imes-icore®
Dental & Medical Solutions

Operating manual

CORiTEC 150i Serie

Translation of the original operating manual

Revision: 09/2023

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1 Basic guidelines

Read this operating manual carefully before connecting and starting up the machine! As with all technical systems, it is only possible to guarantee the faultless functionality and operational safety of this machine if the generally applicable safety precautions and the special safety instructions in this operating manual are observed during its operation. Every person involved with the installation, operation, maintenance, repair and inspection of the system must have read and understood the following safety instructions!

This operating manual must be kept throughout the entire service life of the machine! It must be freely accessible at all times and must be located in the immediate vicinity of the machine!

1.1 Explanation of the machine types and designations

This operating manual is valid for the following machine types: The individual specifications can be found in the technical data. If the contents affect all machine types, they will be designated in the text as CORiTEC 150i series.

- CORiTEC 150i PRO
- CORiTEC 150i dry

1.1.1 Overview of the respective chapters

Chapter 1 contains **fundamental instructions** and information about the operating manual

Chapter 2 includes **safety-related information** for working with the machine.

Chapter 3 includes the **description of** the machine.

Chapter 4 includes all **technical data of** the machine.

Chapter 5 provides information on **the layout and function of** the machine.

Chapter 6 describes the machine's **transport process** and **how to handle the packaging**.

Chapter 7 addresses the **installation and first commissioning of** the machine.

Chapter 8 provides information on the procedures for **operating** the machine.

Chapter 9 includes information about the **operating software** Smart Control X.X.

Chapter 10 describes the **maintenance, servicing and cleaning** of the machine.

Chapter 11 contains suggested solutions for **trouble-shooting**.

Chapter 12 provides information about the disassembly **and disposal of** the machine.

1.1.2 Explanation of the warning and information fields

The following warning fields label hazards according to their risk level (hazard level) and contain important safety-relevant information on handling the machine. The information field contains (important) instructions and additional information. Furthermore, always observe the generally valid accident prevention regulations and the internal health and safety regulations.

The hazard warnings and warning messages in this manual are based on the SAFE principle:

Signal	Degree of risk and signal word (danger, warning or caution).
Type and danger	Nature, cause, type and source of danger.
Consequences	Consequences of ignoring the danger.
Escape	Action to escape the danger.

The signal words indicate the degree of risk of the hazard:

Signal word	Degree of risk	Consequences
⚠ **DANGER!**	**High**	Certain consequence grave injury or death!
⚠ **WARNING!**	**Moderate**	Could have grave injury or death as a consequence.
⚠ **CAUTION!**	**Low**	Could have a minor to medium injury as a consequence.

The information fields indicate (important) information and hints for the operator or user of the machine:

i	**Info box**

1.1.3 Symbol key

Symbols are used in this operating manual and on the machine itself in order to highlight particularly important sections/areas. Pay special attention to all sections/areas that are marked with the symbols listed here!

Symbol	Description
	**Caution, warning, danger! Personal injury due to a lack of care!**
	This symbol is used in all areas where a lack of diligence can lead to (serious) personal injury or property damage.
	**Attention! Life-threatening danger due to electricity!**
	This symbol is used to highlight sections containing warnings of electricity and the associated dangers.
	**Attention! Danger of explosion and fire!**
	This symbol is used in all areas where a lack of diligence can lead to a risk of fire and explosion, and with this to personal injury or a risk of death.
	**Attention! Danger of crushing!**
	This symbol is used in all areas where a lack of diligence can lead to personal injury due to crushing or trapping.
	**Warning of a risk of slipping!**
	This symbol is used in all areas where oil or coolant on the floor can lead to personal injury.
	**Warning of sharp-edged or pointed objects!**
	This symbol marks areas with potential hazards, which may cause cuts or punctures resulting in personal injury and even death.
	**Warning of rotating components, risk of being drawn in!**
	This symbol is used in all areas where rotating components may cause serious personal injury or death.
	**Attention! Prior to automatic start-up!**
	This symbol is used in all areas where automatic start-up of components may cause serious personal injury or death.
	**Attention! Hot surfaces!**
	This symbol marks hazard areas, in which hot surfaces may cause injuries in the form of burns.

Symbol	Description
	**Attention! Concerning ozone discharge!**
	This symbol indicates on outlet of ozone. Ozone can be harmful to the human body.
	**People with pacemakers or implanted defibrillators must keep their distance!**
	Machines designated by this symbol may not be operated by persons with implanted pacemakers, implanted defibrillators or other active implants, nor may such persons be in proximity to such machines.

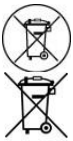
Symbol	Description
	**Use protective gloves!**
	The symbol is used in all areas where it is necessary to use protective gloves!
	**Wear safety shoes!**
	The symbol is used in all areas where it is necessary to wear safety shoes!
	**Use hearing protection!**
	The symbol is used in all areas where it is necessary to use hearing protection!
	**Use respiratory protection!**
	The symbol is used in all areas where it is necessary to use respiratory protection!
	**Wear long-sleeved work clothing!**
	The symbol is used in all areas where it is necessary to wear long-sleeved work clothing!
	**Use eye protection!**
	The symbol is used in all areas where it is necessary to wear safety goggles (eye protection)!

1.1.4 Symbols on the packaging

Always observe the following symbols on the packing during transport.

Symbol	Description
	**Fragile!**
	Packages marked with this symbol contain fragile and sensitive contents. Handle the package with care, do not allow it to fall and protect it against impacts.
	**Do not stack!**
	Do not stack any objects on packages marked with this symbol.
	**Protect from moisture!**
	Protect packages marked with this symbol from moisture and keep them dry.
	**Maximum stacked load!**
	Pay attention to the specification "... kg max." above the arrow. This value specifies the maximum permissible stacked load. Do not exceed the load limit. If possible, place these packages on top.
	**Top!**
	The arrow should always point up during transport and storage. Do not tip, roll or tilt the package.

1.1.5 Symbols on the device

Symbol	Description
	**Disposal!!**
	Electrical and electronic devices labelled with these symbols may not be disposed of together with household waste, in accordance with EU directives.

1.2 Information about this operating manual

Despite every effort, it is not possible to fully exclude printing errors and mistakes. We welcome any suggestions for improvements and information regarding errors.

The information provided in this manual is based on a standard scope of supply, with which the machine is operational. For the installation and commissioning of software or the accessories, also observe the additional manuals, instructions and annexes provided.

imes-icore machines are compliant with CE requirements and marked appropriately. For all other machine parts and components, for which the CE safety guidelines are applicable, start-up is prohibited until all corresponding requirements have been fulfilled. If a change is made to the system without agreement with the manufacturer (imes-icore GmbH), CE conformity is invalidated.

The following documentation complies with the valid legal provisions, regulations and ordinances, as well as standard engineering practice at the time the machine was delivered.

1.3 Limitations of liability

All data, information and instructions in this operating manual have been provided with due consideration of applicable standards and regulations, current engineering practice, as well as our many years of experience.

The manufacturer assumes no liability for damage in the following cases:

- Disregarding this operating manual
- Improper use
- Deployment of insufficiently qualified personnel
- Unauthorised conversions
- Technical modifications
- Usage of unapproved material, spare parts or accessories

The scope of delivery may vary from the explanations and representations provided in this manual in the case of special versions, with technical changes or if additional options are ordered. The obligations agreed in the delivery contract, the general terms and conditions, as well as delivery conditions of the manufacturer and the statutory regulations valid at the time the contract was concluded, apply.

Insofar as the exclusion of liability is legally permissible, imes-icore GmbH shall not be liable for any loss or damage arising due to this product, regardless of whether this is due to direct, indirect, special, collateral or consequential damages, irrespective of the legal grounds, including guarantee, contract, negligence or malice.

The general terms and conditions (T&Cs) of imes-icore GmbH apply. They are available at https://www.imes-icore.com/.

1.4 Copyright

1.5 Brand protection

1.6 Warranty

imes-icore GmbH guarantees that this product is free of material and manufacturing faults. **imes-icore GmbH accepts no further liability and no implied guarantee regarding its marketability or suitability for a specific purpose. The user is responsible for the application and intended use of the product. If product damages arise during the guarantee period, your only claim and the only obligation of imes-icore GmbH is the repair or the replacement of the imes-icore product.**

1.7 Technical modifications

Technical modifications and errors are reserved. imes-icore GmbH reserves the right to modify any product listed here or the content of the operating manual without prior notification.

1.8 Accessories and modifications

The attachment of accessories to the machine and any other modifications require the express permission of imes-icore GmbH. All attachments and modifications that may affect the operational safety of the machine are strictly prohibited and lead to the immediate voiding of CE-conformity and the manufacturers guarantee!

As soon as such changes are made to the machine, imes-icore GmbH accepts no liability whatsoever.

The ECM test only applies to the machine in its original configuration ex works.

In general, the following is valid:

- The machine may only be used exclusively in accordance with the following operating manual. We accept no liability for damage caused by use of the machine for any other applications.
- The machine must only be operated with consumption materials and the original accessories approved by imes-icore GmbH. The use of non-approved consumables and accessories can cause damage to people, machines and materials. In these cases, we accept no liability.
- If a change is made to the machine or components without the written approval of imes-icore GmbH, the issued EC declaration of conformity becomes invalid and we accept no liability with regard to injuries or damages occurred to the machine.

Detailed information about the limitation of liability is available in chapter 1.3.

1.9 Contact

1.9.1 Manufacturer

Manufacturer			
Address	**imes-icore® GmbH** Im Leibolzgraben 16 D-36132 Eiterfeld	Telephone	+49 (0) 6672 898-228
		Fax	+49 (0) 6672 898-222
		Email	info@imes-icore.de
		Internet	www.imes-icore.de

1.9.2 Customer service

Our customer service department will be happy to provide you with technical information:

imes-icore customer service			
Address	**imes-icore® GmbH** Im Leibolzgraben 16 D-36132 Eiterfeld	Telephone	+49 (0) 6672 898-469
		Fax	+49 (0) 6672 898-222
		Email	service@imes-icore.de
		Internet	www.imes-icore.de

2 For your safety

The following chapter contains a list of safety aspects that are required for the protection of personnel, as well as safe and fault-free operation of the machine.

2.1 Responsibility of the operator

Read this operating manual through carefully before connecting, starting up and operating the machine! As with all technical systems, it is only possible to guarantee the faultless functionality and operational safety of this machine if the generally applicable safety precautions and the special safety instructions in this operating manual are observed during its operation.

The operator is the person who uses the machine for commercial or industrial purposes, or who commissions a third party with this, and who bears the legal product responsibility for protecting the user, personnel or third parties during its operation. The machine operator is subject to the statutory obligations of industrial health and safety when using the machine in commercial areas.

The operator and the personnel authorised by the operator (who receive special instructions regarding hazards that may arise) are responsible for the fault-free operation of the machine, and for clear stipulations regarding the responsibilities when transporting, installing, operating, maintaining and cleaning the machine.

In addition to the safety instructions and information in this instruction manual, it is also necessary to observe and adhere to the local accident prevention regulations and the general health and safety provisions, as well as the valid environmental protection regulations relevant to the area of use of the machine.

The information in this instruction manual must be followed completely and without limitation!

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2.2 Information about the intended use

Any use that goes beyond the intended use or any other use of the machine is prohibited and is considered improper. Claims of any kind towards the manufacturer or his authorized representatives due to damage from improper use of the machine are excluded. The operator alone is liable for any damages resulting from improper use.

All guarantee and warranty entitlements of the operator against the manufacturer are voided in case of improper use of the machine. Any use other than intended use is prohibited!

Unprofessional handling and improper use can lead to dangers and damage. You must therefore carefully read and precisely follow this operating manual and the associated documents carefully. This operating manual must be stored in the immediate vicinity of the machine, and must be accessible to the personnel working on and with the machine at all times. The machine must only be operated when in an operationally safe and technically faultless condition!

DANGER!
Due to lack of care and improper use!
Serious to fatal personal injury due to non-observance of the instructions for use and internal occupational safety!
• Reading, understanding and following the operating instructions! • Training and commissioning by qualified personnel! • Transport, installation, commissioning, operation, cleaning and maintenance of the system must be performed by instructed specialist personnel! • Use of suitable personal protective equipment!

	In order to avoid personal injury or property damage, always observe all safety information and instructions!

2.3 Brief description

The machines of the CORiTEC 150i series were developed for the production of dentures and especially for the requirements of the dental industry. Thus, these machines are not suitable for the application of conventional milling techniques.

The CORiTEC 150i PRO is designed for dry and wet processing of materials. The CORiTEC 150i dry is designed exclusively for dry machining.

The approved materials are listed in chapter 3.1.

2.4 Intended use

- The machines of the CORiTEC 150i series are intended for the production of dentures.
- The following materials are intended for processing:
  - CORiTEC 150i PRO:
    Zirconia, PMMA, Wax, Peek, Sintered metal, CoCr, Composite, Titanium (Pre-milled Abutment only), Glass ceramic.
  - CORiTEC 150i dry:
    Zirconia, PMMA, Wax, Peek, Sintered metal, CoCr
- The usage of highly flammable and inflammable materials is prohibited!
- When processing titanium and other reactive materials, a general risk of fire exists depending on the material! Perform an assessment to determine the requirement for an automatic extinguishing system!
- Only use tools that are defined by imes-icore GmbH on the website, or that have been retrospectively approved.
- The machine must only be operated with approved cooling lubricants from imes-icore GmbH.
- An extraction system must be used in the application cases defined in the operating manual. Only use extraction systems that are supplied or approved by imes-icore GmbH.
- Wet processing may only take place without an extraction system.
- The machine may only be operated within the values specified in the technical data (see chapter 4).
- The machine and components of the machine must only be operated when in an operationally safe and technically faultless condition.
- The machine is designed for use in dry rooms (workshops, laboratories or similar spaces) and industrial plants
- Put the machine into a safe state for maintenance work. This includes de-energising as described in the operating manual, as well as other safety instructions!
- Compliance with the cleaning and maintenance intervals for the machine and its accessories.
- All instructions and safety guidelines from the operating manual and the accident prevention regulations must be observed.
- Transport, installation, commissioning, operation and maintenance of the system must be performed by instructed specialist personnel.

The precise connection values, ambient and installation conditions can be found in chapter 4.

2.5 Residual risks and fundamental dangers

During intended use of the machine, general residual risks and fundamental dangers arise, which are listed in the following chapter.

DANGER!
Due to sharp tools, pieces and components
When dealing with sharp tools and blank s there is an increased risk of cuts that can lead to death!
Always wear cut-resistant safety gloves when reaching into the machine interior and when handling tools and blanks!

WARNING!
Hearing damage due to noise pollution!
• Milling certain materials can cause noise, which can damage your hearing! • If the daily noise exposure level of 85 dB (A) is exceeded, this can cause permanent damage to your hearing!
We recommend always using suitable hearing protection.

WARNING!
Health hazard due to release of ozone!
Various health problems can occur when using an ionizer device!
• Avoid direct blowing of ionized air into the face! • Ventilate the space constantly!

WARNING!
Health damage due to dust / fine dust pollution!
The formation of dusts and fine dusts can lead to various health problems!
• Use of suitable personal protective equipment. • Regular cleaning and maintenance of the extraction system. • Immediate repair of damage to the extraction system and accessories.

⚠CAUTION!
General shock and crushing hazard!
In dealing with the milling machine, injuries can be caused by bumping or crushing!
• Reading, understanding and following the operating instructions! • Training and commissioning by qualified personnel! • Use of suitable personal protective equipment!

2.5.1 Reasonably foreseeable misuses

The (reasonably) foreseeable misuses include:

- Unintended use is any use that exceeds the intended use!
- Incorrect fastening of blanks. The machine operator is responsible for ensuring that the blank clamping device used is suitable for the actual processing - i.e. that it is secure. Unsuitable, insecure clamping devices may result in parts being ejected out of / from the blank clamping device due to the blank loosening. During processing, this can lead to serious accidents resulting in death or personal injury or serious damage to the blank, the tool, the clamping device and other machine parts!
- Processing or use of an unapproved component or material!
- Risk of injury from sharp tools (wear protective gloves)!
- Risk of injury due to protruding tools (wear protective gloves)!
- Operation of the machine outside the specified performance data!
- Misuse of machine parts as storage locations or climbing aids!
- Deployment of insufficiently qualified personnel!
- A failure to comply with the cleaning and maintenance intervals for the machine and its accessories!
- Operating the machine without correctly functioning protective equipment!
- Manipulation of the protective equipment is fundamentally prohibited without exception!

i	Unintended use can result in serious physical injury or death, as well as significant property damage!

2.5.2 Danger due to electrical energy

DANGER!
Due to electric shock!
Contact with live parts or damage to insulation poses immediate danger to life and limb due to electric shock!
Before working on electrical components, disconnect the system from the mains and prevent it from being switched on again during work!

DANGER!
Due to stored charges!
After switching off the machine, electrical charges may still be stored in components. Contact with such components may be painful and even fatal!
Wait until all such components have fully discharged before performing work on them!

Always be aware that:

- Only electricians are permitted to work on the electrical system!
- Work on the electrical system must be carried out when in a safe (de-energised) state!
- With damaged insulation, switch off the power supply immediately and organise a repair!
- Never bypass fuses or render these ineffective. When replacing a fuse always ensure the correct current strength!
- Keep moisture away from live parts. Danger of a short circuit!

When working on active parts of the electrical system and operating equipment, de-energise the system for the duration of the work and observe the **five safety rules**:

1. Disconnect
2. Secure against being switched on again
3. Test to ensure a de-energised state
4. Earth and short circuit
5. Cover or close off any nearby live parts

2.5.3 Mechanical hazards

⚠ WARNING!
Concerning rotating components and moving axes!
Risk of injury and death due to contact with rotating or moving components of the machine!
• Before starting work check that all covers, safety and protective equipment are correctly installed and functional! • Never reach into the machine during operation! • Before performing cleaning, maintenance and servicing work, switch off the machine's main switch and unplug the mains plugs in order to prevent the machine being switched on accidentally (establish safe machine state)! • Before starting work, check that there no loose parts inside the machine!

Always be aware that:

- Manipulating moving and fixed protective equipment is generally prohibited without exception!
- After opening the protective door, reaching into the machining space is strictly prohibited until all parts of the machine have come to a standstill without exception! Because for example the milling spindle can have a follow-up time due to technical reasons!

2.5.4 Dangers due to high temperatures

⚠ WARNING!
Be careful of hot surfaces on materials and tools!
Risk of burns on heated materials or tools after processing! High temperatures may occur during machine operation. Before performing any work or activities, make sure that the surfaces have cooled to the ambient temperature. Tools, blanks and chips may become very hot.
Always wear heat-resistant work clothing and protective gloves during work!

2.5.5 Fire hazard

The risk of fire that applies to the machine is dependent on the materials and tools used. The operator of the machine is responsible for the selection of materials and tools for the machine. In addition, a risk assessment of the workplace must be carried out!

DANGER!

Due to fire under unfavourable conditions!

Injury and death, as well as significant property damage may arise due to:

- Unsuitable tools!
- Incorrect cutting speeds!
- Processing highly combustible materials!
- Overheating machine parts due to irregular cleaning and maintenance!
- Sparks flying from tools!
- Unsuitable cleaning or operating products!

Therefore always ensure that:

- Only approved materials and milling cutter types are used.
- Only approved extraction systems for dry dust are used.
- The maximum cutting and feeding speeds may not be exceeded.
- The operator of the machine is responsible for a risk assessment of the workstation.
- The operator may retrofit an extinguishing device
- When milling with new parameters, the processing procedure must take place under supervision.
- Tools are checked for wear regularly.
- Dirt must be removed from the components immediately.
- When handling cooling lubricants, the corresponding safety data sheet is used with particular awareness of the fire risks.
- Only cooling lubricants approved by imes-icore GmbH are used. When using these substances, sufficient ventilation must be provided.
- Every employee who works with this machine in any manner receives regular safety instructions, is sufficiently trained and has read the operating manuals.
- Before starting wet processing, check the coolant level.
- The machining of titanium must not take place unattended!

2.5.6 In case of fire

In case of fire, only extinguish this at the machine with a CO2 fire extinguisher (carbon dioxide extinguisher). The use of extinguishers containing water must be avoided with electrical systems for safety reasons!

In case of fire:

- Stop machines,
- Disconnect the power supply (fuse box),
- Notify the fire brigade,
- Extinguish machine fire with CO2 fire extinguishers

2.5.7 Radiation hazards

Using the ionizer can crate sources of electromagnetic radiation.

The machine operator must ensure that:

- Employees receive regular safety training.
- Employees are sufficiently sensitised in this regard (information security).
- Persons with implants that are affected by magnets must stay a safe distance of at least one meter from the machine.
- Warning signs are visibly displayed in areas where this is necessary!

2.5.8 Substance hazards (dust)

When working with certain materials, fine milling/drilling dust may arise. These can be hazardous to health or flammable and should be extracted with an approved extraction system by imes-icore GmbH**.**

The machine operator must ensure that:

- Employees receive regular safety training.
- Employees are sufficiently sensitised in this regard (information security).
- Storage and disposal of health-endangering or flammable dust takes place correctly.
- Dust is not inhaled and suitable personal protective equipment is made available if necessary.
- Eating, drinking and smoking are strictly prohibited in areas where health-endangering dust may arise!
- Warning signs are visibly displayed in areas where this is necessary!
- Operation and maintenance instructions for the extraction system are strictly observed!
- a risk assessment of the workstation is carried out.

2.5.9 Substance hazards (vapours)

When working with certain materials, vapours (aerosols) may be created. These may be flammable or hazardous to health.

The machine operator must ensure that:

- Employees receive regular safety training.
- Employees are sufficiently sensitised in this regard (information security).
- User instructions and safety data sheets of the various substances are available to employees and provide information on the dangers!
- Vapours are not inhaled and suitable personal protective equipment is made available if necessary.
- Eating, drinking and smoking are strictly prohibited (ban on flames and fire) in areas where health-endangering gas and vapours may arise!
- Warning signs are visibly displayed in areas where this is necessary!

2.5.10 Substance hazards (gases)

When working with certain materials, fine milling dust may result. In addition, the ionizer creates ozone. Gases like ozone may be hazardous to health.

The machine operator must ensure that:

- The limit value for ozone is complied with. If in doubt, test measurements must be carried out.
- Good ventilation of the machine's installation site is guaranteed.
- Workers are informed about the health risks of increased ozone concentrations and possible protective measures.
- Employees with preexisting conditions (respiratory diseases) receive occupational medical consultations and examinations. Additional protective measures may be necessary.
- Employees receive regular safety training.
- Employees are sufficiently sensitised in this regard (information security).
- A risk assessment of the workstation is carried out.
- Operation and maintenance instructions for the extraction system are strictly observed!

2.5.11 Noise/sound emissions

The machine's emissions sound pressure level is lower than or equal to 85 dB(A) when using the approved materials and tools. However, noise peaks may arise with certain processing combinations, and the operator must therefore ensure that:

- Employees are informed of noise risks and protective measures!
- Suitable hearing protection is available if the daily noise exposure level exceeds 85 dB(A).
- Sufficiently trained personnel are available if necessary, in order to reduce the duration of exposure.
- Warning signs are visibly displayed where this is necessary!

2.5.12 Freeing a trapped person

Freeing a person **trapped** in the machine interior, e.g. by getting stuck or being pulled into a drive axis, takes place after pressing the machine's master switch in order to shut down the machine as quickly as possible and to analyse the dangerous situation! Proceed as follows to release trapped personnel:

- Check the condition of the person and, if necessary, inform emergency services!
- Due to the low mass of the drives, it is possible to move the axes manually when de-energised!

2.6 Personnel requirements

The tasks described in this operating manual place different requirements on the qualifications of the persons entrusted with these tasks.

⚠ WARNING!
With insufficient qualification of personnel!
Insufficiently qualified personnel are unable to correctly assess risks posed when working with the machine. These persons may therefore put themselves and others at risk of serious and even fatal injuries!
• Persons with inadequate qualifications are prohibited from carrying out work on the milling machine! • New operators must receive machine training before using the machine for the first time.

2.6.1 Qualifications

Work on and with the machine must be carried out exclusively by authorised, trained and instructed personnel. Such personnel must receive instruction regarding possible hazards and special residual risks that may arise.

The qualifications required for the various tasks are set out in the following:

Operator:

The operator is required to instruct the user regarding the tasks entrusted to him and to clarify the possible dangers of improper conduct. All tasks that exceed operation in normal mode may only be performed by the user if the operator has expressly assigned these tasks to them.

Electrician:

An electrician is able to independently perform work on electrical systems and detect and avoid possible dangers due to his professional training, skills and experience, as well as knowledge of the applicable standards and provisions.

An electrician is familiar with all the relevant standards and provisions applicable to their working environment.

Specialist personnel:

Qualified personnel are able to independently detect and avoid possible dangers and hazards due to their professional training, skills and experience.

Manufacturer (service technician):

The manufacturer's specialist personnel are authorised to perform certain work exclusively. In order to carry out this work, contact our customer service department.

3 Machine description

The CORiTEC 150i series machines are designed for the production of dental restorations specifically for the requirements of the dental industry.
The CORiTEC 150i PRO has a cooling lubrication system and enables dry and wet machining.
The CORiTEC 150i dry is designed exclusively for dry machining.

3.1 Approved materials

The following materials can be processed on the CORiTEC 150i PRO:

Dry machining	Wet machining	Wet and Dry machining
• Zirconia • Wax • Sintered metal • CoCr	• Glass ceramic • Composite • Titanium (Pre-milled Abutment only)	• PEEK • PMMA

The following materials can be processed on the CORiTEC 150i DRY:

Dry machining	Wet machining	Wet and Dry machining
• Zirconia • Wax • Sintered metal • CoCr • PEEK • PMMA		

The blanks for the above stated materials are available from the sales department of imes-icore GmbH. Depending on the material, blanks up to a height of 30 mm can be machined.

For block materials and prefabricated abutments, appropriate blank holders must be used! These are necessary to clamp other geometries in the round blank holders. Other materials require the express approval of imes-icore GmbH.

Processing other materials is prohibited and requires separate approval and permission from imes-icore GmbH.

3.2 Cooling lubricant CORiTEC mill & grind liquid

Only use cooling lubricant from imes-icore GmbH. The mixture ratio can be found in the cooling lubricant description. For further information regarding handling and disposal, refer to the separate safety data sheet, which you can request from the customer service department of imes-icore GmbH at any time.

Item	Article number
CORiTEC mill & grind liquid	526020 0050

"CORiTEC mill & grind liquid" is available via imes-icore GmbH sales.

3.3 Milling tools

In order to process blanks, the machine must be equipped with at least one milling tool. The appropriate and ready-ringed milling tools for direct change are available from the sales department of imes-icore GmbH.

3.4 Approved milling tools

To machine blanks, the machine must be equipped with the appropriate tools. The suitable and ready ringed tools for the direct change fixture are available from the sales department of imes-icore GmbH. Further information of the current tools can be found on the homepage http://www.imes-icore.com.

Only use milling tools approved by imes-icore GmbH to avoid material damage and injury!

4 Technical data

4.1 Machine

Specification	Value	Unit
Dimensions	422 x 644 x 556	(W x H x D) mm
Weight (gross)	~ 75	kg
Drive type	High-torque stepper motors	—
Control	Stepper motor control IME 481	—
Protective door	Flap door	—
Guides	Precision steel guides in X, Y, Z axis	—
max. dimensions of the blanks	ØH 94 x 30 LWH 40 x 20 x 20	mm
Tool changer	10-slot direct tool changer	—
Cooling lubricant tank	~ 3 (exclusively CORiTEC 150i PRO)	l
Maximum installation height	2000	m above sea level
Maximum setting angle	A-axis: 30 / B-axis: 25	° (degrees)
Monitor	10 Touchscreen	" (Inches)

4.2 Milling spindle

Specification	Value	Unit
Tool change	Electric direct tool changer	—
Collet chuck clamping range	3	mm
Maximum speed	100,000	rpm
Power Pmax	860	W

4.3 Connection values

Specification	Value	Unit
Voltage	100 - 240	V
Nominal current	max. 1.5	A
Frequency	50 / 60	Hz
Nominal power	max. 500	W
Required air pressure	3 | 44	bar | PSI
Required air flow rate	50	l/min
Main fuse	6	A

4.4 Ambient and installation conditions

The components of the machine have different coefficients of expansion. Inaccuracies during machining can only be excluded at an ambient temperature of +18 to +25°C. Direct sunlight on the machine must be avoided. The maximum installation altitude of the machine is 2000 m above sea level.

Requirement	Specification	Value	Unit
Operation	Temperature range	+18 to +25	°C
	max. humidity	60	%
Storage	Temperature range	+10 to +50	°C
	max. humidity	80	%
Transport	Temperature range	-10 to +55	°C
	max. humidity	80	%

4.5 Requirement for a compressed air connection

The compressed air connected must expressly comply with the following conditions:

Specification	Value	Unit
Air pressure [P]	3 to 4	bar
Connection	Plug-in nipple NW 7.2 (quick connection)	mm

4.5.1 Air purity

Specification according to ISO 8573-1, Compressed air for general use, part 1: Contaminants and quality classes

Specification	Class	Value	Unit
Solid contaminants	Class 3 - filter grade for solids	Better than 5	µm
Water content	Class 4 - maximum pressure dew point	+3	°C
Total oil content	Class 3 - maximum oil content	1	mg / m^3

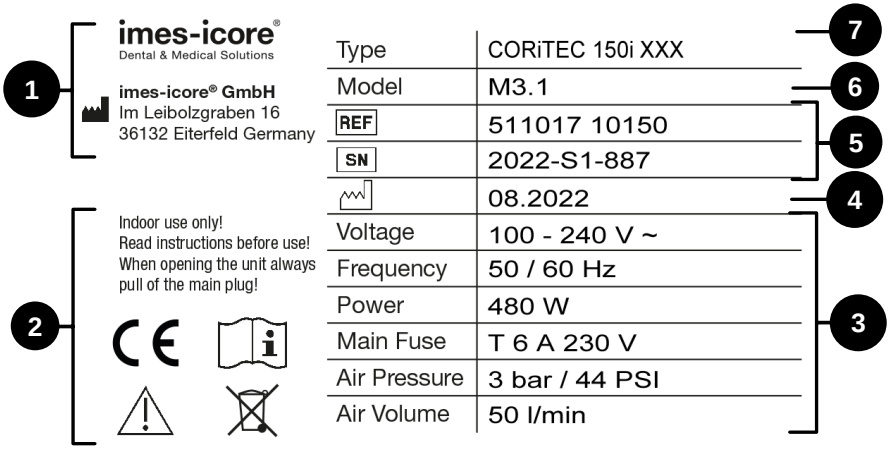
4.6 Noise emission

Specification	Certificate	Value	Unit
Noise level	Milling in plastic	< 70	dB (A)

The noise pressure level may vary depending on the material and milling parameters.

4.7 Type plate

The type plate contains all information about the identification and classification of the machine. The type plate is located on the rear side of the system.



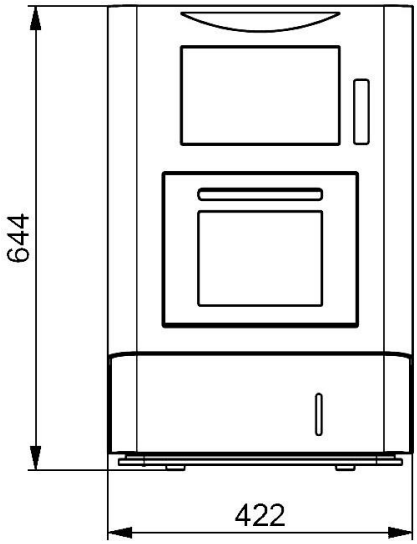
This figure is an example and serves as an illustration only.

Pos.	Designation
1	Machine manufacturer
2	Notes
3	Technical data of the machine
4	Date of machine manufacture
5	Serial number (SN) / Article number (REF)
6	Model version
7	Machine designation

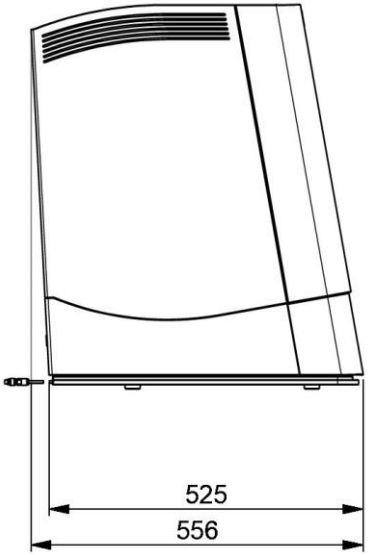
4.8 Technical drawing

All dimensions are indicated in millimeters (mm).

Front view

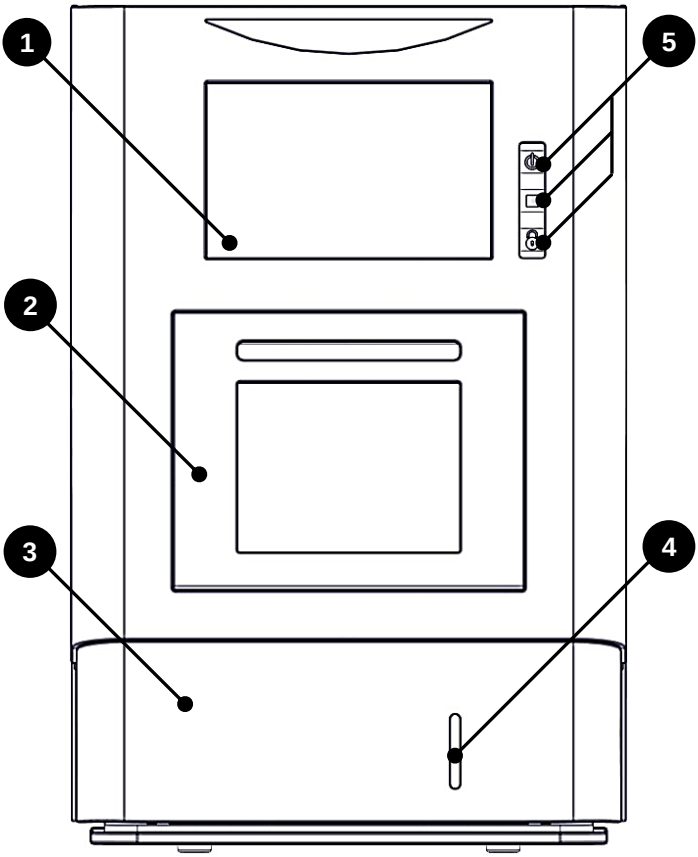


Side view



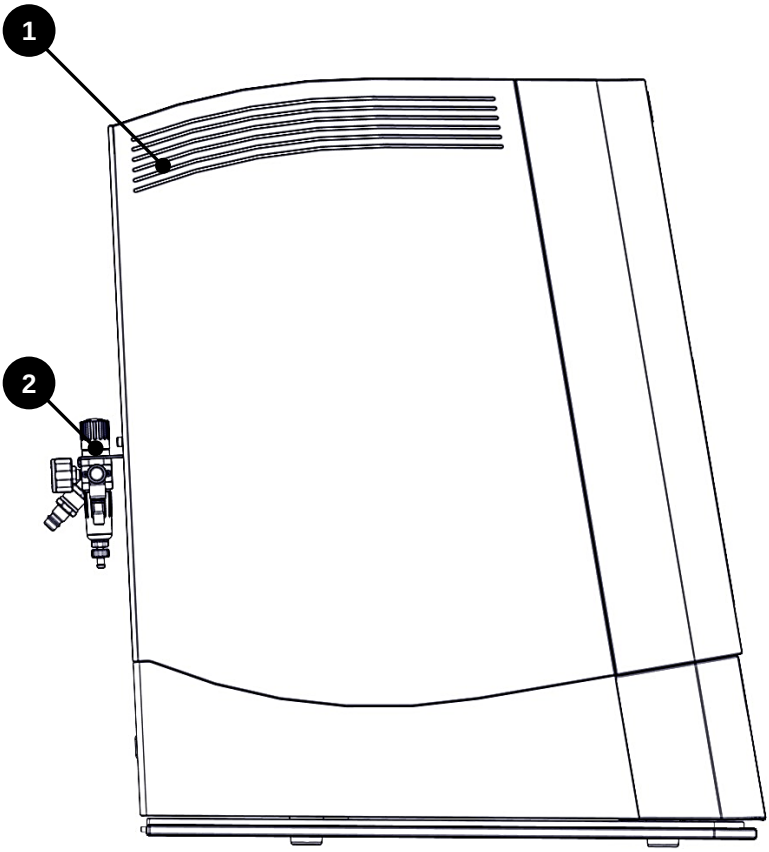
5 Layout and function

5.1 Front view



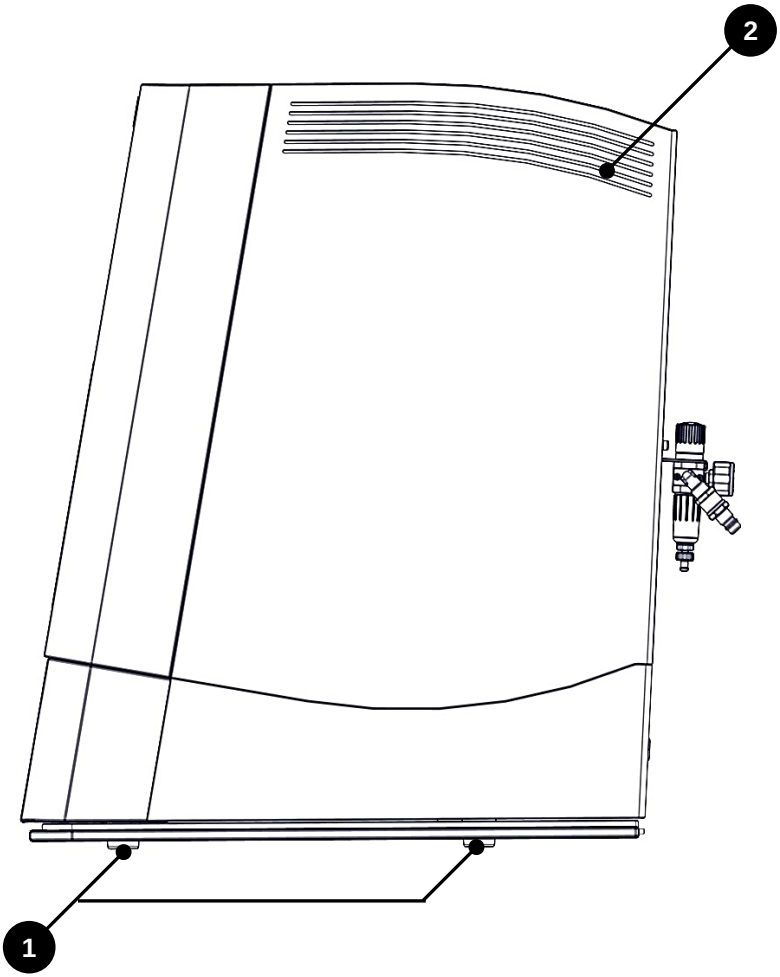
Pos.	Designation
1	Touchscreen TFT
2	Protective door
3	Front panel of cooling lubricant tank
4	Cooling lubricant level display
5	Operating keys

5.2 Side view left



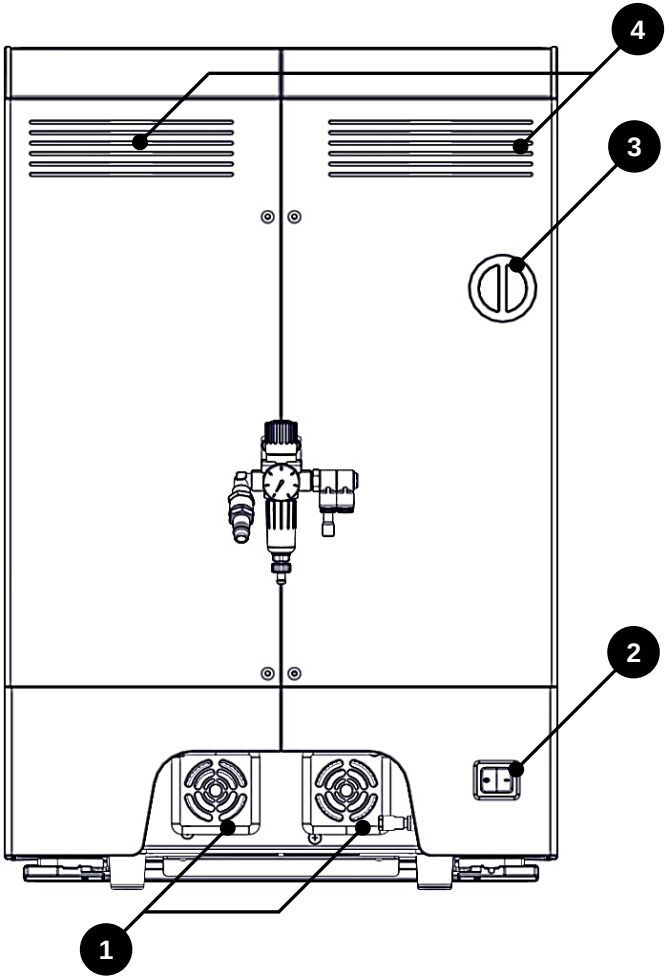
Pos.	Designation
1	Ventilation slits
2	Maintenance unit with compressed air connection

5.3 Side view right



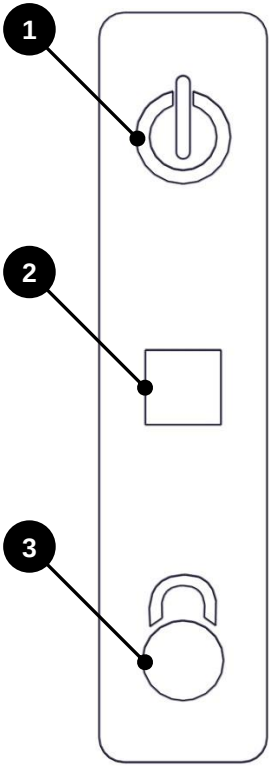
Pos.	Designation
1	Machine feet
2	Ventilation slits

5.4 Rear view



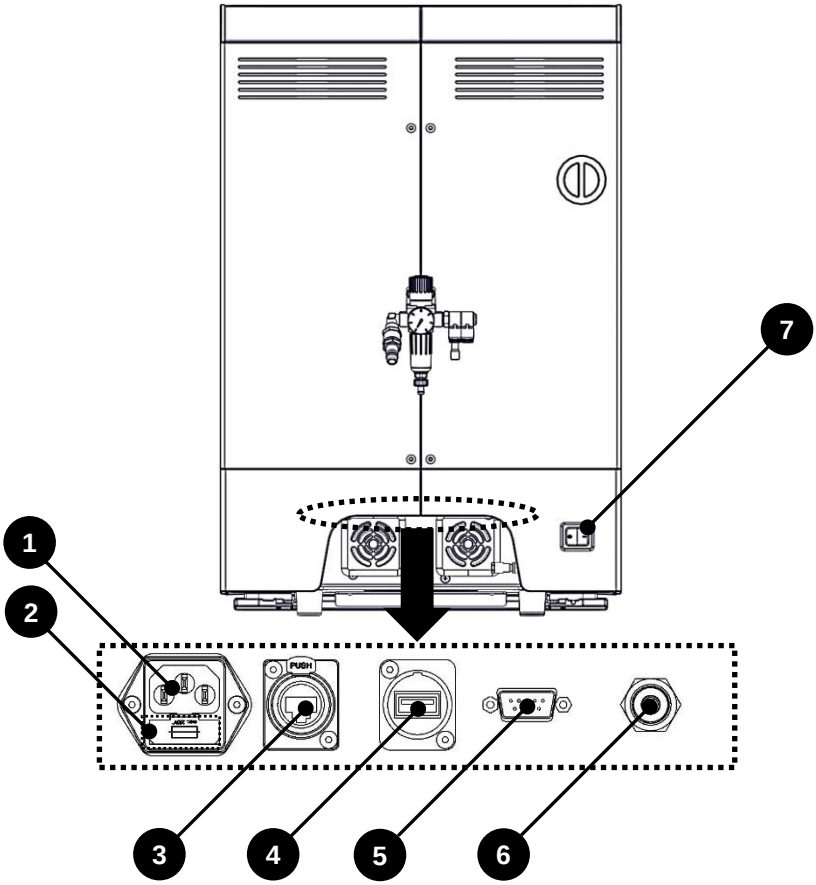
Pos.	Designation
1	Ventilation fans
2	Machine main switch
3	Connection for suction hose of the extraction system
4	Ventilation lamella

5.5 Control elements (front)



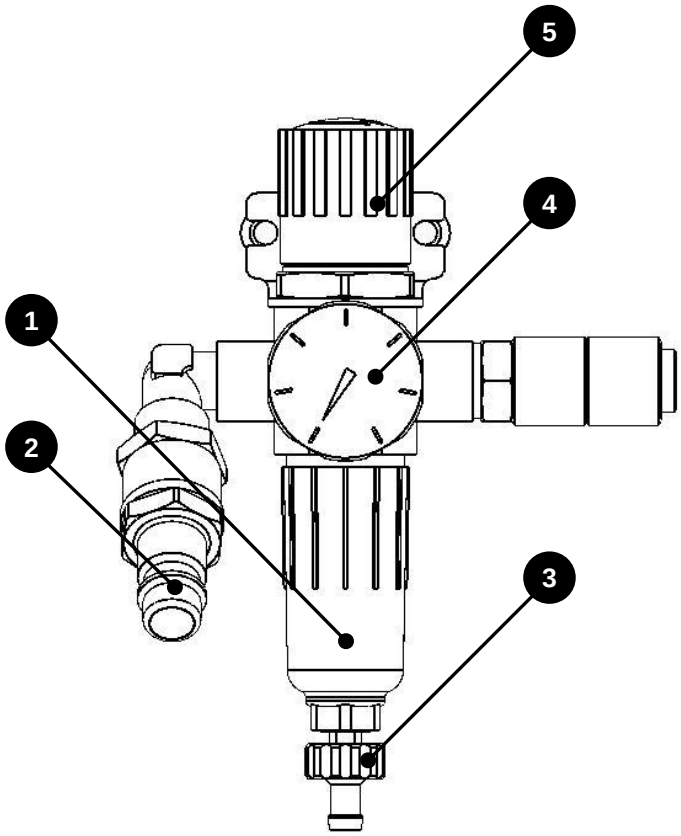
Pos.	Designation
1	Power button
2	Stop button
3	Cover status display

5.6 Connection panel (rear)



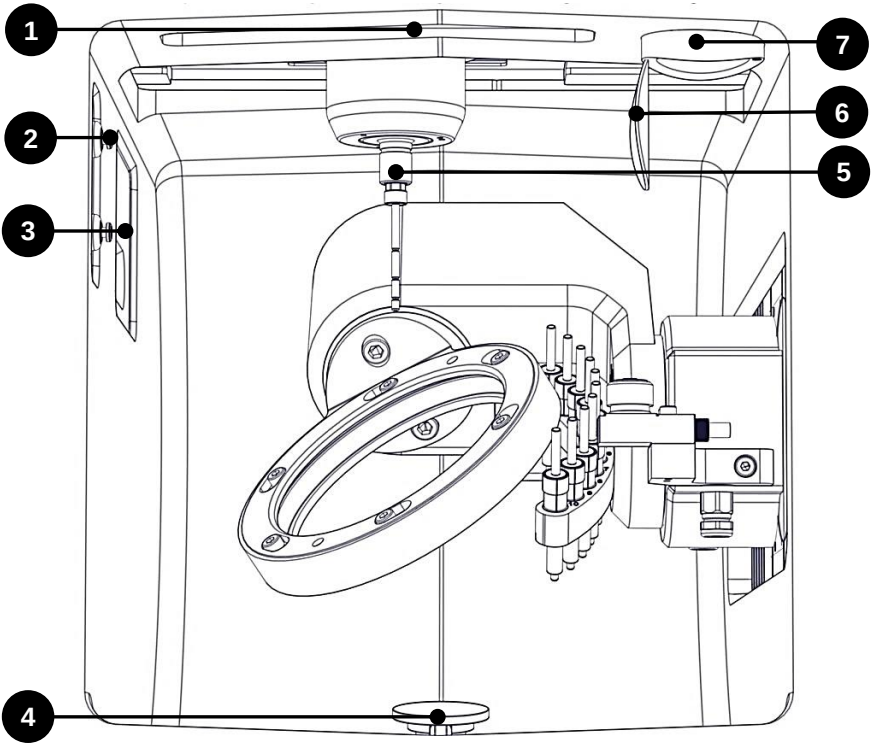
Pos.	Designation
1	Mains connection socket for mains connection cable (IEC connection cable)
2	Access fine wire fuse
3	RJ-45 Network connection
4	USB-socket type A (USB connection)
5	Sub-D connection for the control line of the extraction system
6	Air connection
7	Machine main switch

5.7 Maintenance unit



Pos.	Designation
1	Condensate container
2	Compressed air connection (plug-in nipple NW 7.2 (quick connection))
3	Condensate outlet (tightens/loosens manually)
4	Pressure display (bar)
5	Pressure control valve

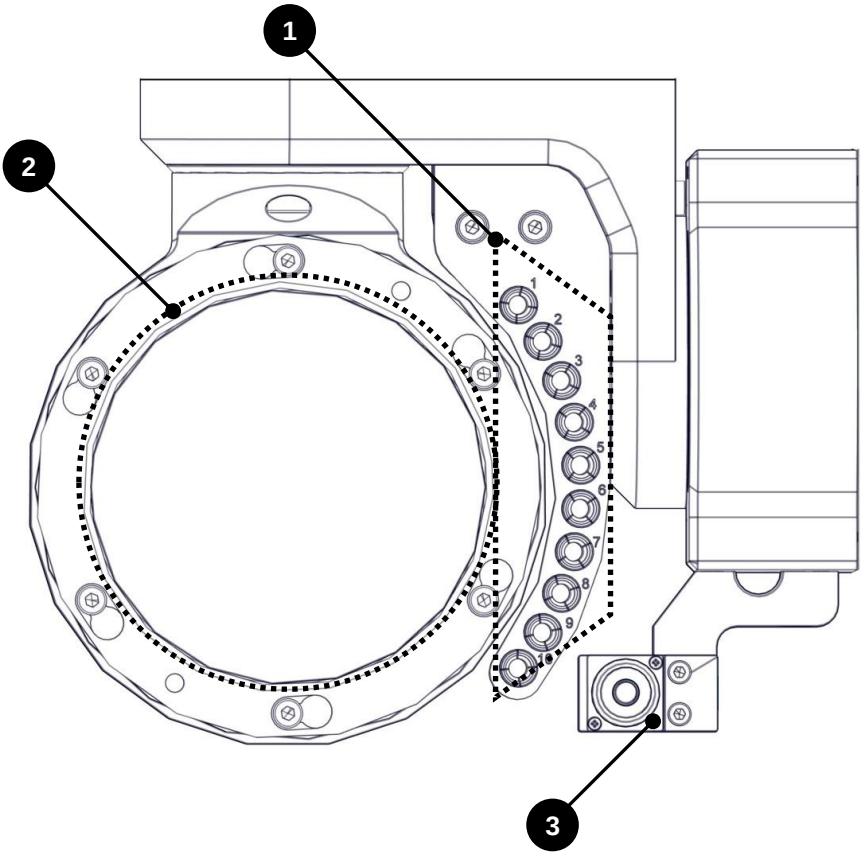
5.8 Working room



Pos.	Designation
1	Workspace lighting
2	Electronic connections for automatic calibration
3	Suction nozzles
4	Cooling lubricant runoff
5	Milling spindle
6	Ionizer seal
7	Ionizer

5.9 Blank holder with tool magazine

The machine's tool magazine contains a total of 10 tool stations for ready-ringed tools. The arrangement of the tool stations is shown in the following figure (1). The length measuring probe (3) for measuring the tools is located in front of the tool stations. The blank holder (2) and the tool magazine are structurally combined in one assembly.

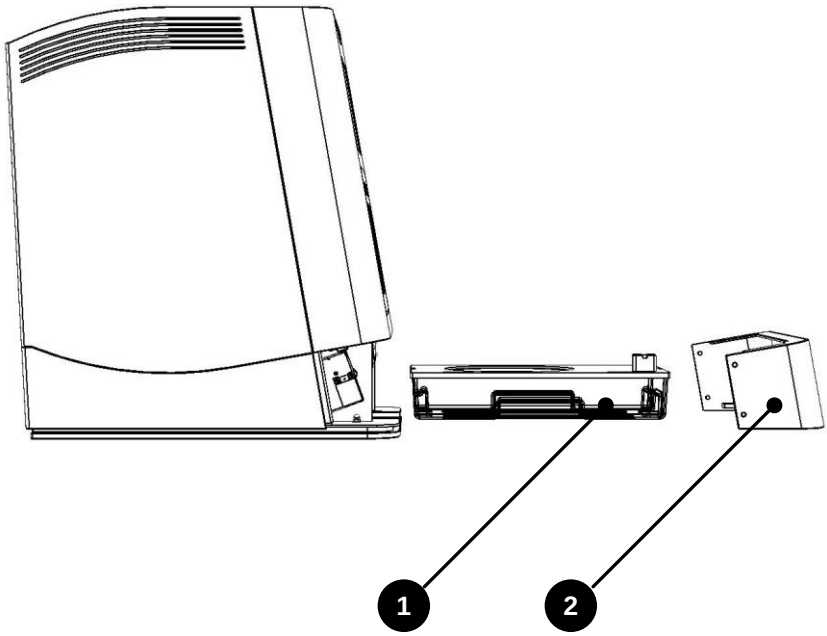


Pos.	Designation
1	Tool stations
2	blank holder
3	Length measuring switch

5.10 Cooling lubricant system (CORiTEC 150i PRO)

The cooling lubricant system is preinstalled in the CORiTEC 150i PRO machine. To fill the cooling lubricant tank, the front panel is pulled off of its attachment in the direction of the operator.

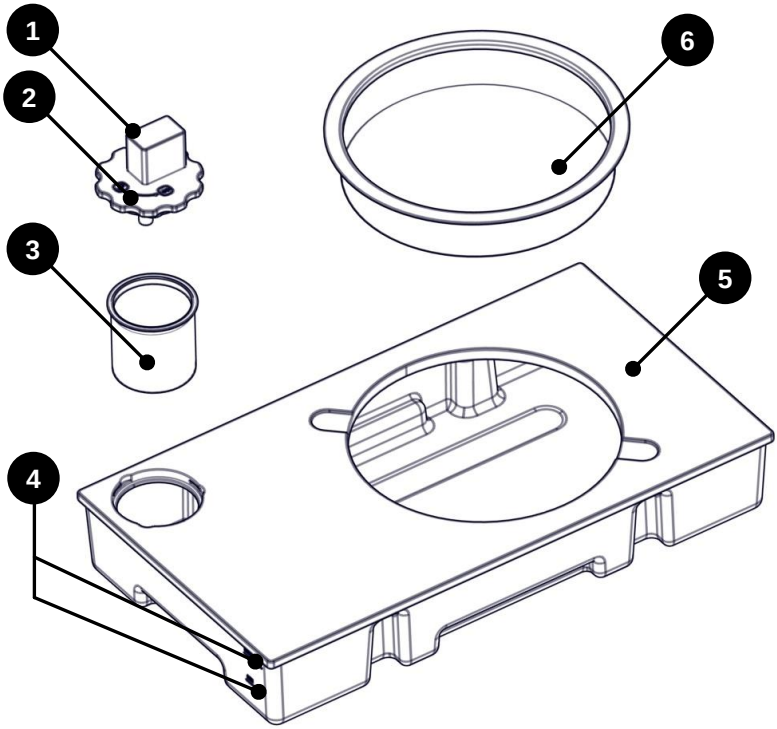
Only use approved cooling lubricants by imes-icore GmbH. These are optimally tailored to the needs of the machine



Pos.	Designation
1	Coolant container (capacity 3 l)
2	Front panel

5.11 Cooling lubricant tank (CORiTEC 150i PRO)

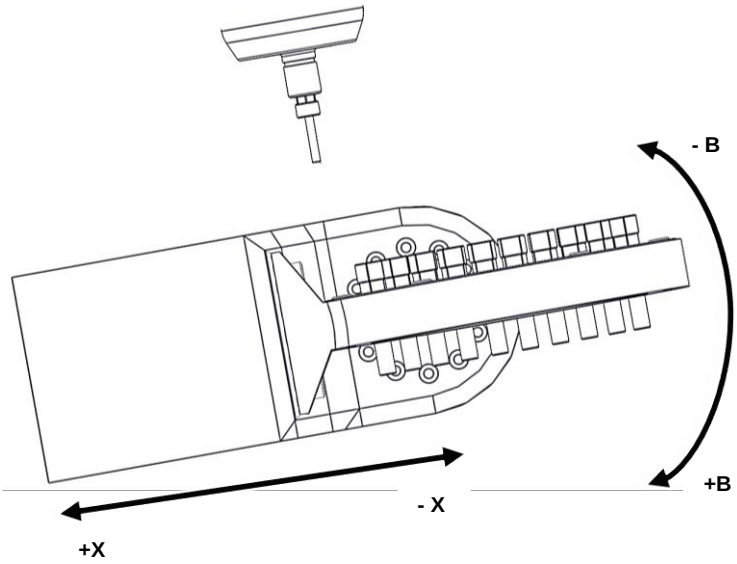
The cooling lubricant tank of the CORiTEC 150i PRO must be filled with 3 l of cooling lubricant. It consists of several components (see diagram). The screens filter milling dust from the cooling lubricant used and clean this so that it can be used again for cooling and lubrication. Check the level of the cooling lubricant before each wet processing run. The cooling lubricant fill level must be within the level indicator.



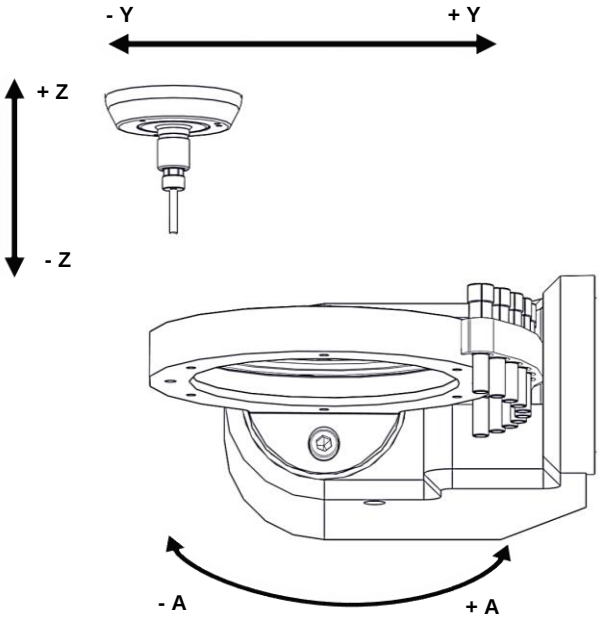
Pos.	Designation
1	Pump connection
2	Cover
3	Sieve insert pump
4	Container
5	Sieve insert
6	Container

5.12 View of axis arrangement

View from left



View from front



5.13 Coordinate system

The linear axes are labeled with the letters X, Y and Z. Rotary axes and swivel axes are generally designated with the letters A, B, and C.

5.14 Assignment of the movement axes

axis.	Designation	Description	
X	Longitudinal axis	+X towards the back	-X towards the front
Y	Transverse axis	+Y to the right	-Y to the left
Z	Stroke axis	+X upwards	+Z downwards
A	Rotating axis	+A counter clockwise	-A clockwise
B	Rotating axis	+B clockwise	-B counter clockwise

5.15 Safety equipment on the machine

DANGER!
By manipulating safety fittings!
You are at risk of serious injuries and even death if you remove or deactivate the safety equipment!
• Do not dismantle or manipulate the safety device! • Check correct function of safety devices on a regular basis! • Have damaged safety equipment repaired immediately!

Therefore always note:

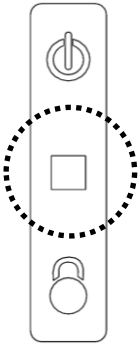
- The machine may only be operated when the safety equipment is intact!
- The user has a duty to immediately report any faults that may affect the safety!
- The machine must not be operated after such security-related faults arise and must be disconnected from the mains power and compressed air supply until the faults have been remedied by qualified specialist personnel!
- If the noise pressure level at the machine exceeds a value of 85 dB(A), the operating personnel must wear suitable hearing protection!

5.15.1 Stopping the machine (in the event of malfunctions)

The machine can be stopped by pressing the Stop button. In situations that require the machine to stop immediately, press the stop button as quickly as possible!
This interrupts the power supply to the machine's power unit.
If persons are ingured:

- Administer first aid,
- Inform emergency doctor or medic!

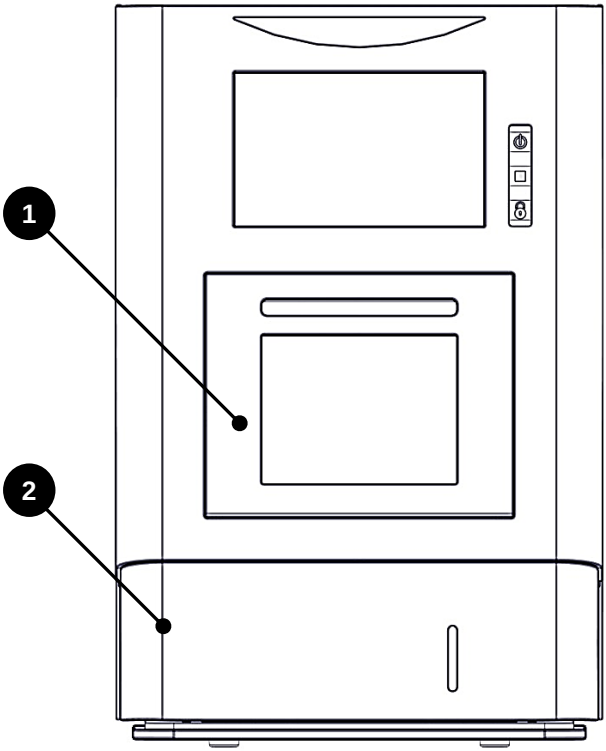
To proceed further, follow the instructions in chapter 11 Faults.



There are no emergency stop control elements in the form of an emergency stop switch mounted on the machine, as this does not adequately minimize the risk!

5.15.2 Protective and access door

The protective door (1) provides access to the machine interior. It protects the user and persons in the environment against dangers, dust and noise development during operation. The front panel of the coolant reservoir (2) provides access to the cooling lubricant tank so that it can be filled or cleaned. For service and maintenance work, the two rear cover panel enable access to the power electronics (only for service employees of imes-icore GmbH). During operation, the protective door of the machine interior is locked and cannot be opened (cover status display does not light up).



5.15.3 Protective door monitoring

The protective door to the machine interior is monitored with a safety interlocking system. If the protective door is opened, then the machine cannot be started and is in set-up mode!

5.15.4 Protective door lock

The protective door to the milling area is locked during a milling process and can only be opened when all axes and the milling spindle have come to a standstill.

5.16 Working and hazard area

5.16.1 Working area

Area	Operating mode
Operating elements	Set-up / automatic
blank holder	Set-up
Tool holder	Set-up

5.16.2 Hazard area

Area	Operating mode
Entire machine interior	Set-up / automatic

The extended setup mode for the parameterization of the operating software is password-protected and may only be used by service technicians!

5.17 Safety equipment that the operator might have to retrofit

5.17.1 Extraction system

When dry processing certain materials, the operator must install an extraction system, in order to vacuum off fine dust that is harmful to health. Only use original imes-icore extraction systems because these are designed for the requirements of the machine. Other extraction systems require the approval of imes-icore GmbH.

For further information please contact the imes-icore customer service department.

5.17.2 Fire protection

When processing flammable materials, the operator of the machine must perform a risk assessment of the workstation, because he selects the materials and tools (see also industrial health and safety regulation). The fire hazards must be assessed, taking into account the materials and tools as well as, if applicable, suitable measures to reduce them (e.g. extinguishing equipment, temperature monitoring, monitored operation by employees) are defined.

Always also observe the safety information and data sheets from the cooling lubricant and materials manufacturers! In accordance with the organisational fire protection, suitable extinguisher equipment (fire blankets and fire extinguishers of class A, B, C, D) must be made available as is expedient and in sufficient quantities. When selecting the extinguisher equipment, it is essential to observe the limitations of use and the distance information.

For further information please contact the imes-icore customer service department.

5.18 Displays and signal states

5.18.1 Lights on the control panel

Symbol / colour	Condition
 Blue	Power element of the machine, energized.
 Red	Power element of the machine, not energized.
 White	Protective doors can be opened because the machine is not moving.

5.18.2 Machine lighting for the light socket and interior

Colour	Condition
Yellow	Initialization of the operating software and the machine performs a reference run.
White	Operational readiness
Red	Fault
Blue	The machine is processing a milling job.

5.18.3 Cooling lubricant fill level display (CORiTEC 150i PRO)

The cooling lubricant tank has a MIN / MAX display. The fill level of the cooling lubricant must be checked by the operator each time before wet processing is started! The amount of cooling lubricant should always be between the two markings in order to enable a smooth machining process!

6 Transport and packaging

6.1 Safety instructions for transport

Personnel required:	Specialist personnel	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear	

Before installation and further use, it is necessary to familiarise the storage, operating and maintenance personnel of the operator with package handling. It is essential to observe the following instructions!

6.1.1 Improper transport

⚠ CAUTION!
Risk of crushing when setting up the machine!
When setting up the machine, there is a risk of injury in the form of trapping, crushing and hitting limbs!
• Use of suitable tools, e.g. pallet truck, forklift, crane. • The machine must only be lifted with suitable lifting equipment or by at least two people!

⚠ CAUTION!
With improper transport!
Improper transport may result in transported items falling or toppling! This may result in significant personal injury or property damage!
• Do not stack transports! • Transport with care! • Remove packaging only directly prior to installing the machine!

6.1.2 Eccentric centre of gravity

⚠ WARNING!
Watch for falling or toppling transported items!
Incorrect striking (fastening) may result in injury or even death due to tipping or falling transport pieces, as these may have an eccentric centre of gravity!
• Observe the markings and details of the centre of gravity of packages. • When using cranes, the crane hook should be placed over the centre of gravity of the package. • Carefully lift packages with consideration for possible tilting. • If necessary, adaptation of the attachment point.

6.2 Transporting pallets

Transported items fastened on a pallet can be transported with a forklift truck or lift truck, if the following conditions have been fulfilled and complied with:

- The forklift truck or lift truck must be designed for the weight of the transported item.
- The transported item must be securely fastened to the pallet.
- A driver authorised in accordance with the valid national regulations must be available to drive the industrial truck with driver's seat or driver's platform.
- Drive the forklift truck or lift truck with the forks between or beneath the spars of the pallet.
- Drive in the forks sufficiently, until they protrude on the opposite side.
- Make sure that the pallet cannot tip if it has an eccentric centre of gravity.
- Lift the pallet with the transport item and start to transport it.

6.3 Transport locks

No transport safety devices must be installed.

6.4 Packaging

The individual packages have been packaged according to the anticipated transport conditions. The packaging serves to protect against transport damage, corrosion and other damage. Therefore only remove the packaging directly prior to assembly.

6.5 Handling packaging materials

Store the machine packaging for any subsequent transport. Otherwise take the packaging to an appropriate recycling centre in accordance with the valid legal and local regulations.

6.6 Standard scope of delivery

- CORiTEC 150i dry or CORiTEC 150i PRO
- chuck maintenance kit
- Brush for machine cleaning
- Operating Manual
- Mains cable 3 m
- Patch cable CAT6 RJ45
- Bit holder short hexagon socket
- Bit 3 mm ball head
- Compressed air hose DLS-SK-SF
- O-ring 6,0 x 1,0 NBR60

7 Installation and first commissioning

7.1 Safety instructions for installation and first commissioning

Personnel required:	Specialist personnel / manufacturer	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear, safety goggles, hearing protection	

⚠ WARNING!

Concerning defective installation and initial commissioning!

Defective installation and false first commissioning can result in serious injuries and significant property damage!

- Reading all of the operating manuals and data sheets (CNC machine, extraction system, accessories, etc.).
- Attention to sufficient freedom of assembly at the workplace!
- The assembly location must be clean and orderly! Components and tools that are lying loose or on top of each other are potential accident sources!
- Use of personal protective equipment!

⚠ WARNING!

Before connecting to the mains supply

Only establish the connection with the mains supply network once the machine is ready for commissioning! Failure to do so could result in serious injuries or property damage!

- Check of all installation work with the help of this operating manual and, if necessary, other accompanying documents!
- Check the installation of accessories.
- Avoidance of tripping hazards and damage during the laying of cables and hoses.
- Check the correct fit of all plug connections.
- Check that the actual mains input voltage matches the mains input voltage on the type plate.

Installation and commissioning must be performed exclusively by authorised specialist personnel!

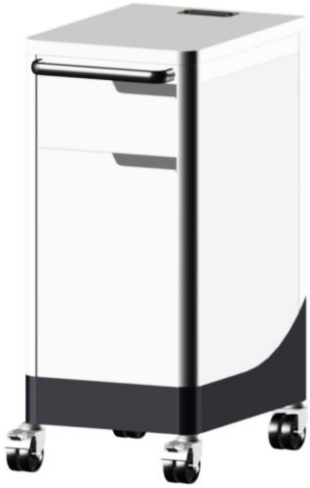
7.2 Requirements for the installation location

The installation location of the machine must fulfil the following requirements. Please observe chapter 4 Technical data in this regard:

- The machine may not be installed in areas at risk of explosion!
- Never operate the machine at locations in which there is a risk that water or other liquids might penetrate the machine.
- The base surface must be dry, level and suitable for the weight of the machine. The base surface must be sufficiently stable, in order to absorb the vibrations produced by the machine.
- Check the surface of the installation site with a spirit level to make sure this is level.
- A corresponding plug, a network connection and a compressed air connection must be located close to the device and be freely accessible.

7.3 Ergonomics and workplace configuration

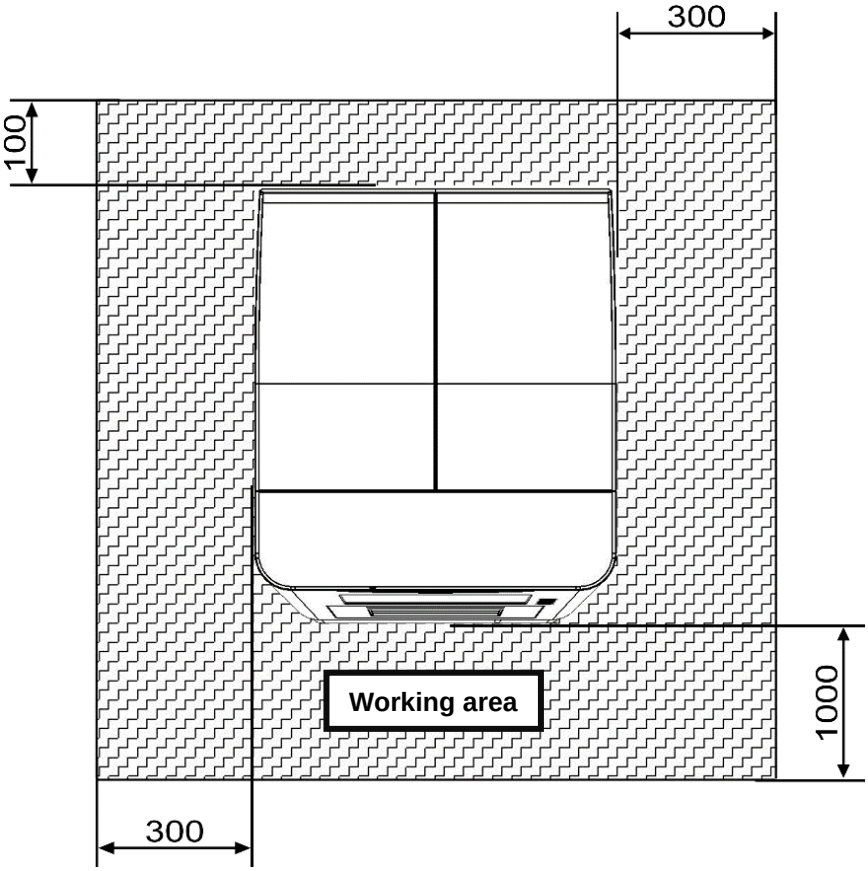
In order to enable the best possible operability and ergonomic work, the machine should be placed on a suitable machine table. imes-icore GmbH will be happy to offer a machine table tailored to your machine.



7.4 Floor plans

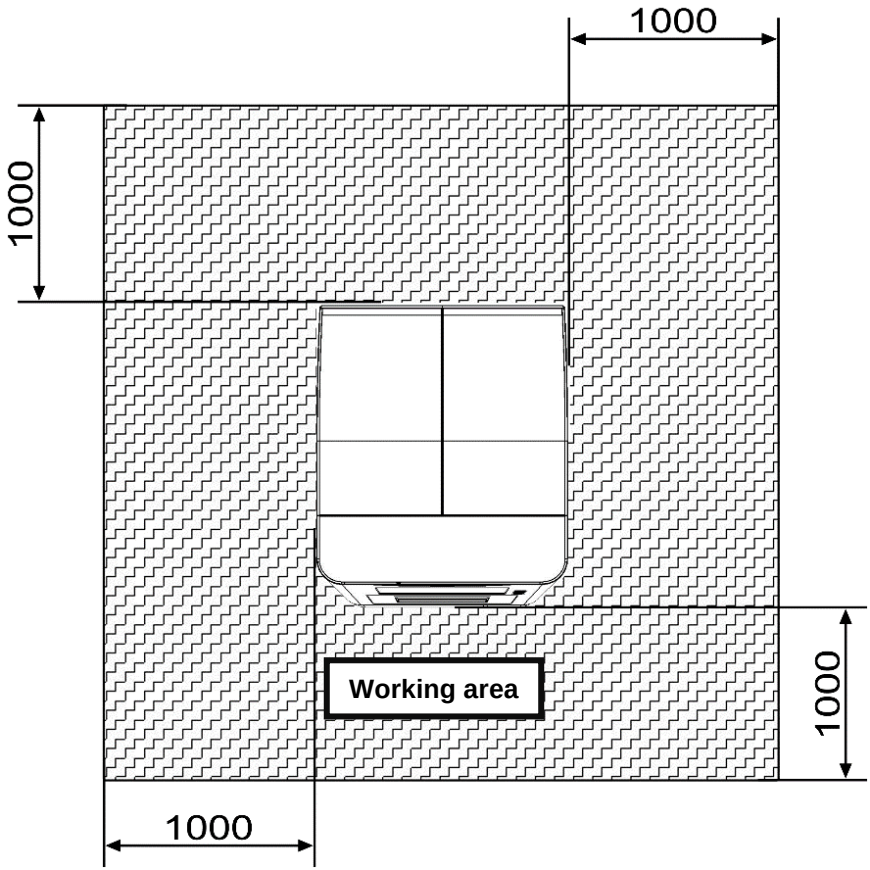
7.4.1 For operation of the machine

All dimensions are indicated in millimetres (mm) and not true to scale.



7.4.2 For service and maintenance work

i	All dimensions are indicated in millimetres (mm) and not true to scale.



i	For service and maintenance work, there must be a distance of 1000 mm to the room ceiling!

7.5 Space requirement

When installing the machine, make sure there is sufficient space around the machine.

- The machine dimensions can be found in the technical drawing (see chapter 4.8) or the technical data (chapter 4).
- Keep sufficient space available around the machine for ventilation and hose connections, and avoid stumbling hazards when laying the connection cables and hoses.
- During operation, the machine must be positioned for operation as described in chapter 7.4.1– Floor plan. So that a distance of 1000 mm in front, 100 mm behind and 300 mm on the right and left side of the machine is available as a minimum.
- Before service and maintenance works the machine must be positioned as described in chapter 7.4.2 - Installation plan for service and maintenance works. There must be a safety distance of 1000 mm around the machine to guarantee an unobstructed area in the workplace, so that it is freely accessible from all sides during service and maintenance work.

This machine is designed for operation in weather-protected areas and must not be operated in explosive atmospheres!

7.6 Setting up the machine

In order to set up the machine, proceed as follows:

Step	Description
1	Transport the machine to the intended installation site (sufficient space must be kept available all around the machine for operation and set-up, traffic/emergency exit routes must be kept clear).
2	Only remove the packaging directly prior to installation.
3	Store the packaging for any subsequent transport.
4	Make sure that all parts included in the scope of supply are contained in the delivery package.
5	Check the delivery for transport damage and raise any complaints immediately.
6	Lift the machine onto a dry, level and firm surface (the installation surface must be capable of absorbing any vibrations, be located at an ergonomically suitable installation height and suitable for the weight of the machine) with at least two persons. A set-up location is also unsuitable if not all machine feet have contact with the floor.

7.7 Connecting the machine

Connect the mains plug-in of the machine with the power mains last. All other electronic and pneumatic connections should be established first!

In order to connect the machine, proceed as follows:

Step	Description
1	Connect the compressed air to the maintenance unit.
2	Connect the hose of the extraction system (optional).
3	Connect control line and, if applicable, cleaning air for the extraction system (optional)
4	Put the extraction system into operation (see manual for the extraction system) (optional).
5	Establish the network connection (optional).
6	If necessary, connect additional accessories (see manuals for the accessories).

The connection requirements can be found in chapter 4. - Technical data and on the machine's type plate!

7.8 Aligning the machine

The clamping surface and all axes are aligned at precise right angles in the factory. It is therefore unnecessary to align the machine. Never loosen the axes fastenings, otherwise a service technician will need to readjust these against a cost!

	The alignment of the machine is checked and guaranteed by authorized service personnel during commissioning!

7.9 Connection to the mains network

DANGER!
Due to electricity!
Contact with live parts or damage to insulation poses immediate danger to life and limb due to electric shock!
• Immediately repair damage to safety equipment and live parts. • When connecting the machine to the mains supply network only use the connection cable supplied. • Only use Schuko outlets because the protective conductor connection is established via the mains connection line!

In order to connect the machine to the mains supply network, proceed as follows:

Step	Description
1	Check whether a suitable power connection is within reach.
2	Compare the technical data for the machine with the data for the available mains supply network. Only proceed with the machine installation if the data corresponds!
3	Connect the mains connection cable with the machine.
4	Check that the mains connection cable is positioned correctly.
5	Connect the mains connection cable with the power connection (shock-proof socket).
6	Make sure that the cable is not strained or rubbing on edges.

7.10 Before first commissioning

Before initial commissioning, you must ensure that:

- The system is installed and aligned on a horizontal surface. Check this with a suitable spirit level.
- The safety distances from the installation plans (see chapter 7.4) were adhered to.
- The workstation is clean and well-illuminated.
- The maintenance unit is connected with a pressure between 3 – 4 bar.
- The required accessories are correctly connected and installed.
- All plug-in connections are secure and correctly seated.
- All cable and hose connections have been laid professionally.
- All covers and safety equipment are installed and functioning perfectly.
- The ambient temperature is between +18 and +25 °C (see chapter 4.4).
- All stipulated technical requirements of the system have been fulfilled (see chapter 4).
- In case of machines with a cooling lubricant system, the cooling lubricant tank is sufficiently filled.
- The operating manual has been read in full and understood, and it is located in the immediate vicinity of the machine and is freely accessible at all times.

7.11 Installation, assembly and use of accessories

The installation or assembly of accessories must take place in accordance with the information in the respective operating manual for the accessories!

⚠ WARNING!
Due to improperly installed accessories!
Improperly installed accessories, e.g. in the interior of the machine, can fall or be thrown around in an uncontrolled manner during operation, which can cause serious injuries!
Always install accessories professionally, with consideration to the safety regulations and the associated documentation!

i	Our customer service is available to you for any questions and assistance you may require.

7.11.1 Extraction systems (optional)

When processing certain materials, harmful fine dust is generated, as well as possible gas development. Ensure adequate ventilation. Make sure the extraction system is functioning correctly. Only process materials that may produce fine dust or gases in conjunction with an appropriately configured extraction system. Please observe the separate operating manual when using and servicing the extraction system. imes-icore GmbH will be happy to offer the appropriate extraction systems.

Always observe the instruction manual for the extraction system selected by you and the safety instructions, maintenance and cleaning intervals specified, in order to ensure the machine's safe and seamless operation.

To connect an extraction system, follow the instructions in chapter 8.3.1.

7.11.2 Wet processing (optional)

During wet processing, the material is processed with an active cooling lubrication system. Only use cooling lubricant approved by imes-icore GmbH for wet processing.

In order to put the cooling lubrication system into operation, follow the instructions in chapter 8.3.2.

DANGER!
By machining reactive materials!
Processing reactive materials such as titanium is a fire hazard due to the material!
• - Reactive materials may only be machined with an active cooling lubricant system! • - Reactive materials may only be machined under supervision! • - The necessity of an automatic extinguishing device must be reviewed!

7.11.3 Cooling lubricants (optional)

Only use cooling lubricants approved by imes-icore GmbH for material processing with a cooling lubricant system. The cooling lubricants used by imes-icore are optimally tailored to the requirements of the machine and guarantee a seamless processing sequence. To ensure intended use, storage and disposal of the cooling lubricant be sure to read the respective safety data sheet issued by the manufacturer. The cooling lubricants must be stored in the containers supplied and intended for this purpose!

Always observe the legal regulations and safety data sheets when handling cooling lubricants. The machine operator must instruct his employees regularly regarding the handling of cooling lubricants and ensure correct storage and disposal!

When using cooling lubricants, always ensure sufficient ventilation!

Malfunctions and property damage when using distilled or demineralized water!

- Distilled or demineralized water, in combination with cooling lubricant, leads to a reduction in the pump capacity of the cooling lubricant system!
- Distilled or demineralized water causes damage to the machine as a result of chemical reactions!
- If necessary, distilled or demineralized water may only be used mixed with drinking water, according to a mixing ratio of no more than 50%.

8 Operating the machine

8.1 Safety instructions for operation

Personnel required:	Operator	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear, safety goggles, hearing protection	

For safe handling of the machine, note the following points:

- Persons who operate the machine must be at least 18 years of age!
- During training, all persons - in particular those under the age of 18 - must be supervised constantly!
- The machine must be operated exclusively by authorised and trained specialist personnel without physical limitations!
- Responsibilities for the operation, maintenance and servicing of the machine must be clearly stipulated and complied with!
- Cleaning, maintenance and servicing work must only ever be carried out when the machine is switched off!
- The machine operator should attend a training session of at least one day before operation, in order to learn how to handle the system safely and avoid erroneous use!
- Before every milling process check that the blank is secure, so that it cannot become loose during processing.
- Before starting processing, always check that sufficient cooling lubricant is present in the cooling lubricant tank! If the pump of the cooling lubricant system should run dry, then this can lead to the destruction of the pump!
- Do not use running water for cooling/lubrication, but rather only a cooling lubrication system with suitable cooling lubricant!
- Every person involved with the installation, operation, maintenance, repair or inspection of the machine must have read and understood all the safety instructions!
- In order to minimize ergonomic hazards, the operator must provide sufficient personnel to operate the machine!

⚠ DANGER!
Due to sharp-edged or pointed tools!
Risk of injury and death when reaching into the machine's interior!
• Be aware of protruding tools! • Caution with sharp tools! • Never reach inside the machine until all components and tools are at a complete standstill! • Wear protective gloves and safety goggles!

DANGER!

Due to improper operation!

Improper operation of the machine can result in serious injuries and significant property damage!

- Operating steps must be carried out in accordance with the instructions in this operating manual!
- Safety devices must not be bypassed, manipulated or turned off!
- Changes to tools, materials or parameters must be monitored during the process (monitored operation)!
- Check the machine for obvious defects and integrity before switching on.
- Eating, drinking and smoking are prohibited when handling cooling lubricants or vacuumed substances!
- Mobile phones may not be used in close proximity to the machine, because interference of the CNC control cannot be excluded.
- Keep traffic and escape routes clear!

WARNING!

Risk of slipping!

A risk of slipping exists due to dust, material, oil or cooling lubricants on the floor! Heavy parts or sharp tools may cause serious injuries!

- Therefore, remove all soiling from the user's workstation immediately!
- Clean the machine and workstation regularly!
- Wear non-slip safety footwear!
- Carry out regular employee training!

Caution!

Be careful of hot surfaces on materials and tools!

Risk of burns on heated materials or tools after processing!

- - Check the temperature of components, materials or tools before they come into contact with other items!
- - After machining, wait several minutes until the surfaces of components, materials or tools have cooled down!

⚠CAUTION!
When switching the machine and the accessories on and off!
Incorrect switching on and off can cause a short!
The machine and accessories must always be switched on and off with the respective master switch. Never use the mains plug as an on / off switch!

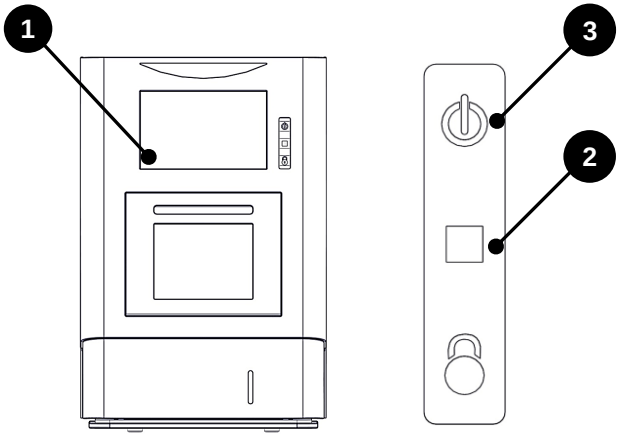
⚠CAUTION!
Loose tools or objects inside the machine!
Loose tools or objects in the interior of the machine can block or be thrown around moving components of the machine. This can cause property damage!
Before starting the machine, check the machine interior for loose and lying objects!

⚠CAUTION!
Beware of the formation of fine dust or gas development!
Damaged suction hoses or an unsuitable extraction system can cause gas and fine dust pollution!
• Before starting the machine, check the extraction system for proper function and integrity! • Replace porous and defective suction hoses!

i	Always ensure a clean and well-lit workstation!

8.2 Operating elements

Machines from the **CORiTEC 150i series** have the three following operating elements:



Pos.	Designation	Description
1	Control panel	The control panel serves to operate the machine (control -PC). Navigation and the entry of data for the operating system and operating software are done directly via the touchscreen.
	The touchscreen is used to operate the machine.	
2	Stop button	The stop button interrupts the movements of the machine. After pressing the stop button, the power electronics are disconnected from the power supply.
	After resetting or restarting the operating software, the machining process can be restarted from the beginning.	
3	Power button	Pressing the power button switches on the machine's power electronics. It is only possible to switch on the power electronics if all safety-relevant electronic equipment is fully functional.
	The power button must be pressed before starting the operating software or after a prompt from the operating software.	

8.3 Operating modes

⚠CAUTION!
When changing operating modes!
When changing the types of dry to wet or wet to dry, heavy contamination and coolants can damage the machine or the extraction system!
Thoroughly clean the machine when changing the type of machining and at least once a day!

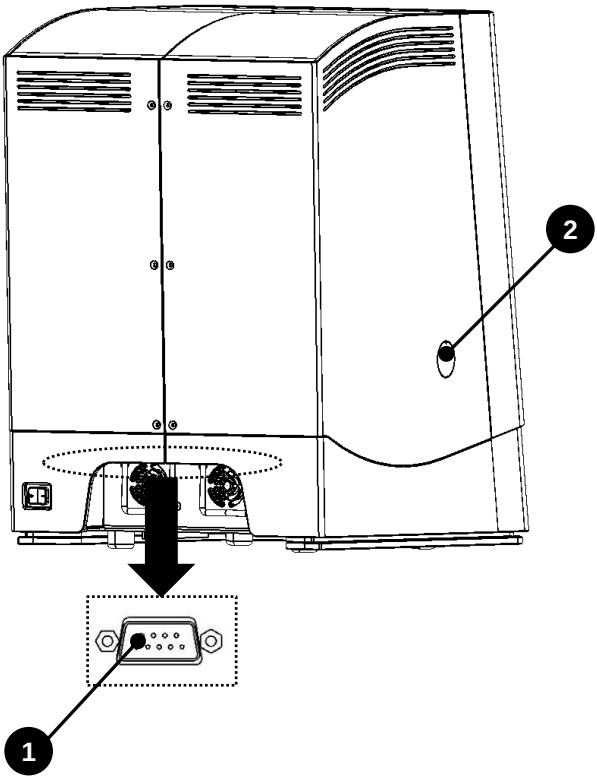
8.3.1 Dry processing

⚠CAUTION!
In case of improper use of an imes-icore extraction system!
The extraction systems supplied by imes-icore GmbH serve exclusively to vacuum **dry** milling dust. Do not vacuum cooling lubricant residues with the extraction systems supplied. This can lead to serious damage and even destruction of the extraction system!
Thoroughly clean the machine when changing the type of machining and at least once a day!

During dry processing, the material is processed without a cooling lubrication system. As such, fine dust and gases can be produced, which may have harmful effects on health. Furthermore, dust that is not extracted may damage the machine and result in an increased risk of fire. The connection and operation of an extraction system approved by imes-icore GmbH is therefore required for the dry processing of materials.

In order to start dry-processing a blank, proceed as follows:

Step	Description
1	Connect the extraction system to the control connection of the machine (1) using the supplied control cable (included in the extraction system).
2	Plug the hose of the extraction system into the suction port (2).
3	Connect the low-heat device connector of the extraction system to an external Schuko socket®.
4	Check that the extraction system is correctly connected.
5	Start the milling process with the extraction system switched on.

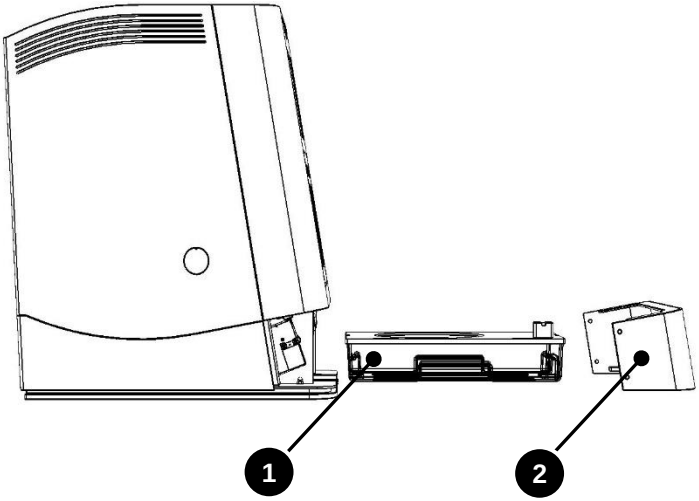


Pos.	Designation
1	Sub-D socket (connection for control cable of the extraction system)
2	Suction port (connection for the extraction system hose)

8.3.2 Wet processing (CORiTEC 150i PRO)

In order to start wet-processing a blank, proceed as follows:

Step	Description
1	Thoroughly clean the complete machine interior of chips and dry milling dust (always wear protective gloves and protective goggles!).
2	Remove the cooling lubricant tank (2) access door by pulling it off.
3	Remove the cooling lubricant tank (1).
4	Thoroughly clean all filters and the sump of contaminants and fill the sump with 3 l of diluted cooling lubricant mixture (observe the mixture ratio according to the cooling lubricant description).
5	Reinsert the cooling lubricant tank (1).
6	Close the access door to the cooling lubricant tank (2).
7	Start the milling process.



8.4 Operating modes

⚠ WARNING!
Beware sharp and pointed tools or chips during set-up operations!
In the machine's set-up mode there is an increased risk of injury due to sharp milling tools, protruding tools, sharp or pointed chips!
Always wear adequate protective gloves and safety goggles in set-up mode!

This milling machine has two modes of operation. These are explained hereafter.

8.4.1 Automatic mode

When the protective door is closed, the machine is in "automatic" mode. The drives and milling spindle can only be actuated in this operating mode. A program start can take place when the machine is in this state.

8.4.2 Setup mode

When the protective door is open, the machine is in "set-up" mode. The drives and milling spindle cannot be actuated in this operating mode. No program start can take place in this machine state. This operating mode is used to load the machine with tools and blanks.

8.4.3 Expanded set-up

Expanded set-up is only accessible to authorised and trained specialist personnel (service personnel) of imes-icore GmbH. This function serves to parametrise the machine and access is protected by a password.

8.5 Process description

The templates of the components to be milled are sent as "STL files" to a CAM software, such as CORiTEC iCAM VX in the CAM software, the components are positioned in a blank. Afterwards, settings such as traversing speed, immersion depth of the milling cutter, milling sequence and scaling are automatically determined for further processing. The CAM software generates the milling paths and calculates a milling file. The fully calculated milling file is saved on the machine's control PC in the folder "Documents\imes-icore\SmartControl“. The operating software "Smart Control" assumes and processes this information and controls the machine.

8.6 Tasks before each use of the machine

Observe the following every time before starting work with this machine:

- Check the machine for visible defects and ensure integrity.
- Make sure that all covers and safety equipment are installed and functioning perfectly.
- Make sure that all plug-in connections are securely positioned.
- Check the ambient temperature. It should correspond with the information provided in the technical data.
- Ensure that the required accessories (e.g. extraction system) are correctly connected and ready for operation.
- Make sure that machines with a cooling lubrication system have sufficient cooling lubricant in the cooling lubricant tank and that the filters/screens are clean (CORiTEC 150i PRO).
- Check that the required tools are in the machine's tool changer and that the assignment corresponds with the assignment in the operating software.
- Check the machine interior for any loose parts and tools lying around.
- Check the alignment and correct fastening of the blank.
- Ensure that successful referencing of the machine has taken place.

8.7 Milling file identifiers

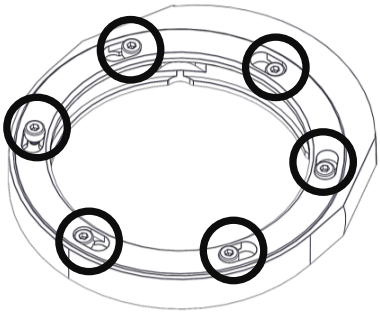
After processing the blank to be produced in the CAM software, a file is created with the ending ".iso". This file contains all relevant data that is required for executing the milling process. The name of the generated file is composed of blank names, blank heights, material descriptions and other information. Once the file has loaded, it is possible start the milling process by selecting the menu item "open milling program" and pressing the "start" button in the operating software.

8.8 Switching on the machine

In order to switch on the machine, proceed as follows:

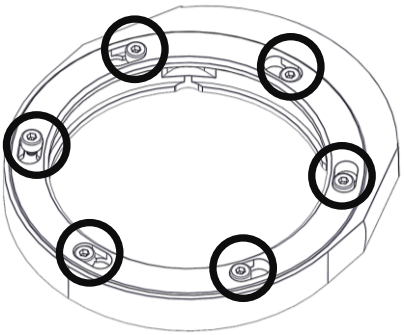
Step	Description
1	Close the safety door.
2	Switch on the main switch (position "1"). 
3	Switch on the power button. 
4	If necessary, activate additional accessories (such as the extraction system).
5	Open “settings”. 
6	Open “maintenance and cleaning”. 
7	Start the function “Run spindle warm-up”.

8.9 Insert blank

Step	Description
1	Start the machine (chapter 8.8).
2	Wait until the cover signal lamp lights up, then open the protective door. 
3	Loosen (do not remove) the clamping screws (black circle) with a 3 mm Allen key. 
4	Remove the clamping ring by turning it in a clockwise direction to the right.
5	Clean the tool holder using the cleaning brush.
6	Insert the blank into the blank holder.
7	Make sure the blank is correctly aligned.
8	Insert the clamping ring and turn it to the left in counter-clockwise direction, until reaching the stop.
9	Tighten the clamping screws of the clamping ring until hand-tight. The clamping ring may not lift off. It must be flush with the blank holder on all sides!
10	Check the secure seating of the blank!
11	Close the protective door.

8.10 Remove blank

In order to remove a blank **from the** blank **holder, proceed as follows:**

<table>
<tr><th>Step</th><th colspan="2">Description</th></tr>
<tr><td>1</td><td colspan="2">Start the machine (chapter 8.8).</td></tr>
<tr><td>2</td><td colspan="2">Wait until the cover signal lamp lights up, then open the protective door.</td></tr>
<tr><td>3</td><td>Loosen (do not remove) the clamping screws (black circle) with a 3 mm Allen key.</td><td rowspan="3">  </td></tr>
<tr><td>4</td><td>Remove the clamping ring by turning it in a clockwise direction to the right.</td></tr>
<tr><td>5</td><td>Remove the blank.</td></tr>
<tr><td>6</td><td colspan="2">Close the protective door.</td></tr>
</table>

8.11 Load the tool magazine

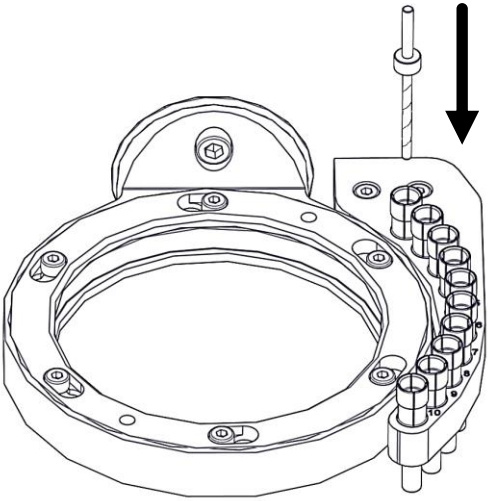
Only use milling tools from imes-icore GmbH.

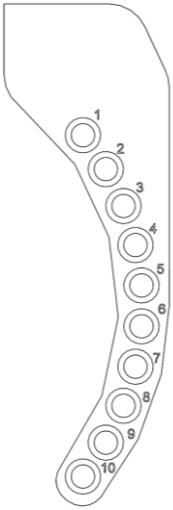
The tool magazine can be loaded with a maximum of ten tools. Each available tool position can be assigned an arbitrary tool type.

The software does not check whether the milling cutters in the tool fields are actually inserted in the machine. If an incorrect milling cutter type or no milling cutter type is stored then this can result in serious damage to the milling cutters, the material or the machine!

In order to load the tool magazine with tools, proceed as follows:

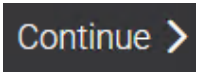
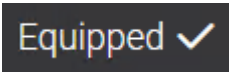
Step	Description
1	Start the machine (chapter 8.8).
2	Wait until the cover signal lamp lights up, then open the protective door. 
3	Insert the tool in the corresponding tool station in the tool magazine with the cutting edge to the front, as shown in the left image below (wear protective gloves!). Do not damage the tools when inserting and pay attention to a tight fit in the tool holder. The arrangement of the tool stations is shown in the lower right-hand view.
4	Close the machine's protective door.
5	Check the operating software in the Tools menu to ensure that the tool assignment in the tool changer matches the assignment in the operating software!





8.12 Tool assignment in the Smart Control operating software

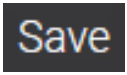
The following chapter includes a description of how to allocate a tool type to a tool station.

Step	Description
1	Start the machine (chapter 8.8).
2	Open the "Tools" menu item. 
3	Open the "Equip tool magazine" menu. 
4	Select the station number in the “Tool places” table.
5	Select a tool In the "Available tools" table that you want to store in the selected tool station.
6	Press “Continue”. 
7	Press “Equipped”. 

8.13 Replacing old tools

The runtime of the tools is logged during machining. The preset maximum service life of the tools is a recommendation of imes-icore GmbH and may vary depending on the material used. If the runtime of a tool has expired, it must be replaced. The tool must also be replaced after a tool breaks.

i	**Only instructed personnel are permitted to replace tools.**

Step	Description
1	Open the "Tools" menu item. 
2	Wait until the cover signal lamp lights up, then open the protective door. 
3	Remove the old tool from the tool magazine. (Wear protective gloves!).
4	Insert the new tool (chapter 8.11).
5	Close the machine's protective door.
6	Open the "Edit tool" menu. 
7	Reset the “Service Life (total)”. 
8	Exit the menu by selecting "Save". 

8.14 Starting a milling process

In order to start a milling process, proceed as follows:

Step	Description
1	Start the machine (chapter 8.8).
2	Insert the blank (see chapter 8.9).
3	For wet processing, check the cooling lubricant fill level.
4	Close the protective door.
5	Open the "Jobs" menu item. 
6	Open the "Select job" menu. 
7	Select the correct holder.
8	Select the Job.
9	Exit the menu by selecting "Selected". 
10	Wait until the milling file has been validated. If problems arise during validation, follow the instructions on the screen.
11	Check whether the machine has been equipped with all the required milling tools.
12	Start the milling process. 

8.15 Switching off the machine

In order to switch off the machine, proceed as follows:

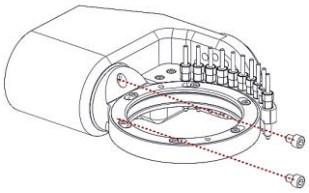
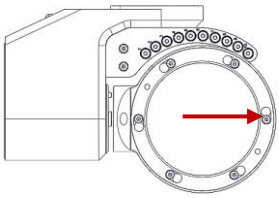
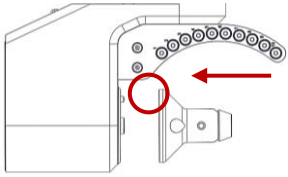
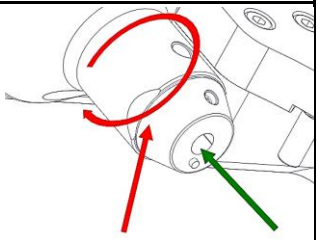
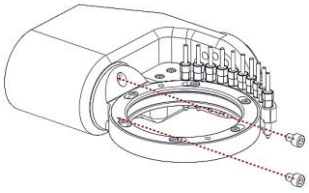
Step	Description
1	Open "Options". 
2	Click "Switch off machine". 
3	Wait for the operating system to shut down completely.
4	Switch off the main switch in the connection panel of the machine (position "0"). 
5	Switch off any accessories (e.g. extraction system).

8.16 Replacing the blank holder

Various blank holders can be used in the machines of the CORiTEC 150i series. The following description can be used analogously for changing all available blank holders.

	Torques for the fastening screws of the blank holders
	A torque wrench with a suitable hexagon socket bit is included in the scope of delivery of optionally available blank holders. This is used for mounting and dismounting the blank holders. In addition, the required torque of the fastening screws of 5.7 Nm can be set with the tool.

Step	Description
1	Open the "Settings" menu item. 
2	Open "Replace holder".
3	Clean the working room (Chapter 10.3.3).

Step	Description	
4	Remove the two M6 cylinder head screws of the installed blank holder by using the torque wrench with hexagon socket bit.	
5	Remove the two M6 cylinder head screws of the installed blank holder.	
6	Carefully place the new blank holder on the fixing. The hole of the blank holder must be located on the locking pin (circle).	
7	Before and during the screwing of the blank holder, a slight axial pressure must be applied with one hand in the direction of the arrow (green). No radial or torsional force (red arrows) may be exerted here.	
8	Carefully screw the two M6 cylinder head screws into the threads until a slight resistance is felt. The two M6 cylinder head screws must then be tightened ever more firmly in alternation (at least three times). The torque wrench with hexagon socket bit must be used for this purpose.	

9 Smart Control operating software

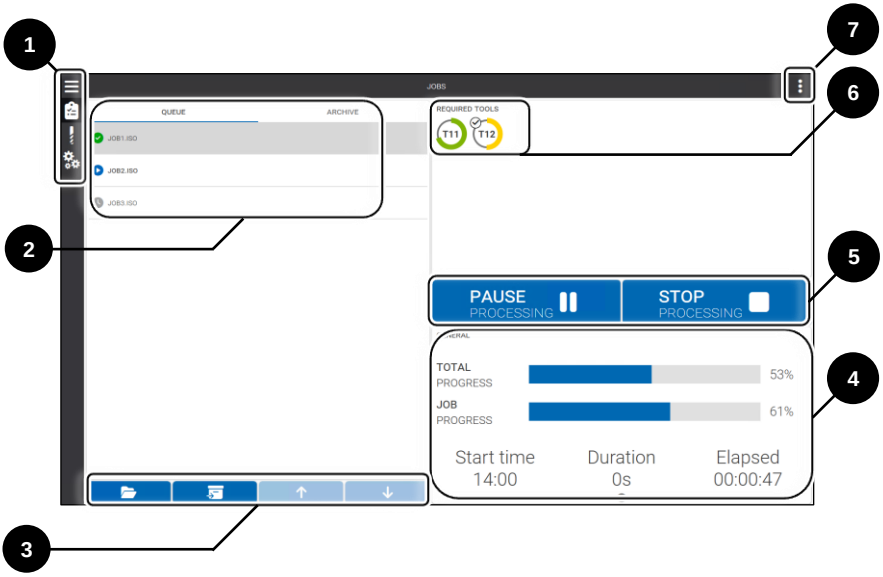
9.1 Menu selection

In the menu selection you can switch menus.

Symbol	Designation
	Jobs
	Tools
	Settings

9.2 Jobs menu item

After starting the operating software, the Jobs menu item will open. This menu contains the functions and status displays before and during the milling process.



Pos.	Designation
1	Menu selection
2	Milling files menu
3	Options for milling files
4	Status displays during machining
5	Job processing control keys
6	List of required tools with status display
7	Options

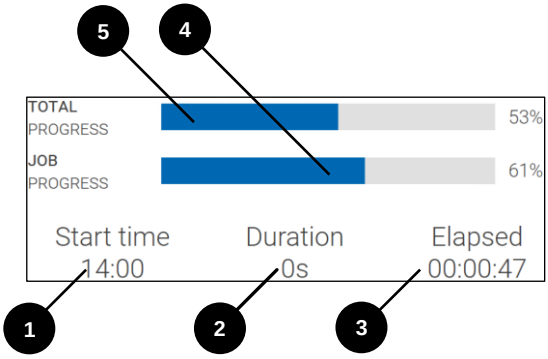
9.2.1 Options for milling files

In the options for milling files, milling files can be loaded into the list of milling files. Milling files can also be deleted, archived and prioritized.

Symbol	Designation
	Load milling file into the list of milling files
	Archive milling file (optionally delete)
	Move the milling file up in priority
	Move the milling file down in priority

9.2.2 Processing status display

The processing status display shows run times and percentage status displays.



Pos.	Designation
1	Processing start time
2	Processing time of all validated jobs
3	Elapsed time of processing all validated jobs
4	Percentage status display of the current job
5	Percentage status display of all jobs

9.2.3 Job processing control keys

The processing options control the processing of the milling file.

Symbol	Designation
START PROCESSING	Start processing the milling file
PAUSE PROCESSING	Pause processing of the milling file
STOP PROCESSING	Stop processing of the milling file

9.2.4 List of required tools with status display

The required tools are displayed in the list of milling files in this section of the operating software. In addition, the operator receives information on the status of the tools and their remaining run time in the form of pie chart.

9.2.5 Options

In the Settings submenu, you can change the "Archive milling file" function to "Delete milling file". You will also find an overview of the serial numbers of components and your machine here. The protocol logs relevant events of the Smart Control for diagnosis in the event of problem cases.

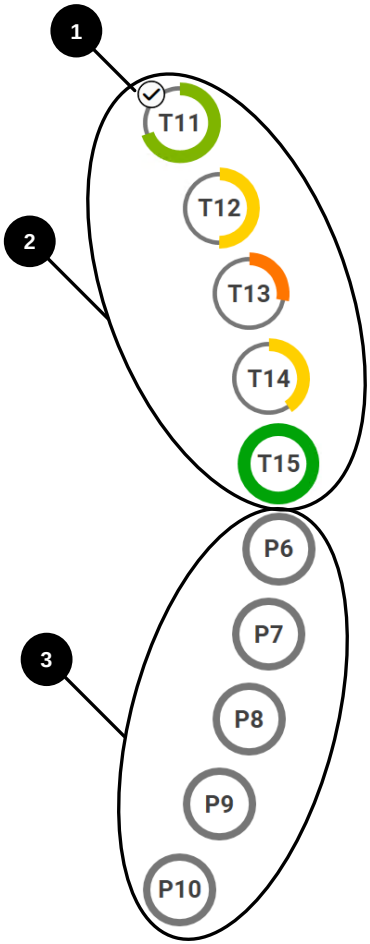
9.3 Tools menu item

The Tools menu item contains information on the status and tool runtime of the tools. In addition, tools (tool stations) can be edited.

Pos.	Designation
1	Overview of tool stations and assignment
2	Zoom functions
3	Edit tool stations
4	Tool information

9.3.1 Overview of tool stations and assignment

This overview shows the assignment of tools to the tools. In addition, the tools' status and remaining time are displayed.



Pos.	Designation
1	Tool clamped in the machining spindle
2	Current tool assignment
3	Free tool stations

9.3.2 Edit tool stations

Symbol	Designation
	This function can be used to assign a new tool to a tool location.
	A previously marked tool is clamped in the milling spindle and measured.
	The residual run time of a marked tool can be reset.
	A previously selected tool is deleted.

9.3.3 Signal states of the tools

Symbol	Designation
	Tool too short
	Tool too long
	Tool runtime has expired
	Tool in collet
	Broken tool
	Tool has not been measured

9.4 Settings menu item

The Settings menu item contains the following subitems:

Symbol	Designation
	General
	Account
	Cleaning and maintenance
	Calibration
	Technical functions
	Setting up
	Help and Contact
	System

9.4.1 General

Periphery of the machine

Displays the status of the temperature monitoring and lighting control.

Operating status of the machine

Displays the measured temperature inside the machine.

Inputs of the machine

Shows the status of the work area door, the collet chuck and the compressed air.

9.4.2 Account

In the Account section, registration in the Dental Smart Market (DSM) can be performed. Then information about the machine, the company account and the user account is displayed.

9.4.3 Cleaning and Maintenance

Automated cleaning

Wet or dry cleaning can be performed here. The cleaning type must be selected according to the last milled job.

Manual cleaning

Starts an assistant to support the cleaning work inside the machine.

Visual inspection

This function rotates the blank and allows access to the underside to check the fit of dental jobs, for example.

Perform spindle warm-up

This function must be performed every time the machine is restarted. In addition, the function must be executed again after four hours of standstill. The grease lubrication of the bearing is preheated by the warm run and increases the service life of the milling spindle.

Perform spindle maintenance

Starts a wizard to perform the cleaning of the machining spindle.

Maintenance intervals

This contains information about the next maintenance date of the machine. In addition, the change interval of the cooling lubricant is displayed and can be reset via "Reset interval".

9.4.4 Calibration

In this area, the blank and rotary pivot point can be calibrated manually or automatically. calibrated.

9.4.5 Technical Function

Positions

Positions contain information about the blank zero point and the current position.

Outputs

Cooling lubricant pump and suction can be switched on manually in this menu.

Holder

In this area, wizard-guided exchange of the blank holder is supported.

9.4.6 Setting Up

Language and style

In this section you can set the language settings and display the color scheme.

Network

Here the network status and the networks in the environment are displayed.

Network drives

Network drives can be added and connected.

Jobs and holders

Here the archiving of jobs after processing can be switched on or off. Additionally, the duration of archiving can be set.

Import

Deleting the source file of the jobs can be switched on or off automatically.

Holder

Additional blank holders can be activated and deactivated.

9.4.7 Help and Contact

Contact

Contact details of the contact person in case of service.

Remote maintenance

Information about remote maintenance for support by the service partner.

Technical details

Information about the serial number, model number and application version of the machine.

9.4.8 System

This area contains information about the machine, the computer, the application, the manufacturer, legal information about the software and third-party libraries. In addition, the registration of the machine can be undone via "Reset options". This function should be executed if the machine is resold.

10 Service, maintenance and cleaning

10.1 Safety instructions for service, maintenance and cleaning

Personnel required:	Specialist personnel / manufacturer	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear, respiratory protection, safety goggles	

Maintenance personnel have a duty to immediately report and eliminate anomalies or faults that could affect safety! This also includes checking for possible corrosion damage or the appearance of component fatigue! The machine must not be operated after such faults arise and must be disconnected from the mains power and compressed air supply until the faults have been remedied by qualified specialist personnel!

The operational safety and service life of the machine are increased by regular maintenance and care.

⚠ DANGER!

Due to lack of care during maintenance, repair and cleaning!

Incorrect use or failure to use operating and auxiliary equipment as well as personal protective equipment results in serious injuries!

- Before performing cleaning, maintenance and servicing work, switch off the machine's main switch and unplug the mains plugs in order to prevent the machine being switched on accidentally (establish safe machine state)!
- Only use suitable climbing aids for cleaning, maintenance or servicing!
- Always wear protective gloves and safety goggles because a general risk of injury exists due to sharp-edged or pointed chips and tools!

⚠ DANGER!

Risk of injury due to sharp-edged or pointed milling tools!

Risk of injury and death when reaching into the machine interior due to sharp-edged or pointed tools!

- Be aware of protruding tools!
- Always wear protective gloves when reaching into the machine's interior!

⚠ DANGER!

Due to sharp-edged or pointed chips!

Risk of injury when reaching into the cooling lubricant tank and taking out the screen and filter. The glass-ceramic / milling chips inside may be sharp-edged or pointed and could cause deep cuts or injuries!

Always wear protective gloves and safety goggles when cleaning the cooling lubricant tank and filter!

⚠ DANGER!

Danger of explosion and fire!

The combination of oil mist and air can produce a highly explosive mixture! An explosion can cause injury and death.

- Do not blow out the machine with compressed air or oxygen!
- Open fire and smoking is strictly prohibited when handling the machine!
- Never use any aggressive, caustic or flammable cleaning products!

⚠ Caution!

By neglecting ergonomic principles

The processes for cleaning, maintenance, troubleshooting and troubleshooting may be hazardous to health!

- Use of suitable lifting aids and tools.
- Replacement of defective lights.
- Regular cleaning of lights.

⚠ CAUTION!

During cleaning and maintenance!

When cleaning and maintaining the machine, your airways may be contaminated by gases and dusts!

- Inhalation of gases and dusts must always be avoided!
- Always wear suitable respiratory protection!

10.1.1 Electrical system

⚠ DANGER!
Mortal danger from electric shock!
All work on the electrical system, such as connecting the mains supply network, maintenance and repair, must be performed by qualified specialist personnel only. Even when the main switch is switched off, parts of the electrical system continue to be live and may cause injury and death if touched!
• In order to perform maintenance, service and cleaning work, always disconnect the machine from the mains power supply first and wait for a few minutes before starting work. • In order to avoid an electric shock, do not insert objects into the machine. The only exception is the intended replacement of parts in accordance with this operating manual. • Regular checks for insulation and housing damage. • Regular checks of earth resistance.

10.1.2 Pneumatic system

⚠ DANGER!
By whipping hose lines and slinging-away parts!
Defective hose lines and the resulting flinging parts can cause life-threatening injuries!
• All work on the pneumatic system, such as commissioning, maintenance and repair must be performed by qualified specialist personnel only! • The machine must be switched off and the pressure relieved prior to commencing work with the pneumatic system!

10.1.3 Replacement parts

DANGER!
Due to the use of incorrect replacement parts!
The use of incorrect or faulty replacement parts causes extreme danger for operating personnel. This can result in damage, malfunctions or a total failure of the machine!
• Only use original replacement parts or replacement parts approved by imes-icore GmbH! • Use of replacement parts that have not been approved voids the manufacturer's guarantee! • In case of question, contact the imes-icore GmbH customer service department!

10.2 Maintenance and repair plan

Daily [Operator]

- Visual inspection* (defective parts must be replaced and defects corrected!)
  - Casing and seals for damage
  - Power and compressed air supply lines for damage
  - Cooling lubrication system for leakage
  - Work area door for damage
  - Condensate tank of the maintenance unit (must be emptied)
- Cleaning (also after changing the milling types wet / dry)
  - Working room
  - Working room door
  - Clean and maintain additional accessories (suction unit, etc.) according to the manufacturer's documentation.
  - Illuminate (interior lighting)
  - Milling spindle and collet (generally also after the machining of glass ceramics and tool breakage)
- Cooling lubrication system (for frequent machining of glass ceramics
  - Rinse with clear water
  - Clean or replace filters and sieves
- Cooling lubricant
  - Check filling level and refill if necessary

Seven-day [operator]

- Cooling lubrication system
  - Rinse with clear water
  - Clean or replace filters and sieves

Fortnightly [Operator]

- Cooling lubrication system
    - Cleaning the coolant tank
    - Grease sealing rings on intake manifold
- Change cooling lubricant

Four-week [operator]

- Calibration (even after faulty machining)
    - Workpiece zero point / B axis
    - Pivot point
- Clean or replace the filters of the aeration fans.

Semi-annual [Service Technician]

- Testing the grounding resistances
- Maintenance for use in multi-shift operation
- Replacing the collet (also in case of fitting problems or unclean surfaces after machining a blank).

Annual [Service Technician]

- Maintenance when used in single-shift operation

*During the visual inspection by the user, it is necessary to observe the following points in general:

- Corrosion,
- Signs of fatigue from
    - Fastenings of the machine parts,
    - Energy supplies (e.g. cable trays)

Irregularities must be reported and remedied immediately. In case of repair work, safety parts (e.g. cotter pins, lock nuts) shall be replaced with new parts. After maintenance and servicing work, activities must be documented in writing in a test log and a check of the most important connections must take place!

10.3 Cleaning and maintenance

10.3.1 General on cleanliness

Cleanliness and regular cleaning of the machine increase the service life of the individual components and prevent malfunctions.

The machine should be cleaned according to the service and maintenance plan (chapter 10.2).

Dry chips and dirt are cleaned with a brush and a suitable vacuum cleaner.

Wet chips and dirt are cleaned with a brush. Cooling lubricant residues are then removed with cleaning cloths.

During cleaning, no dirt in the form of dust or moisture may get into the mechanics of the machine! Therefore, cleaning with compressed air is not permitted!

Only suitable cleaning agents may be used for cleaning the machine. **Never** use abrasive, corrosive or flammable cleaning agents! Cleaning agents may contain substances that are harmful to health! The instructions of the respective manufacturers must always be observed.

The operator of the machine must ensure that cooling lubricants and extracted milling dusts are stored and disposed of properly and professionally. The legal regulations must always be observed!

Aggressive cleaning agents can cause material damage to the machine!
No cleaning agents may be used which damage hoses, cables, paints, plastics or seals!

Only the following aids may be used to clean the machine:

- Brush
- Hand brush
- Suitable vacuum cleaner
- Cleaning wipes
- Non-abrasive and non-flammable liquid cleaners.

10.3.2 Milling spindle and collet chuck

Milling spindle

To ensure a long service life of the milling spindle, the following points must be observed during handling:

After **wet processing** (especially with glass ceramic), the underside of the milling spindle must be cleaned with a damp cloth! There must be no visible residue of chips or dirt. The underside of the milling spindle must then be dried with a disposable cloth.

After **dry processing**, dry chips and dirt are removed with a brush and a suitable vacuum cleaner.

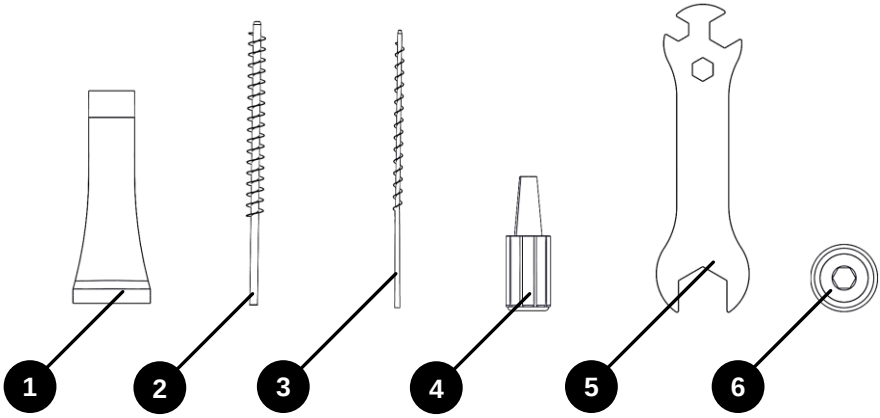
For proper cleaning and maintenance of the milling spindle, the operating instructions of the milling spindle must also be observed.

- Proceed with the necessary caution. Avoid the application of force, e.g. impacts, striking, excessive pressure on the shaft or forceful clamping, because the precision and service life of the milling spindle will be impaired. Details are available in the separately supplied operating manual.
- The milling spindle nose and tools used must be clean. Dirt and the resulting increased centrifugal forces create a heavy load on the bearings, which significantly increases wear and tear.
- The hybrid ball bearing of the milling spindle is equipped with permanent grease lubrication and is therefore maintenance-free. In order to achieve the longest possible service life of the hybrid ball bearing, only well-balanced tools should be used (reduced centrifugal forces).
- In order to guarantee concentricity, the clamping device must not be damaged. To check this, open the collet chuck, remove the tool and check the collet chuck for damage, corrosion or soiling (deposits).
- For professional cleaning and maintenance of the machining spindle, also observe the manual of the manufacturer supplied separately.
- Never clean the milling spindle with spray oils, liquids or compressed air pointed directly at the centrifugal disc of the spindle nose, as moisture or dirt can penetrate directly through to the bearing.

For cleaning and maintenance of the collet, the supplied collet maintenance set must be used.

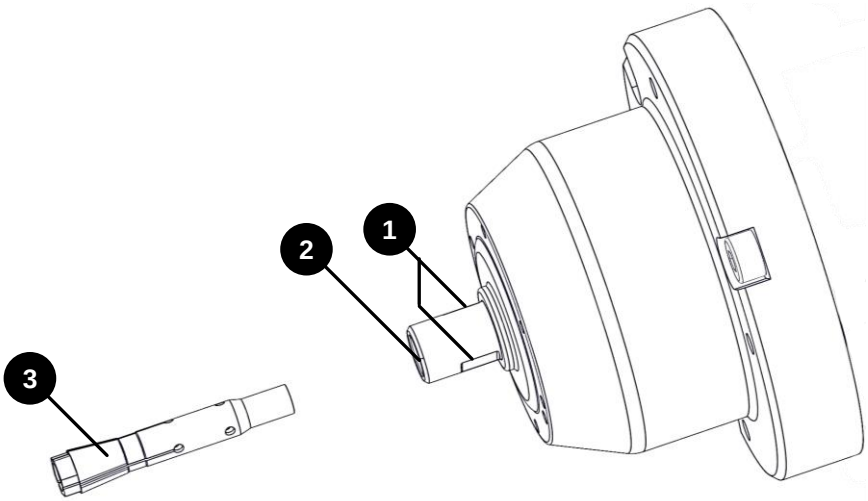
i	Switching on the milling spindle without a collet chuck and inserted tool will damage the milling spindle

Collet maintenance kit

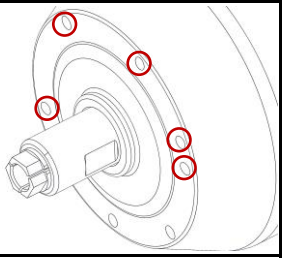
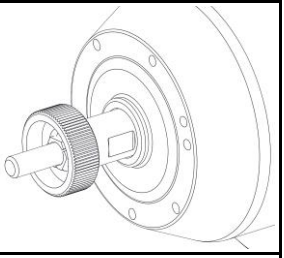
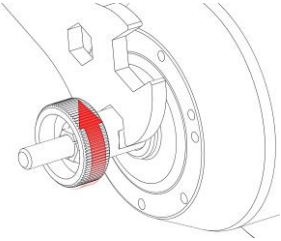
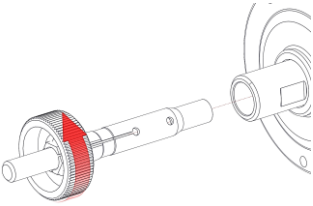


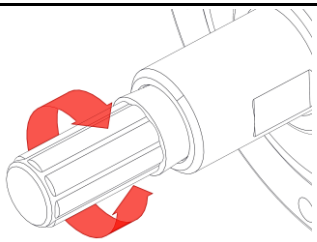
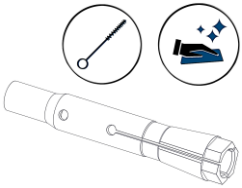
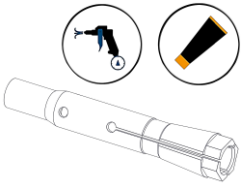
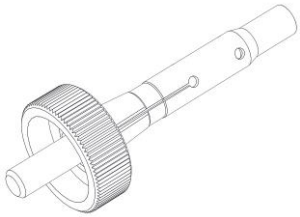
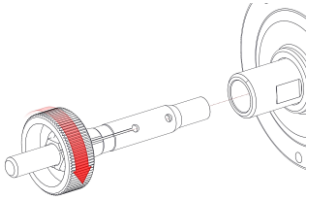
Pos.	Designation
1	Collet grease
2	Cylinder brush large
3	Cylinder brush small
4	Felt cleaning cone
5	Open-end wrench (quadruple)
6	Tool for collet

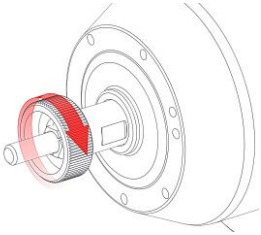
⚠CAUTION!
When using the chuck grease!
Extended skin contact with the chuck grease can lead to skin irritations and/or dermatitis!
• Avoid lengthy and intensive skin contact! • Clean skin thoroughly after work and before breaks! • Apply skin protection products to protect your hands! • To request the safety data sheet for the chuck grease, contact the respective customer service department!



Pos.	Designation
1	Width across flats
2	Shaft with inner cone
3	Taper of collet

Schritt	Description
1	Open the "Settings" menu item. 
2	Open "Cleaning & Maintenance" and press "Perform Spindle Maintenance". 
3	Clean the air and coolant nozzles in the lower area of the milling spindle with an interdental brush. 
4	Clean the work room (chapter 10.3.3).
5	Carefully place the collet tool on the outer hexagon of the collet and insert the blind plug or a tool shank into the collet opening. 
6	Turn the collet tool in the direction of the arrow to loosen the collet. If the collet cannot be loosened with little force, a suitable open-end wrench must be applied to the wrench size for countering. The collet can then be loosened by applying greater force. 
7	Unscrew the collet completely from the inner cone of the shaft and remove it carefully. 

Schritt	Description
8	Evaluate the condition of the collet. In case of heavy wear or long running time, a new collet must be used.
9	Clean the inner cone of the shaft with the cleaning cone. To do this, turn the cleaning cone back and forth several times, remove it in the meantime, clean it and repeat the process until there is no more residue! 
10	Clean the openings and slots of the chuck thoroughly with the cylinder brush! Clean the surfaces with a dry and clean cloth. 
11	Blow off and blow out the collet with cleaned and dried compressed air. Apply a thin film of the collet grease to the conical outer part of the collet and spread it evenly. 
12	Carefully place the collet tool on the outer hexagon of the collet and insert the blind plug or a tool shank into the collet opening. 
13	Turn the collet tool and screw the collet into the milling spindle. 

Schritt	Description	
14	The collet must be screwed in hand-tight up to the screw stop with a tightening torque of 0.2 - 0.5 Nm! For this purpose, imes-icore GmbH offers an optional torque wrench. **ATTENTION**: If the collet chuck is not mounted properly, machining problems and destruction of the milling spindle are the result!	
15	Finish collet maintenance.	

10.3.3 Working room

Before opening the work area door, an automatic pre-cleaning must be carried out. If the machine last performed wet processing, wet cleaning must be performed! If the last machining was a dry machining, a dry cleaning must be selected! The starting of the automatic cleaning is described as in the following table:

Step	Description
1	Open the “Settings” 
2	Press "Cleaning and maintenance". 
3	Select the desired type of cleaning in the "Automated cleaning" menu.

Afterwards, the working area must be thoroughly cleaned and all chips, dirt and cooling lubricant residues removed.

Dry chips and dirt are cleaned with a brush and a suitable vacuum cleaner.

Wet chips and dirt are cleaned with a brush. Subsequently, cooling lubricant residues can be removed with cleaning cloths.

Tool magazine

The entire tool magazine including tool places (tool holders) and tools (tool shanks) must be cleaned. The condition of all tools and tool locations must be checked. Defective or worn tools and tool holders must be replaced! The tools must then be reinserted in the correct tool position (stored in the operating software). The tool magazine must then be properly reassembled in the machine.

Length probe

The measuring surface of the length gauge must always be free of contamination, otherwise the precision of the machine will be impaired.

Blank holder

The blank holder must be cleaned thoroughly. Contamination can lead to problems when clamping the blanks.

10.3.4 Working room door

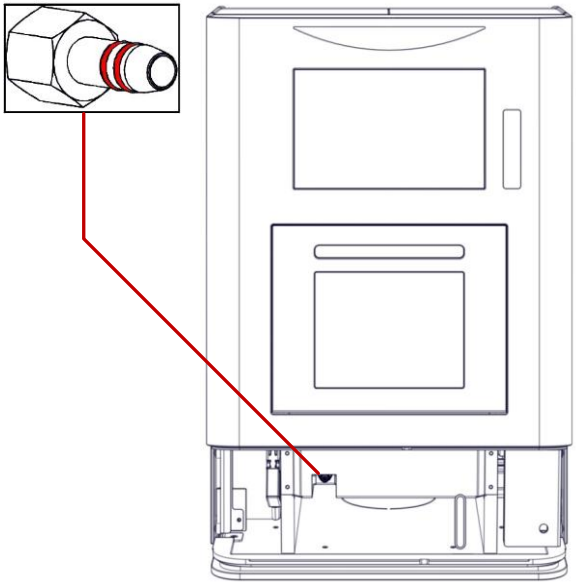
The work area door must be cleaned thoroughly. All chips, dirt and cooling lubricant residues must be removed, also from the hinges.

A commercially available, non-abrasive window cleaner should be used to clean the windows.

Dry chips and dirt are cleaned with a brush and a suitable vacuum cleaner.

Wet chips and dirt are cleaned with a brush. Subsequently, cooling lubricant residues can be removed with cleaning cloths.

10.3.5 Cooling lubricant tank, Sealing rings and filters



The two sieve inserts of the cooling lubricant container (chapter 5.11) should be cleaned at the end of the cleaning work so that dissolved impurities from the working chamber do not enter the cooling lubricant container.

The cooling lubricant container and the filters must be cleaned with a damp cloth and, if necessary, with a suitable cleaning agent (liquid cleaner).

Finally, the two sealing rings on the intake nozzle of the cooling lubricant pump must be greased with silicone grease (see illustration).

10.3.6 Flushing the cooling lubrication system

Step	Description
1	Clean the working room (chapter 10.3.3).
2	Open the "Tools" menu item. 
3	Select the tool number of a wet tool (titanium or glass ceramic) in the tool magazine on the screen.
4	Select the "Measure/Clamp" function. 
5	Confirm the selection with "Yes".
6	Remove the cooling lubricant container from the machine.
7	The cooling lubricant must be filled into a suitable separate container. If the cooling lubricant is not reused, it can be disposed of.
8	Clean the coolant tank and the sieve inserts (chapter 10.3.5).
9	Fill the coolant tank with 2.5 liters of clear drinking water.
10	Insert the coolant tank into the machine.
11	Open the "Settings" menu item. 
12	Press "Technical functions". 
13	Open the "Outputs" menu item.
14	Switch on the cooling lubricant pump and allow the flushing process to run for at least five minutes.

Step	Description
15	Switch off the cooling lubricant pump.
16	The rinsing water must be disposed of properly. Afterwards, the cooling lubricant container and the two sieve inserts must be thoroughly cleaned (chapter 10.3.5).
17	Fill the cooling lubricant container with cooling lubricant (filling quantity 2.5 l), assemble it and insert it into the machine.

10.3.7 Illuminant

The interior of the machine is illuminated by special LED strips. These must be wiped with a dry cloth once a day. If the interior lighting fails, the machine must be shut down, as the machining process must be able to be monitored at all times. The machine must not be put back into operation until the interior lighting has been replaced or repaired by authorized specialists.

10.3.8 Extraction system

Extraction systems supplied by imes-icore GmbH are used exclusively for the extraction of dry milling dust. Suction of cooling lubricant residues is not permitted and leads to damage or destruction of the suction system!

Extraction systems must be cleaned and maintained regularly. The operating and maintenance instructions for the extraction system must be observed! The contamination of the filters and the collection container must be disposed of professionally and properly in accordance with the legal requirements and local regulations.!

10.3.9 Filters of the aeration fans

The ventilation fans are located on the rear side, in the connection panel of the machine. There are filters on the ventilation fans. These must be cleaned carefully every week with a suitable brush and a vacuum cleaner. The suction nozzle must not be held directly against the filter, as this may damage it! If the filter is severely damaged, it must be replaced! Otherwise, the machine may be defective.

10.3.10 Emptying the condensate container of the maintenance unit

At the rear of the machine is the maintenance unit with a condensate container for the compressed air. It separates any moisture still present from the compressed air. However, the use of clean, dry and oil-free compressed air is a prerequisite (chapter 4.3)!

Um den Kondensatbehälter zu entleeren, müssen folgende Schritte ausgeführt werden:

Step	Description
1	Switch off the compressed air supply (maintenance unit depressurized)!
2	Turn the condensate drain of the condensate container (see chapter 5.7) counterclockwise to the left.
3	Wait until the condensate container is completely empty.
4	To close the condensate container, turn the condensate drain clockwise (right) again hand-tight.

i	With contamination it is essential to have the compressed air supply checked!

10.4 Mixing the cooling lubricant

The preparation of a cooling lubricant emulsion from cooling lubricant and water (in drinking water quality) must always be carried out according to the specifications of the respective cooling lubricant manufacturer! In addition, the separately available safety data sheet and the mixing ratio on the respective container must be observed! To maintain and check the correct cooling lubricant concentration, imes-icore GmbH recommends the use of a refractometer. Finally, the maintenance interval of the cooling lubricant must be reset in the operating software:

Step	Description	
1	Open the "Settings".	
2	Press "Cleaning and maintenance".	
3	Reset the interval of the cooling lubricant.	Reset Interval

Mix the cooling lubricant to produce a cooling lubricant emulsion!

- Tap water of drinking water quality must be used for mixing a cooling lubricant emulsion!
- Always observe the instructions for use of the cooling lubricant used!
- If the degree of hardness is ≥ 14 °dH (degree of German hardness), the drinking water must be mixed with distilled or demineralized water to prevent calcification of the machine!
- The mixing ratio of drinking water to distilled or demineralized water must not exceed 50%!
- The selection of distilled or demineralized water is the responsibility of the operator and has no influence on the cooling lubricant emulsion!

Malfunctions and material damage due to incorrect use of distilled or demineralized water!

- If the mixing ratio of drinking water to distilled or demineralized water exceeds 50%, this will result in a reduction in the pumping capacity of the cooling lubrication system!
- Too high a proportion of distilled or demineralized water in the cooling lubricant emulsion leads to damage to the machine as a result of chemical reactions! If necessary, distilled or demineralized water may only be used mixed with drinking water, in a mixing ratio of maximum 50%..

10.5 Manual calibration (calibration bodies)

The manual calibration workpiece zero point sets the workpiece zero point of the Y and Z axis. In addition, this calibration sets the alignment of the B axis. Two test pieces are required, which are milled in one job.

The manual calibration of the pivot points sets the required offset values at the rotary axes on the machine.

Not every blank is suitable for milling the test specimens. imes-icore GmbH recommends the following calibration blank for milling the test specimens.

This blank is available from the imes-icore GmbH sales department.

CORiTEC Model Disc  Item number 525013 9815

10.5.1 Milling the calibration bodies workpiece zero point

Step	Description
1	Insert blank (chapter 8.9).
2	Start the milling of the job „C:\Users\SmartControl\Admin\Documents\SmartControl\Jobs\150i-CalibrationBody-03-12g.iso“ (chapter 8.14).
3	Remove blank (chapter 8.10).
4	Separate the calibration bodies from the blank.

10.5.2 Setting the workpiece zero point

Step	Description
1	Open the "Settings" menu. 
2	Open the "Calibration" menu. 
3	In the manual calibration area, select "Calibrate workpiece zero" and follow the instructions on the screen.

10.5.3 Milling the calibration body Pivot point

Step	Description
1	Insert blank (chapter 8.9).
2	Start the milling of the job „C:\Users\SmartControl\Admin\Documents\SmartControl\Jobs\150i-TK18-18-1.iso“ (chapter 8.14).
3	Remove blank (chapter 8.10).
4	Separate the calibration bodies from the blank.

10.5.4 Setting the pivot point

Step	Description
1	Open the "Settings" menu. 
2	Open the "Calibration" menu. 
3	In the manual calibration area, select "Calibrate picot point" and follow the instructions on the screen.

10.6 Automated calibration

10.6.1 Calibrating the workpiece zero point

Step	Description
1	Open the "Settings" menu. 
2	Open the "Calibration" menu. 
3	In the automated calibration area, select "Calibrate workpiece zero" and follow the instructions on the screen.

10.6.2 10.6.2 Calibrating the pivot point

Step	Description
1	Open the "Settings" menu. 
2	Open the "Calibration" menu. 
3	In the automated calibration area, select "Calibrate picot point" and follow the instructions on the screen.

10.7 Commissioning maintenance work

Maintenance by a service technician of imes-icore GmbH must be mutually arranged in good time. During maintenance, the milling machine is not available for processing. With multiple milling machines, maintenance must be performed in direct succession, on the same date or on consecutive days.

Maintenance takes place 4 - 8 weeks after the order is placed. After an order is placed, the precise date is agreed with the service department of imes-icore GmbH. Therefore, always commission any necessary machine maintenance promptly and in good time in order to ensure the timely scheduling of maintenance work. Inform us of the model designation and serial number of your system at the time of order placement, as well as your preferred date!

Services and replacement parts that are necessary but not listed in the maintenance offer and repairs that are necessary after diagnosis during inspection will be invoiced separately in case a guarantee claim is excluded.

imes-icore service department			
Address	**imes-icore® GmbH** Im Leibolzgraben 16 D-36132 Eiterfeld	Reception	+49 (0) 6672 898-228
		Hotline	+49 (0) 6672 898-469
		Email	service@imes-icore.de
		Internet	www.imes-icore.com

10.8 Measures after completion of maintenance

After maintenance and before switching the machine on for the first time, it is necessary to check the following points:

- Check that all threaded connections loosened during maintenance have been correctly tightened again.
- Make sure that all screws have been tightened with the correct torque.
- Make sure that all covers and safety equipment are installed and functioning again faultlessly.
- Make sure that all tools, materials and other equipment used have been removed from the working area again.
- Clean the work area and remove any leaked substances, such as liquids, lubricants, processing materials or the like.
- Make sure that all maintenance work has been documented correctly.

10.9 Replacement parts and parts of wear

The use of replacement parts that have not been approved voids the manufacturer's guarantee! On request, replacement and wearing parts are available from the customer service department of imes-icore GmbH.

Replacement and wearing parts must comply with the technical specifications of the manufacturer. This is guaranteed through the use of original replacement parts and their installation by qualified personnel.

Only replacement parts Wear and tear parts from imes-icore GmbH. All non-original parts require the explicit written approval of the manufacturer!

Designation	Article number
Stylus	470071 1081
Stylus holder	470071 1082
Hexagon socket screwdriver 3 mm	201001 0063
Cleaning brush	201009 0101
CORiTEC mill & grind liquid	526020 0050
CORiTEC Model Disc (98.5 x 15 mm)	525013 9815
Screw set Dental	526020 2000

11 Faults

11.1 Safety instructions for trouble-shooting

Personnel required:	Specialist personnel	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear, eye protection	

DANGER!

Due to electric shock!

Contact with live parts or damage to insulation poses immediate danger to life and limb
Risk to life and limb due to electric shock!

- In order to perform maintenance, service and cleaning work, always disconnect the machine from the mains power supply first and wait for a few minutes before starting work.
- In order to avoid an electric shock, do not insert objects into the machine. The only exception is the intended replacement of parts in accordance with this operating manual.

DANGER!

Due to moving components!

Rotating components and/or components with linear movements can cause serious injury!

- Switch off all moving components of the machine before starting trouble-shooting work on moving components, and wait until all moving components have come to a standstill
- If possible, switch off the machine main switch and unplug the mains plug!

DANGER!

Due to improper troubleshooting!

If trouble-shooting work is performed incorrectly then this can result in serious physical injuries and significant property damage! It is therefore essential to put the machine into a safe state before starting work. This work must be performed by qualified specialist personnel only!

- Before starting work, ensure that there is adequate free space for assembly
- Ensure order and cleanliness in the working area. Components and tools that are lying loose or on top of each other are potential accident sources
- After removing components, make sure these are reinstalled correctly

11.2 What to do in the event of faults

In the event of a fault, always perform the following steps:

1. Immediately stop all processing (Stop button)
2. Evacuate the hazardous area.
3. Determine the cause of the fault.
4. Switch the machine off and unplug the mains plug of the machine, if work in the hazard area is necessary. Secure the machine against being switched on again.
5. Have the fault rectified (see Faults table, chapter 11.4). The fault may have to be rectified by authorised personnel.

11.3 Behaviour after troubleshooting

After the fault has been rectified and the maintenance or service work has been completed, the machine can be put back into operation. After all faults have been rectified, imes-icore GmbH recommends performing a calibration (chapter 10.5).

11.4 Faults table

Fault	Cause	Solution	Authorisation
Machine cannot be switched on	Power cord not properly plugged in	Check power circuit, mains plug, power socket strip	Operator
	Fuse triggered/defective	Replace fuse	Electrician
Power button does not work	Fuse triggered/defective	Replace fuse	Electrician
	Protective door not closed correctly	Close protective door	Operator
Milling file is not transferred to the machine's computer	CAM computer is switched off	Switch on CAM computer	Operator
	CAM computer or machine computer not signed on to the network	Check the network cable and network connection of the two computers	Operator / network administrator
Milling file cannot be started	In the started milling file, not all of the required tools were loaded in the operating software	Load all required tools in the operating software and insert them into the machine	Operator
	Protective doors open	Close protective doors	Operator
Edge breakouts on the preparation line of the milling results	Tool service life exceeded	Replace with new tools	Operator
	Collet runout too high	Clean or replace the collet	Operator
	Workpiece zero point inaccurate or B-axis crooked	Mill and set calibration blocks 3 and 12	Operator
Scoring on the surface of the milling results	Tool service life exceeded	Replace with new tools	Operator
	Collet runout too high	Clean or replace the collet	Operator
	Collet runout too high	Replace the collet	Operator
Suction performance decreases	Filter bag / dirt collector full of milling dust	Replace the filter bag / clean the dirt collector	Operator

Fault	Cause	Solution	Authorisation
Milling results do not match	Incorrect tool assignment in the tool changer	Check/correct the tool assignment in the tool changer	Operator
	Workpiece zero point inaccurate or B-axis crooked	Mill calibrating bodies 3 and 12	Operator
	Incorrect zero point compensation values in the CAM software	Perform 5-axis calibration	Operator

11.5 Online support and remote maintenance (TeamViewer®)

⚠ DANGER!
Due to improper remote maintenance!
Unsolicited actions during remote maintenance may result in personal injury and property damage.
• Strictly follow the instructions of the service technician! • Close service flaps and protective doors before starting the remote maintenance! • Do not reach into the hazardous area during remote maintenance!

In the age of digitization (Industry 4.0), imes-icore GmbH relies on networked CNC systems with Internet access.

This way, we can offer you fast, targeted and optimal service & support by our service technicians.

Take advantage of our offer for online error analysis by our service staff and benefit from our fast support and troubleshooting via remote maintenance. This will help you avoid unnecessary delays, higher downtime costs and possibly occurring service charges during the warranty period, which may be caused by operator error, improper use of the machine or out-of-warranty service.

Requirement for online support:

The machine must be connected to the internet.

Using the online support:

Step	Description
1	Open the "Settings" menu. 
2	Open the "Technical Functions" menu. 
3	Contact customer service.
4	Provide the customer service with the individual TeamViewer ID.

12 Disassembly and disposal

At the end of the machine's service life, the machine must be dismantled and disposed of in an environmentally responsible manner.

12.1 Safety instructions for disassembly and disposal

Personnel required:	Specialist personnel / electrician / manufacturer	
Protective equipment required:	Protective work clothing, protective gloves, safety footwear, respiratory protection, eye protection	

DANGER!

In the event of improper dismantling and disposal of the machine!

f the machine is improperly dismantled, angular components, points, corners, sharp edges, vapours, lubricants, liquids, etc. may cause serious injuries! Observe the safety regulations, accident prevention regulations and safety data sheets!

- Disassembly must be performed by specially trained specialist personnel!
- Only electricians are permitted to work on the electrical system!
- Appropriate warning signs must be visibly displayed in the areas!

DANGER!

Mortal danger from electric shock!

Contact with live parts or damage to insulation poses immediate danger to life and limb Risk to life and limb due to electric shock!

- In order to perform maintenance, service and cleaning work, always disconnect the machine from the mains power supply first and wait for a few minutes before starting work.
- In order to avoid an electric shock, do not insert objects into the machine. The only exception is the intended replacement of parts in accordance with this operating manual.

⚠CAUTION!
Risk to the environment due to improper disposal!
Improper disposal can endanger the environment!
Disposal of the materials must be performed by specialist personnel and in accordance with the applicable legal provisions. When handling hazardous materials, observe the respective safety data sheet and use personal protective equipment if necessary! • Disposal must be performed by specialist personnel and in accordance with the applicable legal provisions. • Use appropriate personal protective equipment! • During disposal, the handling of the hazardous substances must be carried out according to the instructions on the respective safety data sheet!

12.2 Disassembly

Important information prior to disassembly:

- Before starting work, ensure that there is adequate free space!
- Handle exposed sharp-edged components with care!
- Ensure order and cleanliness in the working area. Components and tools that are lying loose or on top of each other are potential accident sources!
- Ensure correct disassembly of the components!
- Note that some components are individually very heavy. Use hoist equipment if necessary!
- Secure the components against falling and toppling!
- Do not breathe in vapours or dust!
- Fire, naked flames and smoking are prohibited in the areas!
- Eating and drinking are prohibited in the areas!
- In case of ambiguities, consult the manufacturer!

Prior to starting disassembly, always perform the following steps:

Step	Description
1	Switch the machine off (see chapter 8.8).
2	Disconnect the machine from all media (power supply network, compressed air supply, cooling water supply, hydraulic supply, etc.).
3	Physically disconnect the entire energy supply from the machine and discharge residual energies.
4	Remove all remaining operating and auxiliary substances, as well as all processing materials. Dispose of these in an environmentally responsible manner, in accordance with your local regulations.
5	Subsequently clean and dismantle the components correctly with consideration to the locally applicable health, safety and environmental regulations.

12.3 Disposal

If no return or disposal agreements have been concluded, recycle the dismantled components.

- Scrap all metals
- Submit all glass and plastic parts for recycling
- Sort the remaining components according to their material characteristics
- Dispose of hazardous substances such as oils, oil-water mixtures, emulsions, grease, fuel, coolants and lubricants in the correct manner!

12.3.1 Collection

Users of electrical and electronic devices are obligated to collect used appliances separately in accordance with regional regulations. Used electrical and electronic devices must not be disposed of with non-separated household waste. Separate collection is a prerequisite for recycling and reuse, which protect environmental resources.

12.3.2 Return and collection systems

When disposing of your CNC machine and in particular its electronic components, do not dispose of these with household waste. Local disposal organisations have established disposal options for this purpose

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