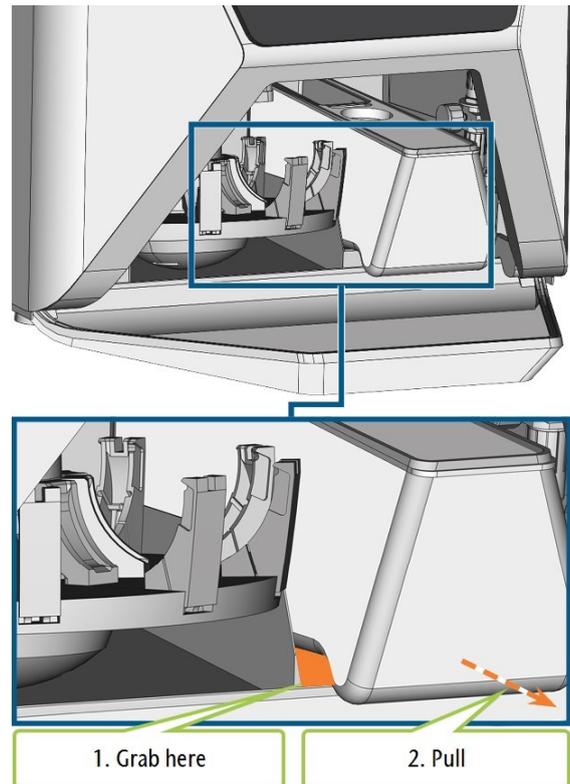


FIG. 35 – REMOVING THE COOLING LIQUID TANK FROM THE MULTI-PURPOSE COMPARTMENT

i Information on the disposal of cooling liquid and machining residues: □ Disposal – on page 66

6. Lift the cover off the tank.

7. If there is cooling liquid in the tank:

- a. Pour the cooling liquid into the collecting container.
- b. Use the recessed surfaces at the sides of the strainer basket to pull it upwards.

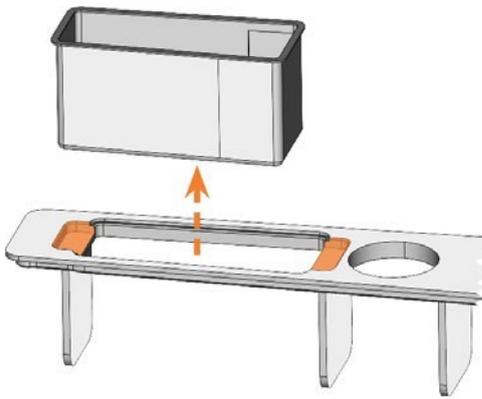


FIG. 36 – REMOVING THE STRAINER BASKET (RECESSED SURFACES COLORED ORANGE)

c. Tap out the strainer basket into the collecting container. You can use water or compressed air to further clean the strainer basket.

✓ **The strainer basket is completely void of machining residues.**

d. Rinse the filter in the cooling liquid tank under running water.

e. Thoroughly clean the tank with the cleaning brush. Pour the cleaning water into the collecting container.

f. If you have used a cleaning agent, ensure that no residues of it remain in the cooling liquid tank.

✓ **The cooling liquid tank is completely void of liquid, machining and cleaning agent residues.**

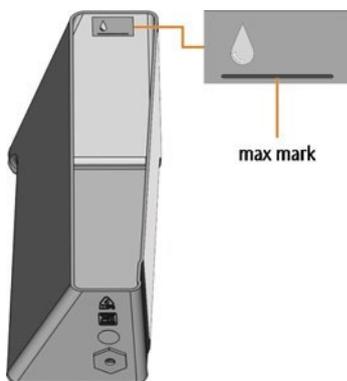


FIG. 37 – THE MAX MARK ON THE LABEL INSIDE THE TANK

8. Fill the cooling liquid tank with cooling liquid until it reaches the max mark.

- 9. When processing titanium blanks: Add the cooling lubricant Tec Liquid Pro to the cooling liquid. The mixing ratio is indicated on the bottle label.**
- 10. Insert the strainer basket into the tank cover and put the cover onto the tank.**
- 11. Remove dirt and foreign bodies from the coupling of the cooling liquid tank and the counterpart in the machine.**

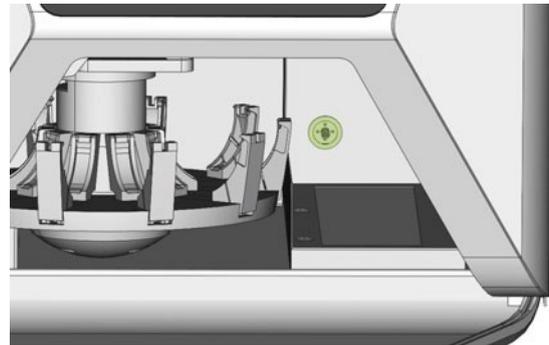


FIG. 38 – THE COUPLING OF THE TANK AND ITS COUNTERPART (COLORED GREEN)

12. Push the cooling liquid tank into the multi-purpose compartment until the tank is properly attached to the machine.

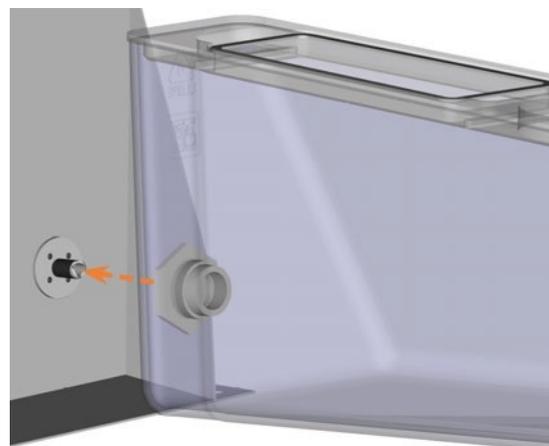


FIG. 39 – INSERTING THE COOLING LIQUID TANK INTO THE COMPARTMENT (SIMPLIFIED SCHEMA)

Mounting & removing blanks

The machine can process the following blanks:

- Discs with a diameter of 98.5 mm – 98.8 mm
- Blocks, max. size: 40 x 20 x 20 mm (L/D/H)
- Prefabricated abutments*

*requires extra equipment

i You can obtain extra equipment from customer service.

How to mount the different blank types

Blank type	Holder required?	How to mount
Discs	No	Discs >> Blank holder or Discs >> Blank magazine
Blocks	Yes	Blocks >> Block holder >> Blank holder or Blocks >> Block holder >> Blank magazine
Prefabricated abutments	Yes	Prefabricated abutments >> Prefabricated abutment holder >> Blank holder or Prefabricated abutments >> Prefabricated abutment holder >> Blank magazine

Mounting blocks to the block holder

You can mount up to 6 blocks to the block holder.

! The block type, the number of blocks and the block positions must correspond to the corresponding job in DentalCAM.

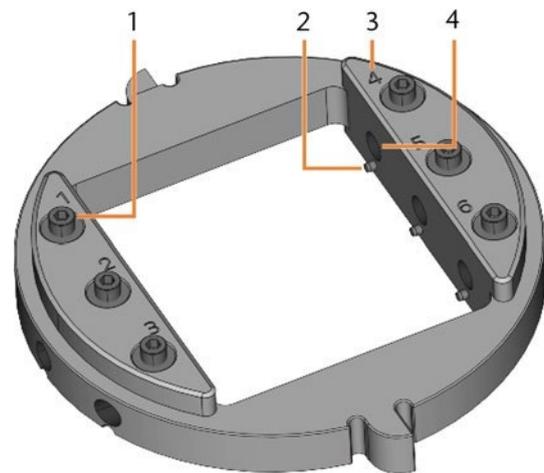


FIG. 40 – THE CC newCOSMO BLOCK HOLDER

1. Fixing screw (x 6)
2. Positioning pin (x 6)
3. Position numbers (1–6)
4. Hole for block shafts (x 6)

1. Use the provided torque wrench to loosen the fixing screw at the desired position.



FIG. 41 – UNSCREWING THE SCREW AT THE DESIRED POSITION

- 2. If the blank is a multilayer blank, orientate the blank so that the top color layer is on top.**
- 3. Position the block so that the positioning pin at the block holder lies in the groove in the block shaft.**

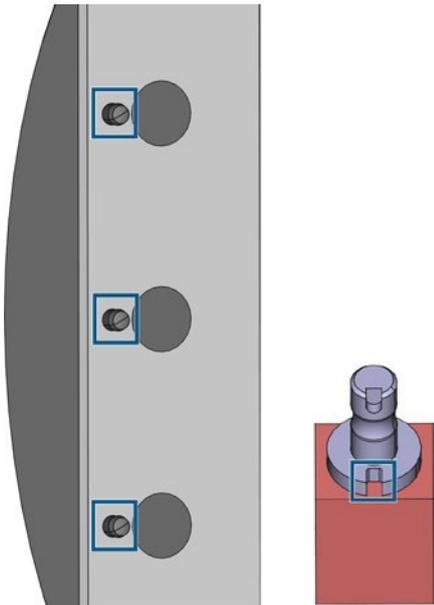


FIG. 42 – POSITIONING PINS (LEFT MARKINGS) MUST LIE IN THE GROOVE IN THE SHAFT (RIGHT MARKING)

- 4. Insert the shaft of the block into the desired position in the block holder until it is firmly seated.**

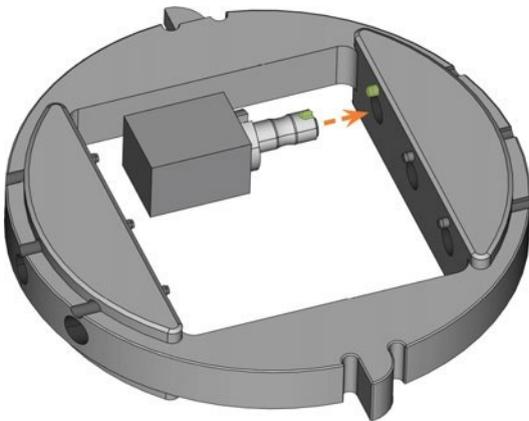


FIG. 43 – INSERTING A BLOCK INTO THE BLOCK HOLDER (HERE SHOWN FROM BELOW; GROOVE AND POSITIONING PIN MARKED GREEN)

- 5. Use the provided torque wrench to fixate the block with the corresponding fixing screw. Tighten the screw firmly.**



FIG. 44 – SCREWING DOWN THE SCREW TO IMMOBILIZE THE BLOCK

✓ **You can now mount the block holder.**

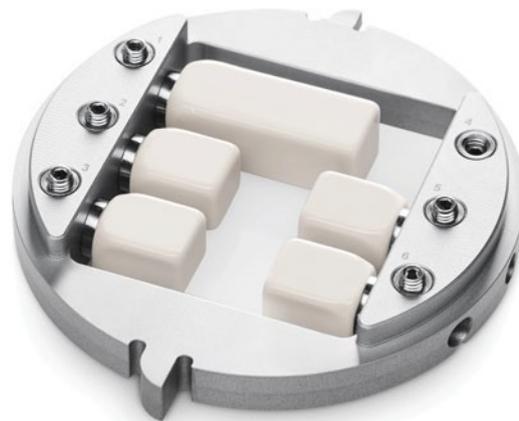


FIG. 45 – An CC newCOSMO BLOCK HOLDER WITH 5 MOUNTED BLOCKS

Mounting the block holder in the working chamber

If you only want to machine blocks in 1 block holder, directly mounting the block holder in the working chamber is faster than using the blank changer.

1. Open the working chamber door.
2. Open the blank holder by selecting the depicted icon in the Machining view in DentalCNC. 
3. Remove the blank in the blank holder if any.
4. Correctly orient the block holder:
 - The numbers labeling the block positions must face upwards.
 - The positioning aid with reduced height must be positioned in the rear.
 - The positioning aid with full height must be positioned in the front.
5. Push the block holder into the blank holder.

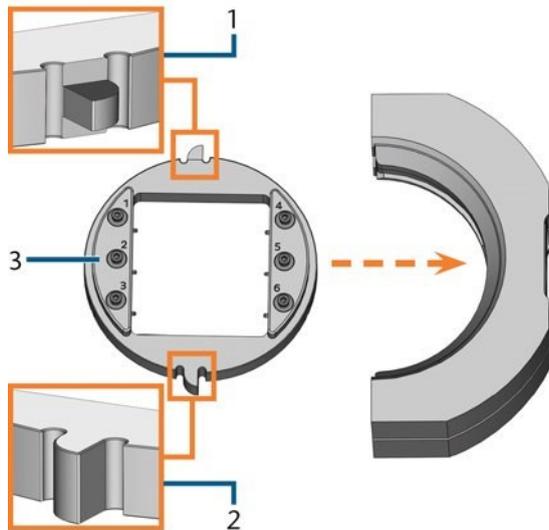


FIG. 46 – INSERTING THE CORRECTLY ORIENTATED BLOCK HOLDER INTO THE BLANK HOLDER

1. Rear positioning aid (reduced height)
2. Front positioning aid (full height)
3. Upper side of the block holder

6. Close the blank holder by selecting the depicted icon in the Machining view in DentalCNC. 

Mounting discs in the working chamber

If you only want to machine 1 disc, directly mounting the disc in the working chamber is faster than using the blank changer.

1. Open the working chamber door.
2. Open the blank holder by selecting the depicted icon in the Machining view in DentalCNC. 
3. Remove the blank from the blank holder if any.
4. If the blank is a multilayer blank, orientate the blank so that the top color layer is on top.
5. If the disc has been processed before, ensure the following:
 - The original top side faces upwards.
 - If the disc has been marked for safer remounting by DentalCNC, ensure that the marking is in the position shown below.
6. Push the disc into the blank holder.

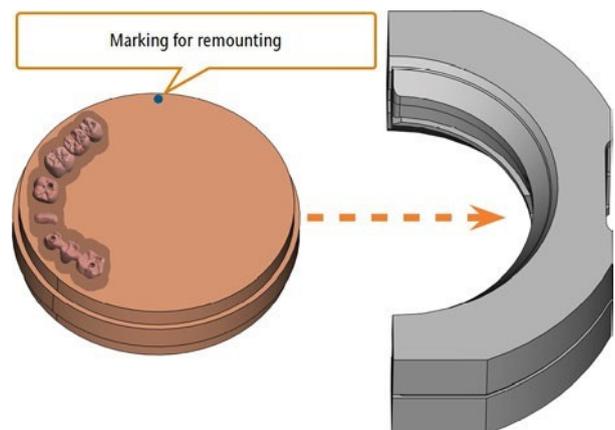


FIG. 47 – REMOUNTING AN ALREADY PROCESSED DISC TO THE BLANK HOLDER (MARKINGS FOR SAFER REMOUNTING IN BLUE)

7. Close the blank holder by selecting the depicted icon in the Machining view in DentalCNC. 

Using an optional abutment holder

With an optional abutment holder, your machine can process prefabricated abutments with prefabricated connection geometries.

- i** Abutment holders for common abutment systems can be obtained from customer service.

You can find more information about abutment holders and abutment blanks at the following internet address:

dentalportal.info/abutments

Operating the blank changer

You can mount up to 10 blanks to the magazine slots of the blank changer. The machine automatically loads blanks into the working chamber when they are required for the next job. This allows you to process up to 10 jobs in succession without having to start each job manually.

CAUTION

Crushing hazard caused by the moving blank magazine and blank gripper

If you reach into the multi-purpose compartment while the blank magazine or blank gripper is moving, you may suffer from bruises.

- » Before moving the blank magazine via DentalCNC, remove your hands from the multi-purpose compartment.
- » While the machine is operating, always expect the blank magazine to suddenly start moving.
- » When you are working in the multi-purpose compartment while the machine is operating, always keep your hands at the change position and never reach into the multi-purpose compartment.
- » If you manually move the blank magazine, ensure that you do not pinch your fingers.

To the left of each blank magazine slot is a laser engraved number labeling the corresponding slot.

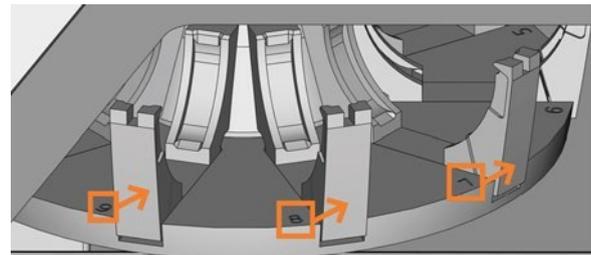


FIG. 48 – THE BLANK MAGAZINE (SLOT NUMBERS MARKED ORANGE, ARROWS INDICATE THE SLOTS THEY CORRESPOND TO)

- The blank types in the physical slots *must* correspond to the blank types which are assigned to the virtual slots in DentalCNC.
- To move the blank magazine or to manually load blanks into the working chamber, use the Machining view in DentalCNC.

- i** How to manually operate the blank changer and how to assign jobs to blank magazine slots is described in the documentation for DentalCNC.

Change position of the blank magazine

When you mount blanks to a blank magazine slot, you *must* use the change position. Otherwise, the blanks in your machine will not correspond to the blank positions assigned in DentalCNC.

- !** Never mount blanks to a different position, even if the position is easily accessible. The machine may load the wrong blanks, which can result in unusable machining results and broken tools.

The change position is shown in the following figure:

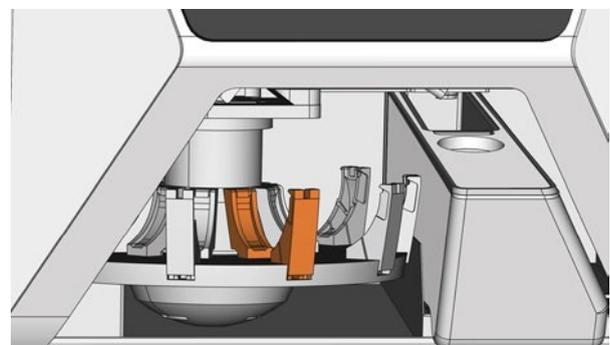


FIG. 49 – THE CHANGE POSITION (COLORED ORANGE)

Mounting discs & block holders to the blank magazine

You can mount blanks and block holders to the blank magazine while the machine is operating.

! To relocate blanks to different blank magazine positions, do not simply swap them around. The blanks in the blank magazine must correspond to the blanks in the virtual blank magazine in DentalCNC.

1. Open the multi-purpose compartment.
2. Move the desired blank magazine slot into the change position via DentalCNC.
3. Pull the clamping lever downwards.

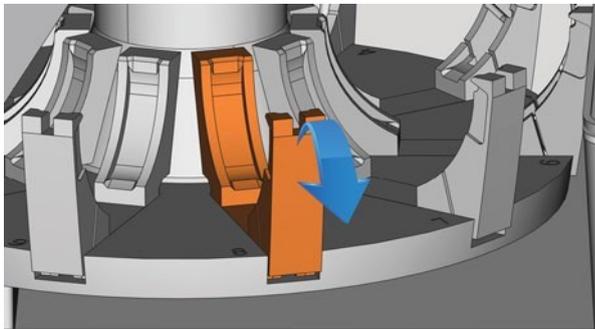


FIG. 50 – PULLING DOWN THE CLAMPING LEVER

4. Remove the blank from the blank changer slot if any.
5. If you want to mount a disc of a height of 40 mm, ensure that the discs in the adjacent blank magazine slots are of a maximum height of 25 mm. Otherwise, the disc will not properly fit into the blank magazine.
6. Correctly orientate the disc or block holder:
 - **Block holder:** The numbers for the block positions 1 – 3 must be on top and the positioning aid of half-height must be in front.
 - **Discs:** If the blank is a multilayer blank, orientate the blank so that the top color layer is on the left side. If the disc has been marked for safer remounting by DentalCNC, ensure that the marking is in the position shown below.

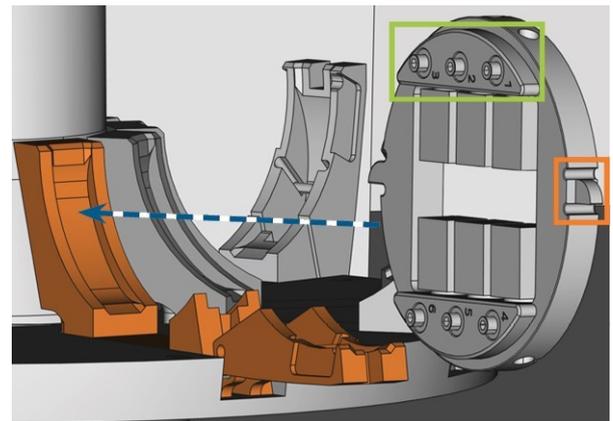
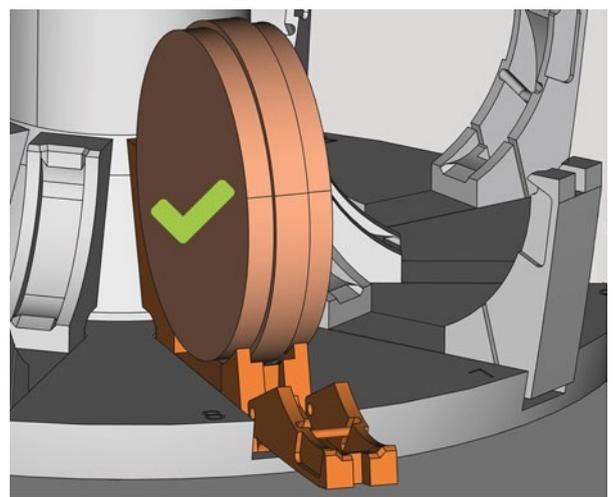


FIG. 51 – (A) INSERTING A DISC INTO THE CHANGE POSITION; (B) INSERTING A BLOCK HOLDER INTO THE CHANGE POSITION (BLOCK POSITIONS 1 – 3 MARKED GREEN, FRONT POSITIONING AID MARKED ORANGE)

7. Insert the blank or block holder into the change position of the blank changer. Ensure that you position it fully upright and not in a slanted position. Otherwise, the loading process will fail.



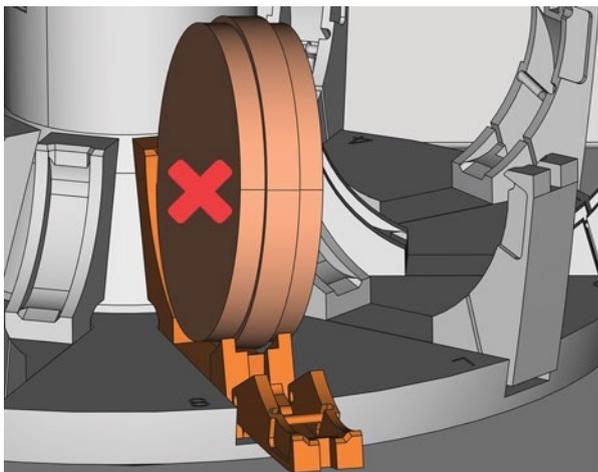


FIG. 52 – (A) A CORRECTLY INSERTED DISC; (B) A DISC IN A SLANTED POSITION

NOTICE

Damaging of the blank, block holder or clamping lever in case of improper handling

If you let the clamping lever snap against the blank or block holder, the clamping lever may damage the blank or block holder and / or the clamping lever may get damaged.

- » **Do not let the clamping lever snap against the blank or block holder.**
- » **lowly guide the clamping lever upwards against the blank or block holder.**

- 8. Immobilize the blank or block holder by guiding the clamping lever against it.**
- 9. To ensure a proper seating, push the blank or block holder slightly downwards.**
- 10. Discs: If the disc has been marked for remounting, slightly rotate the disc until the marking lies in the corresponding opening in the clamping lever (□ Fig. 53 – see below).**

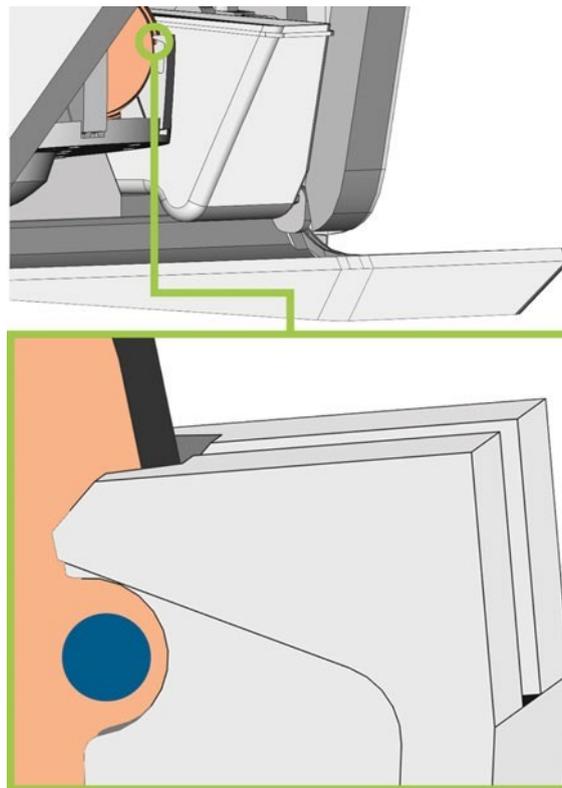


FIG. 53 – THE MARKING FOR REMOUNTING (BLUE CIRCLE) LIES IN THE OPENING IN THE CLAMPING LEVER

- ✓ **The blank or block holder can be loaded into the working chamber.**

Managing tools

NOTICE

Damaging of the spindle or the tool positions if you use improper tools
Improper tools can damage the collet chuck of the spindle and / or the tool positions.

- » Only use tools with a sufficiently large chamfer at the tool shank.
- » Install a retaining ring as a stop ring according to DIN 471-A3.
- » Only insert tools with a maximum diameter of 3 mm at the thickest part into the collet chuck.
- » Only insert tools with a maximum cutting edge diameter of 2.6 mm into the tool magazine.



We recommend original tools as they are designed especially for the designated jobs.

You can insert up to 16 tools into the tool magazine. The tool magazine is removable.



FIG. 54 – TOOL MAGAZINE IN THE WORKING CHAMBER (MARKED ORANGE)

Normally, the machine loads tools from the tool magazine of the machine. In the following cases, this might not be possible:

- A tool magazine position is worn so that it can no longer properly hold a tool
- You use tools which do not fit into the tool magazine

In these cases, you can force a manual tool change in DentalCNC (see the corresponding documentation).



If tool magazine inserts are worn, you should replace them. (□ *Replacing the tool magazine inserts – on page 62*)

Inserting and exchanging tools

You need to insert or exchange tools in the following cases:

- Upon first use of the machine
- After exchanging tool magazine inserts due to wear
- When the tool life of a tool has expired
- When tools are damaged or worn
- If the next jobs require additional / different tools than those in the tool magazine



You can check the remaining tool life of all tools in the Tool management **view in DentalCNC.**

You can equip the tool magazine of your machine in two ways:

- By manually inserting the tools into the tool magazine. This is the fastest way. It is described below.
- Via the spindle – you insert a tool into the collet chuck and the spindle will deposit the tool in the tool magazine. This option takes more time, but might be more convenient for some. It is described in the documentation for the manufacturing software.

You insert tools manually as follows:

1. If you prefer to equip the tool magazine outside of the machine, pull the tool magazine out of the working chamber.

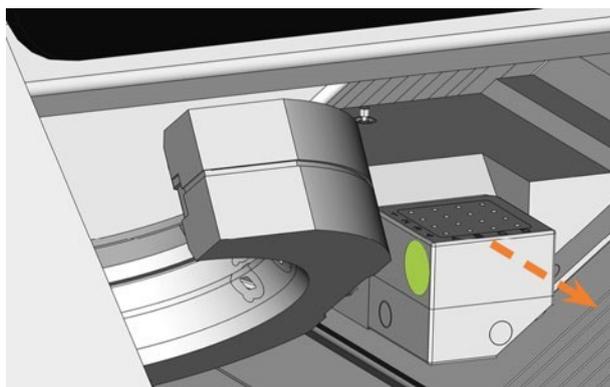


FIG. 55 – PULLING OUT THE TOOL MAGAZINE (LEFT RECESSED GRIP COLORED GREEN)

2. Remove worn or damaged tools from the tool magazine if any.
 3. Insert the new tools:
 - a. Ensure that the positions of the tools in the tool magazine match the tool positions in DentalCNC.
 - b. Insert the tools straight into the tool positions with the cutting edge pointing downwards. Push them in until the ring touches the rubber.
- !** If the positions of the tools in the tool magazine do not match the tool positions in DentalCNC, the machine will use the wrong tool(s) during job execution and the job result will become unusable.
4. After replacing a tool, reset the tool life value. For this, use the Tool management view in DentalCNC.
 5. Plug the tool magazine back onto the tool magazine holder if required.

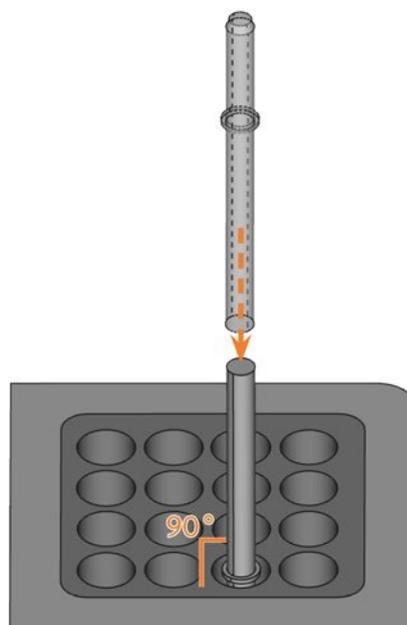
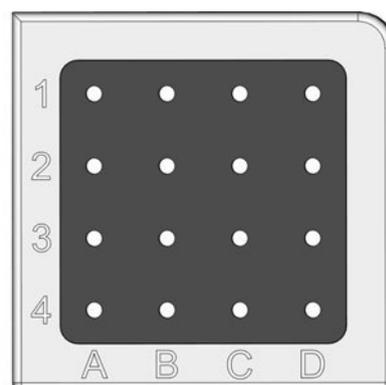


FIG. 56 – INSERTING TOOLS INTO THE TOOL POSITIONS



A1	G240-R-35		C1	U050-F2-40	
A2	G260-T-35		C2	U030-R2-40	
A3	G100-R-35		C3	P250-F1-40	
A4	G060-R-35		C4	P200-R1-40	
B1	G120-T-35		D1	P100-R1-40	
B2	G060-T-35		D2	P200-R2-40	
B3	U120-F2-40		D3	M200-R4-35	
B4	U060-R2-40		D4	P100-R2-40	

FIG. 57 – TOP: TOOL POSITIONS 1 – 16 IN THE TOOL MAGAZINE
 BOTTOM: TOOL POSITIONS 1 – 16 IN DENTALCNC

7 Operation: Executing jobs

You control and start manufacturing with DentalCNC. In this chapter, we will give you a brief overview. For the complete instructions, see the documentation for DentalCNC.

NOTICE

Damaging of the machine when using damaged tools or blanks

If tools or blanks are damaged, parts can break off and damage the machine during job execution.

» Check the blanks and tools thoroughly for damage before every job execution.

When you have prepared your jobs and your machine, you can start machining. Machining is a fully automated process and only requires your attention in case of unexpected events.

! Do not move the machine during job execution, otherwise the results may become imprecise.

Starting jobs

1. Ensure the following:
 - You created a job on your CAM computer. It has been transferred to DentalCNC.
 - All required tools are in the right positions in the tool magazine and are neither worn nor damaged. They have also been added to the virtual tool magazine in DentalCNC.
 - The required blanks are mounted.
 - If using the blank changer, the required blanks are mounted in the blank magazine and are assigned in DentalCNC.
 - For wet machining: There is enough cooling liquid in the cooling liquid tank.
 - The compressed air supply is set correctly.
 - If you wish to work with ionizer: the option Ionizer activated in DentalCNC is activated.
2. Close the working chamber door.
3. For dry machining: If you manually control the suction device, switch it on and set it to the required level.

4. Start machining via the depicted icon in DentalCNC.



Aborting machining

You can abort machining as follows:

1. Select the depicted icon.
2. Confirm the current message.



✓ The following happens:

- a. Machining stops immediately.
 - b. You are prompted to select whether the tool in the spindle can be inserted safely into the tool magazine.
3. If you want the machine to automatically put the tool into the tool magazine, confirm the dialog. If you want to remove the tool manually from the collet chuck, answer the question in the negative.

Removing the tool manually is necessary in case that putting it into the tool magazine would damage the tool magazine inserts. Damaging the tool magazine inserts can, for example, occur if you mill plastics with a blunt tool. This can cause the material to swell and accumulate at the tool blade until the blade diameter is too large for the tool magazine inserts.

✓ Depending on your choice, the spindle either puts the tool into the tool magazine or moves into the tool change position. In the latter case, continue with the next step.

4. Open the working chamber door.

! CAUTION

Risk of injury through fast ejected tools
As soon as the collet chuck opens, any tool in the collet chuck may be ejected into the working chamber very fast if you do not hold in place. The fast ejected tool may hit and injure you.

» Before the collet chuck opens and as long as the collet chuck is open, hold the tool in place by its shank.

CAUTION

Danger of cuts and burns when touching tools with your bare hands. If you handle tools on the cutting surface, you may be injured. As the tool may be very hot, you may also suffer from skin burns.

- » Only touch tools at their shank.
- » When handling tools, wear protective gloves.

5. Hold the tool in the collet chuck in place.
6. Confirm the current message.
- ✓ The following happens:
 - a. The collet chuck opens.
 - b. The current dialog window closes.
 - c. A dialog window opens.
7. Remove the tool from the collet chuck.



FIG. 58 – REMOVING THE TOOL FROM THE COLLET CHUCK

8. Close the working chamber door.
9. Confirm the current message.
- ✓ The following happens:
 - a. The collet chuck closes.
 - b. The working chamber door closes.
 - c. The spindle moves to its default position.

DirectClean Technology

The DirectClean Technology of the CC newCOSMO allows you to process multiple jobs in succession using the blank changer, even alternating between wet and dry jobs. The machine will automatically rinse and / or dry the working chamber.

The rinsing and drying process is triggered by the sequence and type of jobs. You can find the corresponding details in the table below.

Job	followed by	Program	D
Dry job	no job	Blowing off the blank1	1
Wet job	no job	None	-
Dry job	wet or dry job	Blowing off the blank	1
Dry job	no job	Rinsing & drying2	17
Wet job	dry job or no job	Drying	15

- 1 If activated in the DentalCNC settings
- 2 Can be deactivated in the DentalCNC settings

D Duration in minutes

- Blank inserted into the working chamber
- Blank(s) loaded from the blank magazine

It is a good idea to order the jobs in the job list in DentalCNC in such a way that the cleaning time is minimized. We recommend executing all dry jobs followed by all wet jobs.

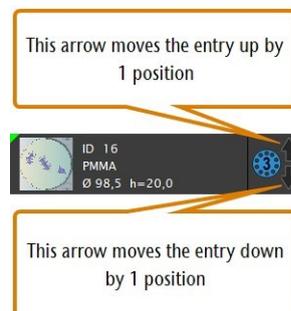


FIG. 59 – REORDERING JOBS IN THE JOB LIST IN DENTALCNC

You can also start the drying program manually.

» To manually start the drying program, select the depicted icon in the Machining view in DentalCNC.



✓ The machine dries the working chamber for 15 minutes.

The built-in ionizer is also part of the DirectClean Technology. It is automatically activated for suitable jobs to make cleaning the working chamber easier.

Job interruptions and job abortions

A job will be *interrupted* in the following cases:

- The compressed air supply is not sufficient
- The vacuum in the working chamber is not sufficient
- The cooling liquid flow rate is not sufficient

An *interrupted* job will normally be continued automatically after the error is corrected.

A job will be *aborted* in the following cases:

- In case of a machine malfunction
- In case of a tool breakage
- In case of a power failure

If a job was *aborted*, you have to restart it.

i DentalCNC allows you to resume the job from the last machining step. For more information, see the corresponding documentation.

How to proceed in case of a job interruption

If the job was interrupted, DentalCNC displays a corresponding message.

If the compressed air is insufficient

» Check the following:

- The manometer of the compressed air regulator
- The installation of the pneumatic hoses
- Your compressor

If the vacuum is insufficient

» Check the suction hose and your suction unit.

If the cooling liquid flow rate is insufficient

1. Check if there is enough cooling liquid in the tank.
2. Check if the cooling liquid and the tank including the filter are clean.

How to proceed in case of a machine malfunction

A machine malfunction is recognized by the internal control unit in case of a critical event. The working chamber will be illuminated in red. DentalCNC displays the error message and error code that was sent by the control unit.

1. Record the error message and error code that is displayed.
2. Restart the machine and the CAM computer. If the problem persists, continue with the next step.
3. Disconnect the machine from the electrical source and prevent it from being restarted.
4. Contact customer service. Have the error message and error code readily available.
5. If you need to remove a blank from the working chamber, perform an emergency opening of the working chamber door.

How to proceed in case of a tool breakage

If a tool breaks during machining, the machine will not recognize this immediately. Instead, the spindle will continue to move with the broken tool. The tool breakage will be recognized upon the following events:

- The next regular tool change
- The next check for broken tools, if activated in the application settings of DentalCNC.

A tool breakage can be caused by the following:

- The tool was damaged or worn
- The tool was put into the wrong tool magazine position or was manually inserted into the spindle at the wrong time. As a consequence, it was not suitable for the processing step.
- The distribution of the objects in the blank ("nesting") was not correct.

If a tool breaks, do the following:

1. Open the working chamber door.
2. Remove all parts of the broken tool from the working chamber and the collet chuck.
3. If the spindle picked up the tool from the tool magazine, check if the tool was inserted into the correct position. Insert a spare tool into the correct position in the tool magazine.
4. If you manually inserted the tool into the collet chuck, check if the broken tool corresponds to

the tool type which you were prompted to insert.
Have a correct spare tool ready.

5. Close the working chamber door. Restart the job.

i DentalCNC allows you to resume the job from the last machining step. For more information, see the corresponding documentation.

💡 If tools break regularly, you can find additional information in the troubleshooting section: (□ *Troubleshooting – on page 67*)

How to proceed in case of a power failure

NOTICE

Damaging of the multi-purpose compartment flap when you open it manually

If compressed air is being conducted through the machine while you open the multi-purpose compartment flap, the flap mechanics may get damaged.

» Before you manually open the multi-purpose compartment flap, close the external compressed air supply valve.

As long as the machine is not powered, you do not have access to the working chamber.

» After a short power failure, restart the machine and the CAM computer.

» If you need to access the working chamber in case of a longer power failure, perform an emergency opening of the working chamber door.

» If you need to access the multi-purpose compartment, do the following:

- a. Close the external compressed air supply valve.
- b. *Carefully* pull the flap down with your hands.



FIG. 60 – MANUALLY PULLING DOWN THE FLAP OF THE MULTI-PURPOSE COMPARTMENT

Emergency opening of the working chamber door

WARNING

Crushing hazard and cutting injuries if the working chamber door is open

If the working chamber door is open during machining, it will not protect users from bruises and cuts.

- » Do not open or close the working chamber door during machining.
- » Never operate the machine with the working chamber door open.
- » Perform the emergency opening only if you are authorized to do so and if you have received training on it.

CAUTION

Cutting injuries when touching a rotating tool

If a power failure or a machine malfunction occurs during machining, the spindle including the inserted tool keeps rotating. If you touch the rotating tool, you will suffer from cutting injuries.

- » Wait until the spindle has stopped rotating before performing an emergency opening.

NOTICE

Improper opening or closing of the working chamber door

To avoid damage, heed the following instructions when you manually open or close the working chamber door.

- » Disconnect the machine from the electrical source.
- » Prevent the working chamber door from twisting by pushing or pulling it with both hands.
- » Only apply as much force as needed to overcome the resistance.

You can perform an emergency opening as follows:

1. Switch off the machine at the main power switch. Disconnect the machine from the electrical source.
- ✓ You can manually open the working chamber door.

-  **The working chamber door should move sluggishly, but evenly. If the movement is jerky or the working chamber door gets stuck, do not use excessive force.**

2. Open the working chamber door by straightly and evenly pushing it upwards with both hands.
3. If the working chamber door can only be moved with very high effort, ensure that the guide rails at the back are clean.

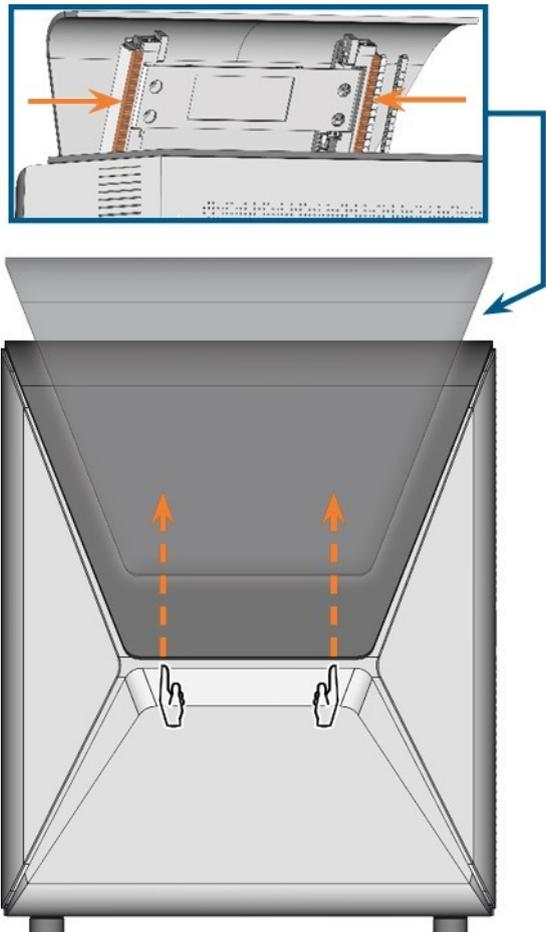


FIG. 61 – EMERGENCY OPENING OF THE WORKING CHAMBER DOOR AND CHECKING THE GUIDE RAILS

4. If the working chamber is wet, leave the working chamber door open so that the working chamber can dry.
5. Close the working chamber door by carefully pushing it downwards with both hands.

Releasing a stuck tool magazine

In case a tool magazine got stuck on the holder, use the screw on the backside of the tool magazine:

1. Use the screw as follows:

- a. Pick up a flat blunt tool (e. g. a slot screw driver)
 - b. Use the tool to remove the protective cap of the screw and put it aside within reach.
 - c. Using the provided allen key, turn the screw to the right.
- ✓ The tool magazine moves backwards and is released.

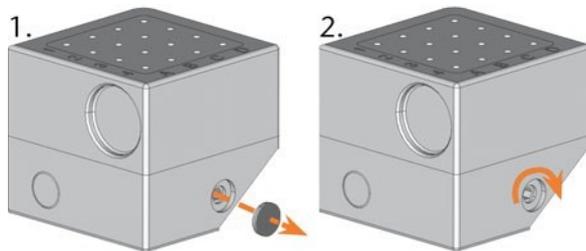


FIG. 62 – REMOVING THE PROTECTIVE CAP (LEFT) AND USING THE SCREW

2. Remove the tool magazine from the working chamber.

3. To reset the screw, do the following:

- a. Using the provided allen key, turn the screw to the left into its original position.
 - b. Cover the screw opening with the protective cap.
- ✓ The screw is reset and the tool magazine is ready to be mounted again.

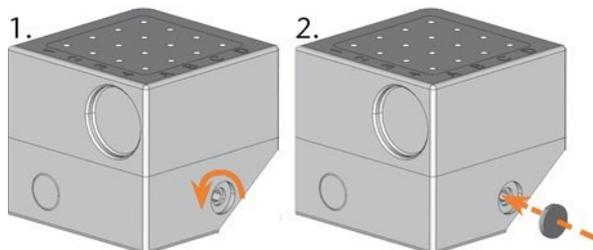


FIG. 63 – RESETTING THE SCREW (LEFT) AND PLACING THE PROTECTIVE CAP

8 Maintenance and do-it-yourself

Some day-to-day basic maintenance and preventive maintenance is essential to keep the machine mechanics and electric components in good condition for proper machining results.

It is your responsibility to make sure that preventive maintenance, as well as basic maintenance, is performed.

You are the only one who can ensure that your machine receives the proper maintenance care. You are a vital link in the maintenance chain.

Basic maintenance

Basic maintenance includes tasks which are part of everyday operation. You are responsible to ensure that these tasks are carried out according to the maintenance table. You only need minimal manual skills for these tasks and most required tools are provided with the machine.

Maintenance section

i The maintenance section is not yet available for this machine. We plan to implement it as soon as possible. Consider this section as advance information.

For your convenience, DentalCNC lists all basic maintenance tasks in the Maintenance section. In the Maintenance section, you can see when the individual tasks are due.

When you have marked a maintenance task as complete, its time interval is reset and the list is updated accordingly.

» When you have performed a maintenance task, mark it as complete in the Maintenance section. This will keep the list up-to-date.

Preventive maintenance

Preventive maintenance for this machine has to be scheduled every 2 years, or after 2,000 operating hours at the latest.

» To schedule preventive maintenance, contact customer service.

Where to get service?

Customer service is your main contact for all service related questions. They will provide you with spare parts, maintenance tips and they will perform preventive maintenance for you on request.

» When your machine is delivered or installed, ask the service technician for contact details for the customer service team. We also recommend scheduling the first preventive maintenance appointment at this point to ensure your machine gets proper maintenance.

Definition of wear parts

The machine and the extra equipment are warranted for a period of 24 months or 2,000 operating hours, whatever comes first. The warranty covers defects in materials or fabrication as long as the regulations for using the machine in all documents are followed.

Of course, the warranty also covers wear parts as long as their failure cannot be attributed to the function-related abrasion. The wear parts that are mentioned in the maintenance table can already wear down within the warranty period due to their normal function. The average useful life of the wear parts can be seen in the maintenance table.

Use these values to determine operating costs, to plan your spare part stock as well as to create individual maintenance and service plans.

Maintenance table

□ page 64

Cleaning the working chamber

Cleaning the working chamber includes the following components:

- Measuring key
- Blank holder
- View window
- Webcam
- Tool magazines
- Tool magazine holder

These components have different maintenance intervals according to the maintenance table. Therefore, you should perform a daily and a weekly cleaning of the working chamber and clean the components which need cleaning.

» When performing the weekly cleaning, also perform the daily cleaning.

CAUTION

Breathing difficulties caused by processing dust

Processing dust that gets into your lungs can cause breathing difficulties.

» Clean the machine only if the air extraction system is properly installed and activated.

» Wear a face mask of class FFP2 during the entire cleaning

NOTICE

Damaging of the linear guides or the spindle when cleaning with compressed air or ultrasound

If you clean the working chamber with compressed air or ultrasound, material chips can reach the linear guides or the spindle bearings.

» Never clean the working chamber with compressed air or ultrasound.

 Do not pour additional water into the working chamber. The cooling liquid tank may overflow.

 We recommend cleaning the working chamber after all other required maintenance tasks.

Performing the daily cleaning

1. **Have ready:**
 - A wet cloth
 - A mild cleaning agent (optional)
 - A wet brush for the measuring key
2. **Close the working chamber door.**
3. **Move the spindle to the cleaning position by selecting the depicted icon in the Machining view in DentalCNC.** 
4. **Open the working chamber door.**
5. **Lift the protective strip at the left side and pull it out of the machine. Clean it thoroughly.**

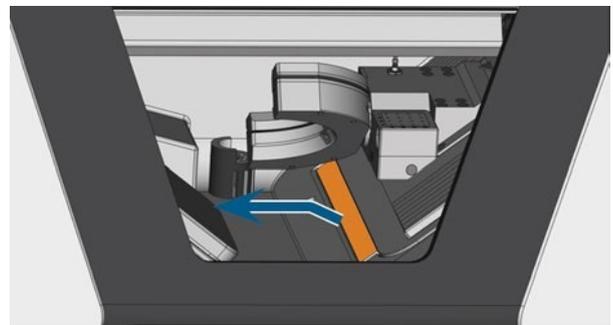


FIG. 64 – REMOVING THE PROTECTIVE STRIP (MARKED ORANGE)

6. **Clean all surfaces and cracks in the working chamber thoroughly with a wet cloth. Use a mild cleaning agent if necessary.**
7. **Clean the measuring key with the wet brush.**
 - a. **Clean every opening of the protective cage (marked orange) with the wet brush.**
 - b. **Clean the measuring key from all sides with the wet brush, reaching into the openings of the protective cage.**
 - c. **Clean the protective cage with a cloth.**

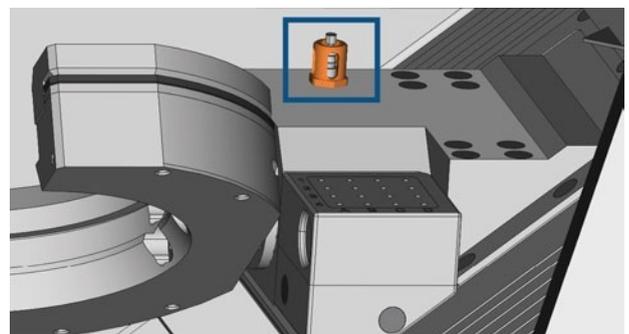


FIG. 65 – MEASURING KEY (MARKED ORANGE)

8. Thoroughly clean the blank holder from all sides with a brush. Especially clean all openings and movable parts of the blank holder.
9. Allow the working chamber to dry.
10. Install the protective strip in the working chamber:
 - a. Orient the protective strip so that the magnets (marked orange) are on the right bottom side.

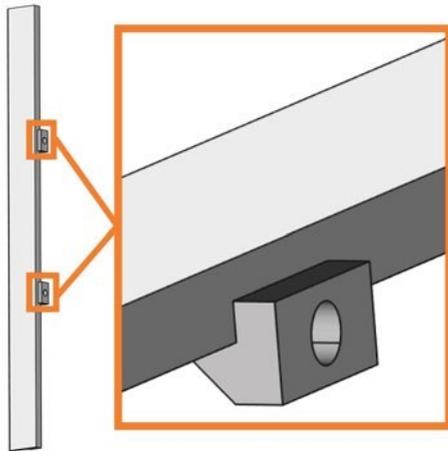


FIG. 66 – CORRECT ORIENTATION OF THE PROTECTIVE STRIP FOR INSTALLATION

- b. Align the right and the bottom edge of the protective strip (colored green) with the imaginary orange lines which are depicted in the following illustration:

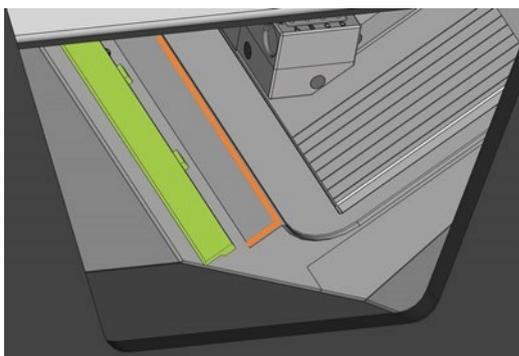


FIG. 67 – ALIGNING THE PROTECTIVE STRIP (COLORED GREEN) BEFORE INSTALLATION

- c. Push the protective strip to the right until it snaps in place.

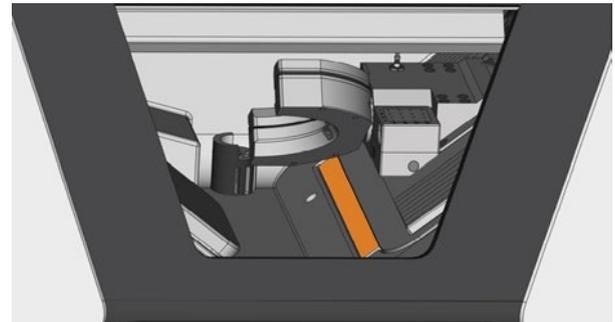


FIG. 68 – CORRECTLY INSTALLED PROTECTIVE STRIP (MARKED ORANGE)

- ✓ The protective strip is immobilized by the magnets.

11. Close the working chamber door.
12. Move the spindle to the default position by selecting the depicted icon in the Machining view in DentalCNC.



Performing the weekly cleaning

1. Have ready: The cleaning brush for the blank holder.
2. Close the working chamber door.
3. Move the spindle to the cleaning position by selecting the depicted icon in the Machining view in DentalCNC.
4. Open the working chamber door.
5. Remove the tool magazine from the working chamber. Clean it with the cloth and the brush.
6. Clean the tool magazine holder with its respective brush.
7. Apply a bit of collet chuck grease to the bolts of the tool magazine holder.



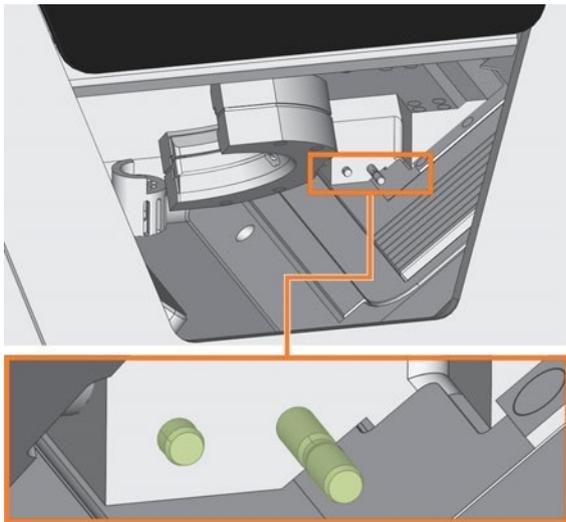


FIG. 69 – THE BOLTS OF THE MAGAZINE HOLDER (COLORED GREEN)

- 8. Plug the tool magazine onto the holder.**
- 9. Screw the protective cap off the webcam and clean the inside of the cap with a dry cloth.**

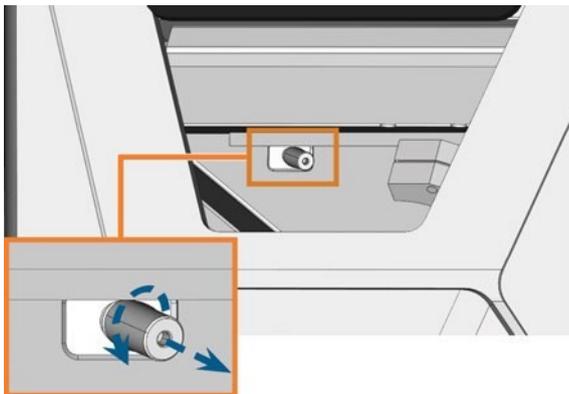


FIG. 70 – SCREWING THE PROTECTIVE CAP OFF THE WEBCAM

- 10. Clean the webcam with a wet cloth. Screw on the protective cap.**
- 11. Continue with cleaning the following components:**
 - **The view window**
 - **The multi-purpose compartment**

Cleaning the view window

To easily clean the view window to the working chamber, you can fold the working chamber door upwards.

1. Have ready:
 - A wet cloth
 - A mild cleaning agent (optional)
2. Open the working chamber door.
3. Grab the working chamber door at the middle of the lower edge and fold it upwards.

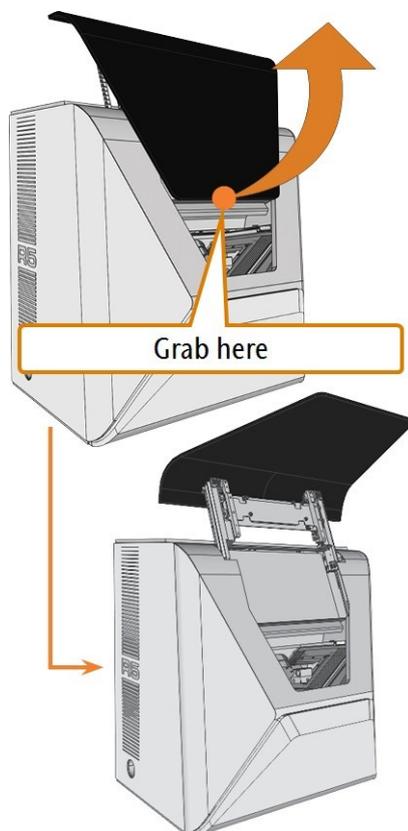


FIG. 71 – FOLDING THE WORKING CHAMBER DOOR UPWARDS

4. Clean the inside of the view window with a wet cloth. If necessary, use a mild cleaning agent.

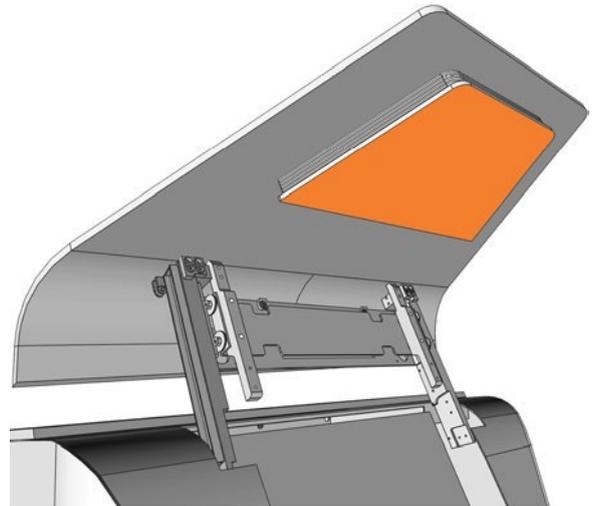


FIG. 72 – THE VIEW WINDOW (MARKED ORANGE)

5. Grab the working chamber door in the middle of the bottom edge and fold it downwards.
- ✓ The working chamber door is locked in place.
6. Close the working chamber door.
7. If DentalCNC displays a message that you need to fold down the working chamber door, the door is not completely fold down. Repeat steps 5 and 6.
8. If necessary, clean the outside of the view window with a wet cloth. If necessary, use a mild cleaning agent.

Cleaning the multi-purpose compartment

Cleaning the multi-purpose compartment is important because otherwise machining debris will damage sensitive machine parts.

1. Open the multi-purpose compartment.
2. Remove all items from the blank magazine.
3. Clean the blank magazine. Clean the clamping levers very thoroughly.
4. Remove the cooling liquid tank.
5. Clean all surfaces in the multi-purpose compartment.

Cleaning the collet chuck

NOTICE

Damaging of the spindle when cleaning with compressed air

If you clean the collet chuck with compressed air or ultrasound, the spindle bearings can be damaged.

» **Clean the collet chuck only with the appropriate service set.**



FIG. 73 – SPINDLE SERVICE SET

1. Cleaning brush
2. Knurled nut
3. Tube of collet chuck grease
4. Cleaning cone

To clean the collet chuck do the following:

1. **Have the spindle service set ready.**
2. **Open the working chamber door.**
3. **Open the collet chuck by selecting the depicted icon in the Machining view in DentalCNC.** 
4. **Put the knurled nut to the spindle with one hand. With the other hand insert the measuring pin into the collet chuck and keep holding it.**

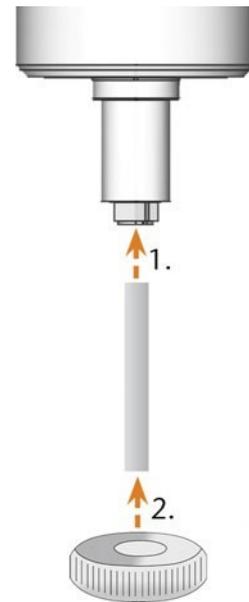


FIG. 74 – UNSCREWING THE COLLET CHUCK

5. **Loosen the collet chuck with the knurled nut. Unscrew the collet chuck with your hand or with the knurled nut.**
6. **Remove the measuring pin from the collet chuck. Then put it aside within reach together with the knurled nut.**
7. **Clean the inner cone of the spindle with the cleaning cone of the service set.**

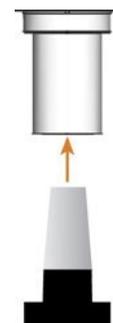


FIG. 75 – CLEANING THE INNER CONE OF THE SPINDLE

8. **Clean the collet chuck with the brush of the service set.**

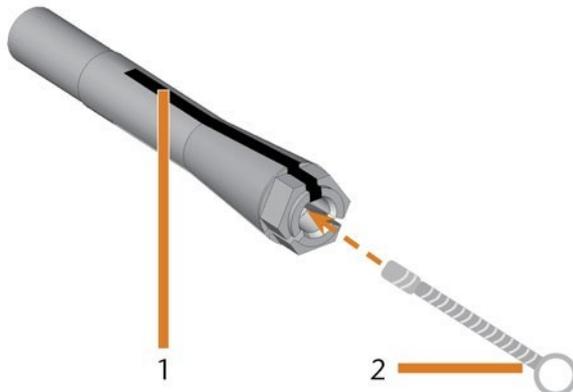


FIG. 76 – CLEANING THE COLLET CHUCK

1. Longitudinal slot
2. Cleaning brush

NOTICE

Damaging of the spindle when using the wrong grease or applying the grease incorrectly

If you use unsuitable grease or if grease gets into the longitudinal slots of the collet chuck, the machine may get damaged.

- » Ensure that no grease gets into the longitudinal slots of the collet chuck.
- » Only use a very small, about pinhead-size amount of the grease.
- » Only use the provided grease of the service set.

9. Put a small amount of the collet grease on the index finger and smear it with the thumb.
10. Apply the smeared collet grease to the flanks of the collet chuck.



FIG. 77 – GREASING THE COLLET CHUCK; SURFACE IN WHICH GREASE IS TO BE APPLIED IS MARKED IN BLUE; SLOT THAT MAY NOT BE GREASED IS MARKED IN RED

11. Insert the measuring pin into the collet chuck with one hand and keep holding it. Screw the collet chuck with the knurled nut in your other hand tightly into the spindle.

! Turn the knurled nut as far as you can so that the collet chuck is properly seated in the spindle. Otherwise rotational imperfections can occur during operation which will worsen your processing results

12. Remove the measuring pin from the collet chuck and store it together with the other components of the spindle service set.
13. Clean the nozzle plate.

Cleaning the nozzle plate

You should clean the nozzle plate every time you clean the collet chuck.

1. Have the interdental brush ready.
2. Open the working chamber door.
3. Clean the ring of 9 holes in the inner area of the nozzle plate. For this, move the interdental brush up and down.



If necessary, apply some water with a cleaning agent and let it sit for some minutes.



FIG. 78 – CLEANING THE NOZZLE PLATE; NOZZLES MARKED ORANGE

Exchanging the carbon filter

The cooling liquid tank of your machine is equipped with a cooling liquid filter that consists of different filter components, including the carbon filter. The carbon filter contains activated carbon pellets that you need to exchange regularly.

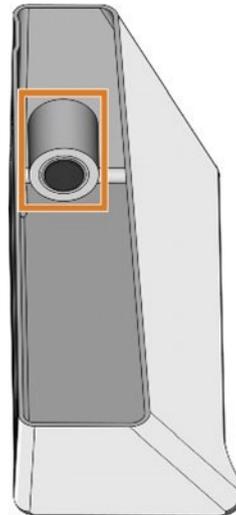


FIG. 79 – COOLING LIQUID FILTER IN THE TANK

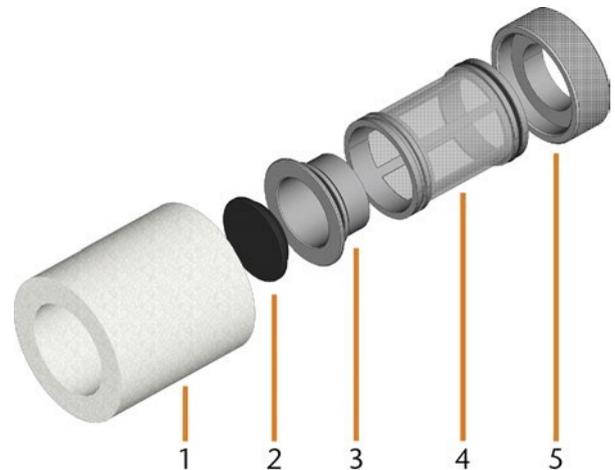


FIG. 80 – THE COMPONENTS OF THE COOLING LIQUID FILTER

1. Fine filter
2. Carbon filter cap
3. Carbon filter
4. Mesh filter
5. Filter socket

To exchange the activated carbon pellets in the filter, do the following:

1. Empty and clean the cooling liquid tank.
2. Remove the fine filter by stretching the top end a bit and straightly pulling it off the filter with both hands.

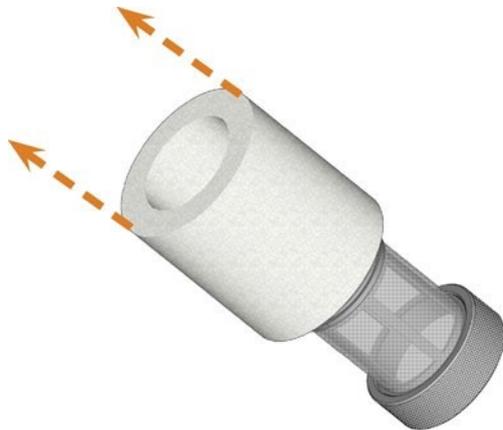


FIG. 81 – REMOVING THE FINE FILTER

3. Clean the fine filter under running water. If the fine filter is too soiled for proper cleaning, replace it with a new one when reassembling the filter.
4. Remove the carbon filter by straightly pulling it off the filter.

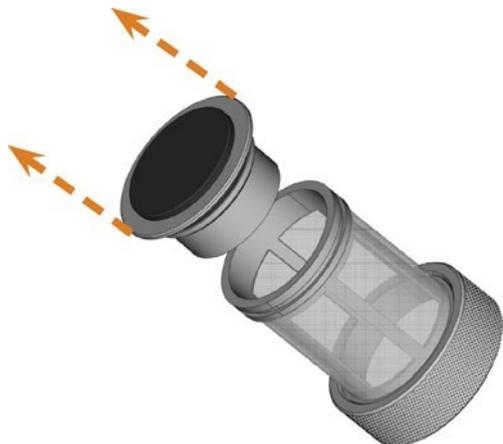


FIG. 82 – REMOVING THE CARBON FILTER

! If you tilt the filter or move it abruptly in the next step, you may spill the activated carbon pellets.

5. Carefully lift the carbon filter cap with your fingernail or a flat blunt tool and pull it off the carbon filter.



FIG. 83 – OPENING THE CARBON FILTER

6. Empty the filter and dispose of the activated carbon pellets.
7. Clean the carbon filter and dry it with a cloth.
8. Fill new activated carbon pellets into the carbon filter.

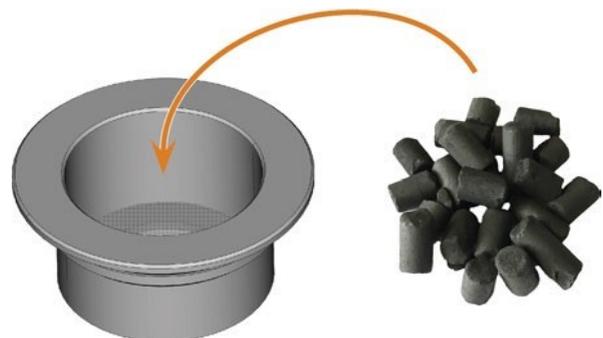


FIG. 84 – REPLACING THE ACTIVATED CARBON PELLETS

9. Firmly close the carbon filter with the cap.
10. If the filter mesh is soiled, pull it off the cooling liquid filter and rinse it under running water.
11. Reassemble the cooling liquid filter. Make sure that the fine filter covers the *complete* filter.
12. Fill new cooling liquid into the tank.

Exchanging the coupling of the cooling liquid tank

1. Empty the cooling liquid tank.
2. Unscrew the filter in the cooling liquid tank with your hand. Put the filter aside.

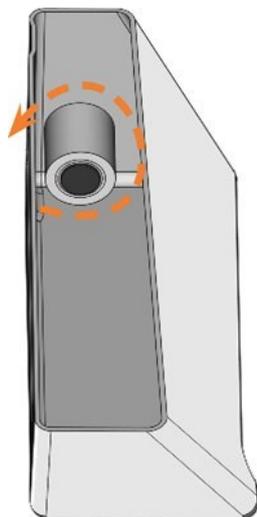


FIG. 85 – UNSCREWING THE FILTER IN THE COOLING LIQUID TANK

3. Push the coupling out of the tank.



FIG. 86 – PUSHING THE COUPLING OUT OF THE TANK

4. Thoroughly clean the cooling liquid tank. Especially clean the sealing surface around the opening for the coupling.

! If the surface around the opening for the coupling is soiled, the sealing ring on the coupling will not properly seal the tank and liquid will leak.

5. Insert the spare coupling into the designated opening as shown in the following figure.

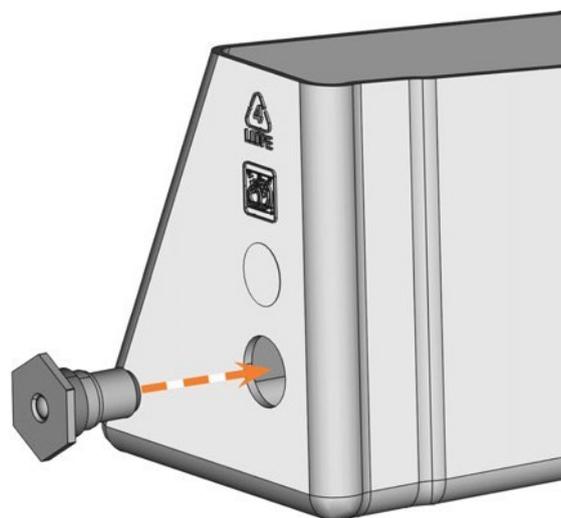


FIG. 87 – INSERTING THE SPARE COUPLING INTO THE COOLING LIQUID TANK

6. Screw down the filter onto the coupling with your hand. Do not tighten the filter completely yet.

! If you tighten the filter now, you may damage the new coupling when you attach the tank to the machine. As a result, the coupling will no longer be water tight.

7. Reinsert the cooling liquid tank until the tank is properly attached to the machine.
8. Pull the cooling liquid tank out of the machine again.
9. Tighten the filter completely.
10. Fill new cooling liquid into the tank.

Checking the compressed air regulator

NOTICE

Damaging of the machine when compressed air is contaminated

Compressed air that does not fulfill the guidelines for purity according to ISO 8573-1 can damage the machine.

- » Check the water separator of the compressed air regulator daily for contamination.
- » **Never use the machine if there is water, oil or solid particles in the water separator.**

Checking the water separator for condensate

Condensate in the separator usually points to compressed air not being dry enough.

1. Check if water, oil or solid particles piled up in the water separator.
2. If this is the case, switch the machine off immediately and proceed as follows.
3. Check the compressed air supply and make sure that the compressed air fulfills the requirements for air purity according to ISO 8573-1. Do not use the machine until the compressed air fulfills this requirement.
4. Drain the water separator by turning the discharge screw counter-clockwise.
- ✓ The condensate is blown out downwards under pressure.
5. Close the discharge screw again by turning it clockwise.

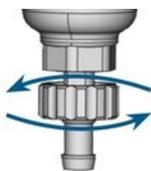


FIG. 88 – OPENING / CLOSING THE DISCHARGE SCREW OF THE COMPRESSED AIR REGULATOR

Exchanging / cleaning the contaminated filter cartridge

You have to clean or exchange the filter cartridge in the water separator in case of strong contamination.

! A strongly contaminated cartridge can lead to a pressure loss.

If the compressed air fulfills the requirements for air purity according to ISO 8573-1, the filter cartridge usually does not have to be changed.

- » If the filter cartridge is contaminated, check the purity of your compressed air.

You exchange or clean the filter cartridge as follows:

1. Disconnect the machine from the compressed air supply.
2. Unscrew the bowl of the water separator.
3. Unscrew the filter screw below the filter cartridge.
4. Pull out the filter cartridge and clean it if necessary.

i A new filter cartridge is available as spare part from customer service.

5. Insert the new or cleaned filter cartridge and reassemble the water separator.

Cleaning the housing

NOTICE

Damaging of the housing when using an unsuitable cleaning agent

If you use an unsuitable cleaning agent and/or cleaning tool for cleaning the machine housing, the surface or the adhesive foil can get damaged.

- » To avoid scratches, only use a microfiber cloth to clean the housing.
- » Take care of the adhesive symbols so that they do not peel off. The adhesive foil is especially sensitive to rubbing and strong cleaning agents.
- » If the usage of a special cleaning agent is necessary to eliminate certain dirt, we recommend checking the suitability of the cleaning agent at a hidden place of the part first.

1. Clean the surface with a dry microfiber cloth.
2. If some dirt cannot be removed this way, moisten the cloth. Use a pH neutral cleaning agent if necessary.

Exchanging the main fuse

The internal power supply of the machine has a main fuse that is accessible from the outside and can be replaced if necessary.

» As a replacement fuse, only use a fuse of the following type: T6,3A L250V

i A new main fuse is available as spare part from customer service.

1. Switch off the machine at the main power switch.
2. Remove the power cord from the connection panel.
3. Remove the cover of the fuse.

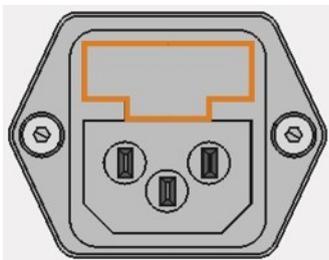


FIG. 89 – COVER OF THE FUSE (MARKED ORANGE)

4. Remove the defective fuse and replace it with a new fuse.
5. If you do not have a replacement fuse ready, take the replacement fuse from the right side of the fuse cover and put it into the left side of the fuse cover.
6. Remount the fuse cover.

Calibrating the axes

NOTICE

Deterioration of machining results caused by an incorrect calibration

At delivery, your machine is already calibrated. As long as your machining results are accurate, a new calibration is not necessary. A calibration takes much time and will deteriorate the machining results if it is improperly executed.

- » In case of inaccurate machining results, try adjusting the machining conditions first: Check the fixation and quality of the blank and the state of the tool.
- » Before **calibrating the machine**, contact customer service.
- » Be very careful **when measuring and entering data during calibration**. When in doubt, abort the calibration.

By calibrating the machine with test and calibration specimens, it may be possible to improve the machining results.

i The documentation for the manufacturing software contains all information on calibrating the machine. Therefore, you will only find information specific to this machine in this document.

Your machine is delivered with a calibration set. It contains the following parts:

- Calibration blanks which are used to mill calibration and test specimens
- A tool for milling the calibration or test specimens
- A micrometer for measuring the machining precision

You can calibrate the machine as follows:

1. Have the calibration set readily available.
2. Mount the calibration blank into the blank holder.
3. Follow the instructions on calibrating the machine in the documentation for DentalCNC.
4. Keep all parts of the calibration set except used calibration blanks for further use.

Replacing the tool magazine inserts

When tool magazine inserts are worn, they should be replaced. New inserts are delivered without holes for the tools. The holes must be drilled into the inserts with the machine.

- Your machine comes with tool magazine inserts as spare parts and with the drill tool.
- Additional inserts and drill tools are available via customer service.

i The documentation for the manufacturing software contains step-by-step instructions for drilling the holes into the inserts. Below you find a description of how to replace the tool magazine insert in the machine.

You can replace tool magazine inserts as follows:

1. Have the spare tool magazine insert readily available.
2. Open the working chamber door.
3. Pull the tool magazine out of the working chamber.
4. Remove all tools from the tool magazine.
5. Unscrew the 4 screws on the bottom side of the tool magazine (□ Fig. 90 – see below, □ Fig. 91 – see below, step 1).

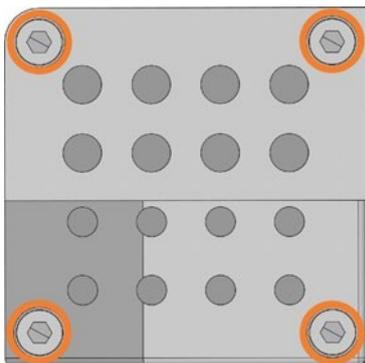


FIG. 90 – THE 4 SCREWS ON THE BOTTOM SIDE OF THE TOOL MAGAZINE (MARKED ORANGE)

6. Lift the cover off the magazine (□ Fig. 91 – see below, step 2).
7. Remove the existing tool magazine insert (□ Fig. 91 – see below, step 3) and replace it with a new one.
8. Put the cover back onto the tool magazine and screw it down.

9. Remount the tool magazine in the working chamber.
10. Follow the instructions in the documentation for DentalCNC and drill the tool positions using the provided drill bit.

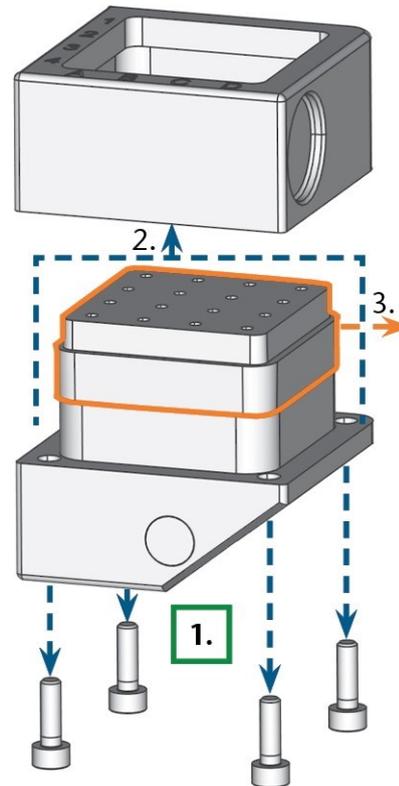


FIG. 91 – DISASSEMBLING THE TOOL MAGAZINE AND REMOVING THE INSERT

Updating the software and firm-ware

Updating the firmware of the machine

The firmware is the internal control software of your machine. New versions may introduce new functions and improve existing ones. New firmware versions come as part of new versions of DentalCNC.

NOTICE

Damaging of the control unit when a firmware update is interrupted

If the firmware update is interrupted, the control unit of the machine may become permanently damaged.

- » Only update the firmware if a permanent electrical supply of the machine and the computer is guaranteed.
- » Only update the firmware if the computer's operating system is stable and is free of malware.
- » Only update the firmware if the connection between the computer and the machine is stable. Always use a wired connection during the update.
- » Do not disconnect the machine or the computer from the electrical source nor switch off the machine or computer during a firmware update.
- » Do not close DentalCNC during a firmware update.

If the version of DentalCNC that is installed contains a newer firmware, you will be prompted to update the firmware when you start machining. The firmware update should take 5–15 minutes to complete.

1. To update the firmware, confirm the message. You can cancel the message to postpone the update, but we recommend updating the firmware immediately.
2. Wait until the update is complete.
3. Switch off the machine at the main power switch.
4. Restart the machine.

Updating the manufacturing software

DentalCAM and DentalCNC are updated regularly.

If an update is available:

1. Switch to DentalCNC on the CAM computer.
- ✓ DentalCNC informs you in the info area that an update is available.

2. Update the software by clicking on the depicted icon in the bottom right corner of the DentalCNC window.



- ✓ DentalCNC closes and the required installation wizards launch.
3. Follow the installation wizards instructions.
 4. Start DentalCNC.
 5. For more information see the documentation for the manufacturing software.

Maintenance table

Several times per day

Task	Recommended interval	Procedure / Parts	Tool illustration
Checking the external compressed air lines for damage	Before switching on the machine	Visual check	
Checking the suction hose for damage	Before switching on the machine	Visual check	
Checking the cooling liquid	If the flow rate is insufficient	Visual check; exchange liquid if necessary	

Once per day

Task	Recommended interval	Procedure / Parts	Tool illustration
Checking the compressed air regulator (□ page 60)	Before work Clean or exchange cartridge in case of visible contamination or every 2 years		
Daily cleaning of the working chamber (□ page 51)	After work If soiled	Wet cloth	
Exchanging the cooling liquid and cleaning the tank (□ page 33)	10 operating hours	Brush, Water, Cooling liquid	

Once per week

Task	Recommended interval	Procedure / Parts	Tool illustration
Weekly cleaning of the working chamber (□ page 51)	Once per week If soiled	Wet cloth, Dry cloth, Brush, Collet chuck grease	
Cleaning the multi-purpose compartment (□ page 54)	Once per week If soiled	Wet cloth, Dry cloth	
Cleaning the view window (□ page 54)	Once per week If soiled	Wet cloth, Dry cloth	
Cleaning the collet chuck (□ page 55)	Once per week In case of rotational imperfections	Spindle service set, Collet chuck grease, Interdental brush	
Cleaning the nozzle plate (□ page 57)	Once per week In case of irregular spray patterns	Interdental brush	

Every 4 weeks

Task	Recommended interval	Procedure / Parts	Tool illustration
Exchanging the carbon filter (□ page 57)	Every 4 weeks	Exchange after rinsing the cooling liquid system	

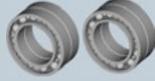
When necessary

Task	Recommended interval	Procedure / Parts	Spare part illustration
Updating the software and firmware (□ page 63)	When an update is available		
Cleaning the housing (□ page 60)		Microfiber cloth, Water, Mild cleaning agent (optional)	
Exchanging the main fuse (□ page 61)		Replacement fuse T6,3AL250V	

Wear parts that you can exchange yourself

Wear part	Recommended interval	Procedure / Parts	Spare part illustration
Tool magazine inserts (□ page 60)	1,000 operating hours* Every year*		
Coupling of the cooling liquid tank (□ page 59)	1,000 operating hours* Every year*		
Collet chuck (□ page 55)	1,000 operating hours* Every year*	Removing & inserting the collet chucks (old/new) as during cleaning	

Wear parts that customer service exchanges for you

Wear part	Recommended interval	Procedure / Parts	Spare part illustration
2 x Cooling liquid pump	2,000 operating hours*		
Spindle bearings (requires spindle exchange by customer service)	2,000 operating hours*		

*These are recommendation guidelines. Depending on the processing material and how well the machine is cleaned, these values may differ.

9 Disposal

Disposing of the cooling liquid

When disposing of the cooling liquid / machining residues, obey the following regulations.

- » **Avoid entry of hazardous machining residues into the soil, water or into sewers.**
- » **Dispose of the machining residues as described by the manufacturer of the material.**
- » **Obey the national and local laws of the disposal location in any case.**
- » **If necessary, have the machining residues disposed of by an approved disposal company.**
- » **If necessary, have the cooling liquid and machining residues disposed of by an approved disposal company.**
- » **Keep a reference sample of the disposal product for at least 6 months.**
- » **If you dispose of the cooling liquid yourself, do as follows:**
 - a. **Completely filter the machining residues out of the used cooling liquid.**
 - b. **Dispose of the liquid via the sewers.**
 - c. **Dispose of the solid machining residues as described by the manufacturer of the material.**

Disposing of the machine

The machine must not be disposed of with the residual waste. This is indicated by the icon which depicts a crossed out trashcan. In the European Union (EU), this is in accordance with Directive 2012/19/EU.



We will dispose of the machine at no cost. The owner will bear the costs for disassembly, packaging and transport.

- » **Before sending in the machine for disposal, contact customer service.**
- » **If you dispose the machine yourself, obey the national and local laws of the disposal location.**
- » **If necessary, have the machine disposed of by an approved disposal company.**

Dismantling, transport and packaging

□ page 9

10 Troubleshooting

In case something is not working as intended, take a look at the following troubleshooting guide.

NOTICE

Machine damage due to improper troubleshooting

In case of improper troubleshooting, your machine may get damaged.

- » If you are unsure of how to perform certain steps during troubleshooting or cannot solve the problems, abort the troubleshooting and contact customer service.

Additional symbols in this chapter

- ❓ Question to narrow down the problem
- 💬 Suggested solution

I cannot open the working chamber door

- ❓ Is the machine operating?

While the axes are moving, you cannot open the working chamber door.

- 💬 If applicable:

- » Wait until the machine has finished.

- ❓ Has a power failure occurred at the installation site of the machine?

- 💬 If applicable:

- » Depending on the duration of the power failure, restart the machine or perform an emergency opening.

- ❓ Is electricity available at the installation site of the machine?

- 💬 If applicable:

1. Connect the machine to the electrical source.
2. Switch on the machine at the main power switch.
3. If the working chamber lighting does not illuminate, check if the power cable is properly seated in the machine and is connected to the electrical source.
4. Try connecting the machine to a different socket.

- ❓ Is the door blocked?

- 💬 If applicable:

1. Check if the guide rails at the back of the working chamber door are free from dirt.
2. Switch on the machine at the main power switch.

3. If the working chamber lighting does not illuminate, check if the power cable is properly seated in the machine and is connected to the electrical source.
4. If the machine is not powered, perform an emergency opening when necessary.

I have installed all components, started the software but the machine does not reference

- ❓ Is the working chamber door open?

The machine does not reference with the working chamber door open.

- 💬 If applicable:

- » Close the working chamber door.

- ❓ Is an Ethernet cable connected to the machine?

- 💬 If applicable:

- » Check if the Ethernet cable is properly seated in the connector and is undamaged. If possible, use the provided cable.

- ❓ Is the working chamber illuminated in red? In this case a machine malfunction occurred.

- 💬 If applicable:

1. Restart the machine.
2. If the working chamber continues to be illuminated in red, contact customer service.

The machining results are not satisfactory and / or tools keep breaking

- ❓ Do the tool positions in the Tools section correspond to the tools in the respective tool magazine?

If not, the machine uses the wrong tools during job execution.

- 💬 How to check this:

1. In DentalCNC, compare the tool positions in the with the tools in the corresponding tool magazine.
2. Replace the wrong tools in the tool magazine with the correct ones.

- ❓ Is the blank properly mounted?

- 💬 How to check this:

- » Remove the blank and remount it. If using blocks: The groove of blocks has to properly sit on the corresponding positioning pin.

❓ Are bolts, fixing mechanisms, gaps and openings of the blank holder contaminated by processing dust?

🗨️ If applicable:

» Clean the mentioned components thoroughly.

❓ Is the measuring key contaminated?

🗨️ If applicable:

» Clean the measuring key with a brush.

❓ Are the tools worn?

🗨️ How to check this:

1. Visually inspect all tools.
2. Check the tool life values in DentalCNC.
3. Replace worn tools with new ones.

❓ Do rings on the tools sit in the groove on the tool shank?

🗨️ How to check this:

» Visually inspect all tools and push rings that have moved into the groove again.

❓ Are the tool magazine inserts worn?

🗨️ If applicable:

» Replace the tool magazine inserts with new ones.

❓ Do the parameters of the job in the software correspond to the parameters of the blank?

🗨️ How to check this:

» Make sure that the following parameters of the job and of the blank in the machine correspond to each other. Also make sure that they are suitable for the objects that you want to machine.

- Material type
- Blank dimensions
- Indications (types) of the individual objects

❓ Do you use the latest version of the manufacturing software that is released for the machine?

If an update is available:

1. Switch to DentalCNC on the CAM computer.
 - ✓ DentalCNC informs you in the info area that an update is available.
2. Update the software by clicking on the depicted icon in the bottom right corner of the DentalCNC window.
 
- ✓ DentalCNC closes and the required installation wizards launch.
3. Follow the installation wizards instructions.
4. Start DentalCNC.

5. For more information see the documentation for the manufacturing software.

❓ Are the object files of sufficient quality?

🗨️ How to check this:

1. Check the quality of object files (STL files) in your CAD application or an STL viewer. Especially, consider the manufacturer information on wall thickness and border thickness.
2. If necessary, adjust the settings of your scanner and scan application.

❓ Is the collet chuck of the spindle contaminated or is it loosely seated in the spindle?

🗨️ If applicable:

1. Clean the collet chuck with the provided spindle service set.
2. When you insert the collet chuck into the spindle, make sure that it is properly seated.

❓ Did you exchange the collet chuck at the recommended interval?

🗨️ How to check this:

» Verify the recommended interval for exchanging the collet chuck in the maintenance table. If necessary, exchange the collet chuck.

The computer displays that the flow rate is too low

i You can resolve this problem while the job execution is interrupted. DentalCNC continues the job as soon as the problem is resolved.

❓ Is cooling liquid lacking in the tank? Is the cooling liquid soiled?

🗨️ If applicable:

» Clean the tank. Fill in clean cooling liquid.

❓ Is the filter in the cooling liquid tank clogged?

🗨️ If applicable:

» Clean the filter and the tank. Fill in clean cooling liquid.

❓ Are the liquid nozzles in the working chamber clogged?

🗨️ If applicable:

» Clean the nozzles with the inter-dental brush.

The computer interrupts the job and displays that the air pressure is too low

i You can resolve this problem while the job execution is interrupted. DentalCNC continues the job as soon as the problem is resolved.

? Is the compressed air regulator properly set?

» Set the air pressure at the compressed air regulator to a value between 6 bar (90 psi) and 8 bar (120 psi) (recommended: 7 bar (100 psi)).

? Is the error caused by the external compressed air supply system?

? How to check this:

1. Close the main external compressed air supply valve.
2. Check if all pneumatic hoses are properly seated in their connections and are undamaged.
3. Check if your compressor is switched on and set correctly.
4. Open all required valves of your compressed air supply system.

? Does the air pressure fluctuate significantly so that jobs are frequently interrupted?

? If applicable:

1. Verify that your compressor can *permanently* generate at least 6 bar (90 psi) air pressure with a volume flow of 100 l/min (3.5 cfm).

i Note every compressor is designed for commercial use with dental machines.

2. If necessary, replace your compressor with one that meets the recommendations.

The computer interrupts the job and displays that the vacuum is too low

i You can resolve this problem while the job execution is interrupted. DentalCNC continues the job as soon as the problem is resolved.

? Is the suction unit switched on and operating?

? How to check this:

1. Check if the suction hose is properly seated in the corresponding opening and is undamaged.

2. If the machine controls the suction unit:

- a. Check if the switching unit or data cable is properly installed.
- b. Try operating the suction unit without the switching unit or data cable.

3. Switch on the suction unit.

4. Set the extraction level higher until the machine continues the job.

? Is the filter or container of the suction unit full?

? If applicable:

» Insert an empty filter into the suction unit or empty the container.

? Does the suction unit have an automatic tapping function?

? If applicable:

» Choose a shorter tapping interval.

I have exchanged the tool magazine inserts and now there are no holes for the tools anymore

Tool magazine inserts are delivered without drilled holes for tools. You drill them with the machine.

» Use DentalCNC to drill new holes into the new inserts.

DECLARATION OF CONFORMITY

Interdent d.o.o., Opekarniška cesta 26, SI -3000 Celje s polno odgovornostjo izjavljamo, da je izdelek, naveden v tej izjavi skladen z navedenimi EU smernicami

We Interdent d.o.o., Opekarniška cesta 26, SI – 3000 Celje declare that products below are in accordance with EU directives

- **Naziv izdelka: CNC rezkalni stroj**
- **Name of the product: CNC milling unit**
- **Tip: CC newCOSMO**
- **Type: CC newCOSMO**

Upoštevane EU smernice:

EU directives:

- 2006/42/EC, smernice za izgradnjo strojev – *directive for machine construction*
- 2014/30/EC, EMC združljivost – *EMC compatibility*

Testne metode po standardih:

Test methods according standards:

- EN 614-1:2006+A1:2009
- EN ISO 12100:2010
- EN 13128:2001+A2:2009
- EN ISO13849-1:2015
- EN ISO 13849-2:2012
- EN 61326-1:2013
- EN 61326-2:2013
- EN 61000-3-2:2014
- EN61000-3-3:2013
- EN 60204-1:2006

Proizvod je varen za uporabo v standardnih pogojih. Vsaka sprememba proizvoda, ki ni odobrena s strani proizvajalca, razveljavlja to izjavo.

Product is safe in standard conditions. Any change of the product that is not approved by producer, repeals this declaration.

Mesto in datum izdaje: Celje dne 08.11.2018

Place and date of issue: Celje, 08.11.2018

Odgovorna oseba:

Responsible person:

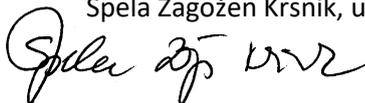
Igor Grudnik, inž. elektr.



Direktor:

Director:

Špela Zagožen Krsnik, univ. dipl. oec



WARRANTY

Device: dental milling machine CC newCOSMO

Serial number:

Installation date:

Installation and connection carried out by:

(Company, Name)

Our company, INTERDENT d.o.o., guarantees a perfect operation of the above stated device for a period of 12 months from the date of its selling to the final customer. During this time the company will remedy at its own expense any faults encountered during a normal use of the said device.

Terms and conditions of warranty:

- The installation and connection must be carried out by a qualified professional authorised by the manufacturer.
 - The device must be operated strictly according to the enclosed instructions.
 - The warranty does not cover any damage incurred during transportation, resulting from inappropriate maintenance or handling, or deriving from disturbances in the power supply network, nor any mechanical damage.
 - The warranty is invalid in the event that non-original spare parts have been used and that the device has been repaired, altered or modified by the customer or other unqualified, non-officially appointed person with the purpose of remedying a defect or malfunction.
 - In the event of defect or malfunction contact us by phone at (03) 42-56-206 or by e-mail at servis@interdent.cc.
-

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