

PLANMECA



Planmeca PlanMill® 60 S

user's manual

EN

30040852

The manufacturer, assembler and importer are responsible for the safety, reliability and performance of the unit only if:

- installation, calibration, modification and repairs are carried out by qualified authorised personnel
- electrical installations are carried out according to the appropriate requirements such as IEC 60364
- equipment is used according to the operating instructions.

Planmecca pursues a policy of continual product development. Although every effort is made to produce up-to-date product documentation this publication should not be regarded as an infallible guide to current specifications. We reserve the right to make changes without prior notice.

COPYRIGHT PLANMECCA

Publication number 30040852 Revision 1

Released 14 December 2022

Table of contents

1	Introduction.....	1
1.1	Information regarding this manual.....	1
1.2	Intended use.....	1
1.3	Limitation of liability.....	2
1.4	Accessories and modifications.....	3
2	Associated documentation.....	4
3	Training.....	5
4	Registering your product.....	6
5	Annual maintenance.....	7
6	Symbols.....	8
6.1	Symbols on product labels.....	8
6.2	Packaging symbols.....	8
6.3	Disposal symbols.....	9
7	For your safety.....	10
7.1	Safety equipment of milling unit.....	10
7.1.1	Stopping milling unit quickly.....	11
7.1.2	Access doors.....	11
7.2	Personnel requirements.....	11
7.2.1	Qualifications.....	12
7.3	Safety instructions for operation.....	12
7.4	Residual risks and fundamental dangers.....	15
7.5	Reasonably foreseeable misuses.....	16
7.6	General hazards.....	16
7.6.1	Danger due to electrical energy.....	16
7.6.2	Mechanical hazards.....	17
7.6.3	Fire hazard.....	18
7.6.4	Substance hazards.....	18
7.6.5	Noise / sound emissions.....	19
7.7	Freeing a trapped person.....	20
7.8	Fire protection.....	20
7.9	In case of fire.....	20
7.10	Radiation hazards.....	21
7.11	Dangers due to high temperatures.....	21
8	System description.....	22
8.1	Materials.....	22
8.2	Coolant lubricant.....	22
8.3	Milling tools.....	23
9	Planmeca 60 S milling unit.....	24
9.1	Front view.....	24
9.1.1	Light indicators.....	25
9.2	Side view.....	26
9.3	Rear view.....	27
9.3.1	Air pressure regulator.....	27

9.3.2	Connection panel.....	29
9.4	Processing area.....	30
9.5	Workpiece holder with tool magazine.....	30
9.6	Coolant lubricant system.....	31
9.6.1	Coolant lubricant tank.....	31
9.6.2	Coolant lubricants.....	32
9.7	Axis arrangement.....	33
9.7.1	View of axis arrangement.....	33
9.7.2	Coordinate system.....	33
9.7.3	Assignment of movement axes.....	34
10	Extraction system.....	35
11	Dry vs. wet milling process.....	36
12	Switching milling unit on/off.....	37
12.1	Switching milling unit on.....	37
12.2	Switching milling unit off.....	37
13	Control software.....	38
13.1	Top bar.....	38
13.1.1	Options.....	38
13.2	Menu selection.....	39
13.3	Jobs menu.....	39
13.3.1	Milling files display.....	39
13.3.2	Options for milling files.....	40
13.3.3	Processing status display.....	40
13.3.4	Machining options.....	41
13.3.5	Required tools with status display.....	41
13.4	Tools menu.....	41
13.4.1	Overview of tool stations and assignment.....	42
13.4.2	Edit tool stations.....	43
13.4.3	Tool information.....	44
13.5	Settings menu.....	44
13.5.1	Move to positions.....	44
13.5.2	General.....	45
13.5.3	Cleaning and maintenance.....	45
13.5.4	Calibration.....	46
13.5.5	Functions.....	46
13.5.6	Temperature.....	47
13.5.7	Positions.....	48
13.5.8	Appearance.....	48
13.5.9	Wi-fi.....	48
13.5.10	Network drives.....	49
13.5.11	Jobs.....	49
13.5.12	About this machine.....	50
13.5.13	Help and contact.....	51
14	Planmeca PlanCAM software as part of milling process.....	52
15	Adapters.....	53
15.1	Attaching C-clamp adapter.....	53
15.2	Glass ceramic adapter.....	55
15.2.1	Attaching glass ceramic adapter.....	55
15.3	Adapters for premilled abutments.....	57
15.3.1	DESS adapter.....	57
15.3.2	Medentika adapter.....	60
15.3.3	Nt-trading adapters.....	64

16	Operating milling unit.....	67
16.1	Operating modes.....	67
16.1.1	Automatic mode.....	67
16.1.2	Setup mode.....	67
16.2	Inserting workpiece/blank.....	68
16.3	Removing workpiece.....	69
16.4	Loading tool magazine.....	71
16.5	Assigning tools.....	72
16.6	Changing tools in spindle.....	72
16.7	Replacing tools in magazine.....	73
16.8	Milling.....	73
16.8.1	Before milling.....	73
16.8.2	Preparing for dry milling.....	74
16.8.3	Preparing for wet milling.....	75
16.8.4	Switching between wet and dry milling.....	76
16.8.5	Starting milling process.....	77
17	Cleaning and maintenance.....	78
17.1	Cleaning and maintenance plan.....	78
17.2	Safety instructions for cleaning and maintenance.....	79
17.3	Suitable cleaning products.....	80
17.4	Surfaces.....	80
17.5	Protective door.....	80
17.6	Milling chamber.....	81
17.7	Milling spindle.....	81
17.8	Collet.....	82
17.8.1	Cleaning collet.....	83
17.9	Guide rails and drive shafts.....	84
17.10	Extraction systems.....	84
17.11	Lights.....	84
17.12	Ventilation fan filters.....	84
17.13	Coolant lubricants.....	84
17.14	Coolant lubricant tank.....	84
17.15	Condensate container.....	85
17.16	Periodic inspections.....	85
17.17	Annual maintenance tasks.....	85
18	Calibrating milling unit.....	86
18.1	Milling calibration bodies.....	86
18.2	Setting calibration bodies.....	86
19	Troubleshooting.....	88
19.1	Safety instructions for troubleshooting.....	88
19.2	Troubleshooting table.....	89
20	Disposal.....	90
21	Technical information.....	91
21.1	Technical specifications.....	91
21.2	Dimensions.....	94
21.3	Space requirements.....	96
21.3.1	Operating space requirements.....	96
21.3.2	Service and maintenance space requirements.....	97
<hr/>		
Appendix A:	Extraction system (optional).....	98
A.1	Safety instructions.....	98
A.1.1	Symbols used.....	98

A.1.2	Electrical safety.....	98
A.1.3	Dangers to eyes, breathing and skin.....	98
A.1.4	Warning and information labels.....	98
A.2	Installation.....	100
A.2.1	Extractor overview.....	100
A.2.2	Installing extractor.....	100
A.2.3	Filter blocked signal.....	101
A.2.4	Remote stop/start.....	101
A.2.5	Electrical supply connection.....	101
A.2.6	General safety requirements.....	101
A.3	Operation.....	102
A.3.1	Manual operation.....	102
A.4	Maintenance.....	102
A.4.1	Cleaning unit.....	102
A.4.2	Replacing filters.....	102
A.4.3	Pre filter replacement.....	103
A.4.4	Consumable spares.....	103
A.4.5	Maintenance protocol.....	104
A.4.6	Filter disposal.....	104
A.5	Troubleshooting.....	104
A.6	Technical specifications.....	104

1 Introduction

1.1 Information regarding this manual

NOTE

Read this user's manual through carefully before connecting, starting up and using the milling unit. This user's manual must be read carefully, understood and strictly followed.

NOTE

All instructions contained in this user's manual, the safety instructions and the accident prevention guidelines must be observed.

NOTE

As with all technical systems, it is only possible to guarantee the faultless functionality and operational safety of this milling unit if the generally applicable safety precautions and the special safety instructions in this user's manual are observed during its operation.

NOTE

This user's manual must be kept throughout the entire service life of the milling unit. It must be freely accessible to the personnel working on and with the milling unit at all times, and it must be located in the immediate vicinity of the milling unit.

This manual describes how to operate the Planmeca PlanMill 60 S milling unit.

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 milling unit is operational.

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

Technical modifications and errors are reserved. Planmeca reserves the right to modify any product listed here or the content of the user's manual without prior notification.

1.2 Intended use

CAUTION

Any use of the milling unit that exceeds the intended use or deviates from this is prohibited and is considered improper use. Any claims against the manufacturer or their authorised representatives due to damages arising from improper use of the milling unit are excluded. The user alone is liable for any damages resulting from improper use.

CAUTION

All guarantee and warranty entitlements of the user against the manufacturer or their authorised representatives are voided in case of improper use of the milling unit. Any use other than intended use is prohibited!

CAUTION

Unprofessional handling and improper use can lead to dangers and damage. You must therefore carefully read and precisely follow this user's manual and the associated documents.

The Planmeca PlanMill 60 S milling unit is intended for the production of dental indications and is specially developed to satisfy the requirements of the dental industry.

Transport, installation, commissioning, operation and maintenance of the system must be performed by instructed specialist personnel.

The milling unit is intended for dry and wet processing of the materials listed in this user's manual.

The milling unit is designed for use in dry rooms (workshops, labs and similar rooms) and industrial operations (for maximum ambient temperature see section "Technical specifications" on page 91).

The unit may only be operated in a technically flawless and reliable condition. Improper handling and use could cause danger to the users and damage the unit.

Milling units from Planmeca are CE compliant and labelled accordingly. For all other milling unit 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 Planmeca, CE conformity is invalidated.

As soon as such changes are made to the milling unit, Planmeca accepts no liability whatsoever.

The EMC test only applies to the milling unit in its original configuration ex works.

1.3 Limitation of liability

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

Planmeca assumes no liability for damage in the following cases:

- Disregard of this user's manual
- Improper use
- Deployment of untrained personnel
- Unauthorised conversions
- Technical modifications
- Use of replacement parts or accessories that have not been approved by Planmeca

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 Planmeca and the statutory regulations valid at the time the contract was concluded, apply.

Insofar as the exclusion of liability is legally permissible, Planmeca 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 of Planmeca apply.

1.4 Accessories and modifications

The attachment of accessories to the Planmeca PlanMill 60 S milling unit and any other modifications require the express permission of Planmeca. All attachments and modifications that may affect the operational safety of the milling unit are strictly prohibited and lead to the immediate voiding of CE-conformity and the manufacturer's guarantee. As soon as such changes are made to the milling unit, Planmeca accepts no liability whatsoever.

The EMC test only applies to the milling unit in its original configuration ex works.

In general, the following is valid:

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

2 Associated documentation

This Planmeca milling unit is delivered with the following manuals:

- Planmeca PlanMill 60 S user's manual
For dental care professionals. Describes the milling unit and its different parts as well as instructs how to operate and clean the milling unit.
- Planmeca PlanMill 60 S installation manual
For service personnel. Describes how to install the milling unit.

NOTE

The user's manual is also available on Planmeca's website: [Material bank > Manuals > CAD/CAM > Dental milling](#).

3 Training

For hands-on user's training, please contact your local Planmeca dealer.

4 Registering your product

Please register your Planmeca device before you start using it.

1. Navigate to the registration website www.planmeca.com/register/ in your Internet browser.
2. Follow the instructions on the website.

5 Annual maintenance

The unit should be serviced once a year by personnel authorised by Planmeca. This ensures a long service life and reliable operation.

6 Symbols

6.1 Symbols on product labels



European conformity



Manufacturer (Standard ISO 7000).



Date of manufacture (Standard ISO 7000).



Reference (Standard ISO 7000).



Serial number (Standard ISO 7000).



Consult electronic instructions for use (Standard ISO 7000-1641).

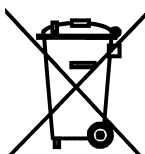


General warning (Standard ISO 7010).



Warning: Electricity (Standard ISO 7010).

To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.



Separate collection for electrical and electronic equipment according to Directive 2012/19/EU (WEEE).

6.2 Packaging symbols

During transport always observe the symbols shown below that are applied to the packaging.



Fragile

Packages marked with this symbol contain fragile and sensitive goods.

Treat the package with care and do not let it drop or expose it to shock or impact.



Do not stack

Never stack any objects on packages marked with this symbol.

**Keep dry**

Protect packages with this marking from moisture and keep it dry.

**Maximum stacking load**

Observe the instruction ... *kg max.* above the arrow. This value states the maximum permissible stacking load. Do not exceed the load limit. Preferably store packages marked with this symbol in the uppermost position.

**This way up**

During transport and storage the arrow must point upwards. Do not tip, roll or lean the package.

6.3 Disposal symbols



All electrical and electronic equipment is marked with this symbol and, in accordance with the EU Directive, must not be disposed of with household waste.

7 For your safety



WARNING

Risk of personal injury due to a lack of diligence! With improper or unintended use come:

- Risk to life and limb
- Risk of milling unit damage
- Risk of further property damage

CAUTION

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

The following section discusses points relevant to maintaining the highest possible level of safety to personnel as well as to operating the unit safely and error free.

Every person involved with operation of the system must have read and understood the following safety instructions.

Notes, cautions and warnings

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



WARNING

Danger with moderate degree of risk!

Provides information on hazards with a moderate degree of risk, which could result in death or serious injury unless avoided.

CAUTION

Danger with low degree of risk!

Provides information on hazards with a low degree of risk, which could result in minor or moderate injury unless avoided.

NOTE

Provides important information.

7.1 Safety equipment of milling unit



WARNING

You are at risk of serious injuries and even death if you remove or deactivate the safety equipment!

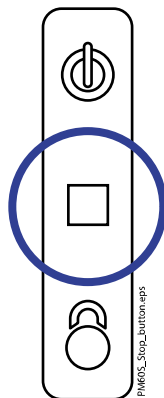
- Do not dismantle or manipulate the safety device!
- Check correct function of safety devices on a regular basis!
- Have damaged safety equipment repaired immediately!

The safety equipment include the stop button and the protective door.

Always note that:

- 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.

7.1.1 Stopping milling unit quickly



NOTE

There are no emergency stop control elements in the form of an emergency stop switch mounted on the milling unit, as this does not adequately minimise the risk.

In the event of a malfunction or emergency, the milling unit can be stopped by pressing the stop button on the front of the milling unit (circled in adjacent picture). In situations that require the milling unit to stop immediately, press the stop button as quickly as possible!

This interrupts the power supply to the milling unit's power unit.

If persons are injured:

- administer first aid, and
- inform an emergency doctor or medic.

7.1.2 Access doors

The protective door 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 lubricant tank provides access to the tank so that it can be filled or cleaned. For service and maintenance work, the two rear cover panels enable access to the power electronics (only for Planmeca authorised service technicians).

During operation, the protective door of the machine interior is locked and cannot be opened (cover status display does not light up). The door can only be opened when all axes and the machining spindle have come to a standstill.

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.

7.2 Personnel requirements

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



WARNING

Insufficiently qualified personnel are unable to correctly assess risks posed when working with the milling unit. These persons may therefore put themselves and others at risk of serious and even fatal injuries.

In order to avoid this, persons with inadequate qualifications are prohibited from carrying out work on the milling unit. New users must receive milling unit training before using the milling unit for the first time.

7.2.1 Qualifications

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

The qualifications required for the various tasks are listed below:

User

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

The user and the personnel authorised by the user (who receive special instructions regarding hazards that may arise) are responsible for the faultfree operation of the milling unit, and for clear stipulations regarding the responsibilities when transporting, installing, operating, maintaining and cleaning the milling unit.

In addition to the safety instructions and information in this user's 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 milling unit.

Electrician

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

A qualified 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 your local Planmeca dealer.

7.3 Safety instructions for operation

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 person using the milling unit 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 workpiece 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 coolant 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 minimise ergonomic hazards, sufficient personnel must be provided to operate the machine.



WARNING

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!**



WARNING

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!

- 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!

NOTE

Always ensure a clean and well-lit workstation.

7.4 Residual risks and fundamental dangers

The general residual risks and fundamental dangers which arise during intended use of the milling unit are listed in this section.



WARNING

Risk of injury due to general residual risks.

Despite compliance with the protective measures, the following residual risks exist when working on the milling unit:

- Risk of injury due to cutting, impacts and crushing!
- Hearing damage due to noise pollution!
- Health hazard due to release of ozone!
- Health damage due to dust / fine dust pollution!

7.5 Reasonably foreseeable misuses



WARNING

Risk of injury due to general residual risks.

The (reasonably) foreseeable misuses include:

- Unintended use is any use that exceeds the intended use!
- The incorrect fastening of workpieces. The milling unit user is responsible for ensuring that the workpiece 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 workpiece clamping device due to the workpiece loosening. During processing, this can lead to serious accidents with physical injury or death or serious damage to the workpiece, the tool, the clamping device and other milling unit 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 milling unit outside the specified performance data!
- Misuse of milling unit parts as storage locations or climbing aids!
- Deployment of insufficiently qualified personnel!
- A failure to comply with the cleaning and maintenance intervals for the milling unit and its accessories!
- Operating the milling unit without correctly functioning protective equipment!
- Manipulation of the protective equipment is fundamentally prohibited without exception!

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

7.6 General hazards

The following sections describe basic risks which are present even when the unit is used properly.

7.6.1 Danger due to electrical energy



WARNING

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





WARNING

Risk of death due to stored charges! After switching off the milling unit, 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 following 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.

7.6.2 Mechanical hazards



WARNING

Danger due to rotating components and moving axes!

Risk of injury and death due to contact with rotating or moving components of the milling unit!

- Before starting work check that all covers, safety and protective equipment are correctly installed and functional.
- Never reach into the milling unit during operation.
- When cleaning inside the milling unit always unplug the milling unit's mains plug and secure it against being reconnected.
- Before starting work check that no loose parts are lying around the milling unit room.

Always be aware that:

- Bypassing or manipulating moving and fixed protective equipment is fundamentally prohibited without exception!
- After opening the protective door, reaching into the milling chamber is strictly prohibited until all parts of the milling unit have come to a standstill without exception! For technical reasons, e.g. the processing spindle may run on!
- Before starting lubrication, maintenance and servicing work in the hazard area, safely disconnect the energy and secure it against reconnection!

7.6.3 Fire hazard



WARNING

Danger of fire with 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 milling unit parts due to irregular cleaning and maintenance
- Sparks flying from tools
- Unsuitable cleaning or operating products

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 speed is not exceeded
- The user of the milling unit is responsible for a risk assessment of the workstation
- If necessary, an extinguisher must be retrospectively installed by the user
- Processing is observed when milling flammable materials (e.g. PMMA, wax, plastics, titanium) with new parameters
- Tools are checked for wear regularly
- Dirt must be removed from the components immediately
- When handling coolant lubricants, the corresponding safety data sheet is used with particular awareness of the fire risks
- Only coolant lubricants approved by Planmeca are used
- Every employee who works with this milling unit in any manner receives regular safety instructions, is sufficiently trained and has read the user's manual

NOTE

Mandatory risk assessment for workstations!

The risk of fire that applies to the milling unit is dependent on the materials and tools used. The milling unit user, who selected the materials and tools, is therefore additionally responsible for conducting a risk assessment of the workstation in accordance with the industrial health and safety act.

7.6.4 Substance hazards

Dust

When working with certain materials, fine milling/drilling dust may arise. This may be harmful to health or flammable and should - if necessary - be vacuumed with an extraction system approved by Planmeca, because this complies with the valid and applicable legal regulations!

The milling unit user must ensure that:

- Users receive regular safety training
- Users 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!

Vapours

When working with certain materials, vapours (gases, aerosols) may arise. These may be harmful to health or flammable, and the user must therefore ensure that:

- Users receive regular safety training
- Users are sufficiently sensitised in this regard (information security)
- User instructions and safety data sheets of the various substances are available to the users and provide information on the dangers (user's manual)!
- 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 healthendangering gas and vapours may arise!
- Warning signs are visibly displayed in areas where this is necessary!

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, and the user must therefore 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.
- Users are informed about the health risks of increased ozone concentrations and possible protective measures.
- Users with pre-existing conditions (respiratory diseases) receive occupational medical consultations and examinations. Additional protective measures may be necessary.
- Users receive regular safety training.
- Users 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!

7.6.5 Noise / sound emissions

The milling unit'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 user must therefore ensure that:

- Users 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!

7.7 Freeing a trapped person

Freeing a person trapped in the milling unit's interior, for example due to trapping or catching on a drive axis, takes place after pressing the milling unit's on/off switch at the back of the unit in order to shut down the milling unit as quickly as possible and to analyse the hazardous situation!

Proceed as follows to release the trapped person:

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

7.8 Fire protection

When processing flammable materials, the milling unit user 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, and, if applicable, suitable measures to reduce them (e.g. extinguishing equipment, temperature monitoring, monitored operation by employees) must be defined.

Always also observe the safety information and data sheets from the coolant 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.

7.9 In case of fire

In case of fire, only extinguish this at the milling unit 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:

- Press the stop button on the milling unit front
- Disconnect the power supply (fuse box)
- Notify the fire brigade
- Extinguish milling unit fire with CO₂ fire extinguishers

NOTE**IMPORTANT INFORMATION!**

Important information regarding the use CO2 fire extinguishers!

Before using a CO2 fire extinguisher, all persons must be warned and evacuated! The person extinguishing the fire must wear respiratory protection and be supplied with oxygen! After using the extinguishing agent, ensure sufficient ventilation of the room before unprotected persons return to it.

7.10 Radiation hazards

Using the ionizer can create sources of electromagnetic radiation, and the user must therefore ensure that:

- Users receive regular safety training.
- Users 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!

7.11 Dangers due to high temperatures

**WARNING**

There is a risk of burns on heated materials or tools after processing. During milling unit operation, high temperatures may arise. Therefore ensure that surfaces have cooled to ambient temperature before commencing all work or activities. Tools, work pieces and chips may become very hot. Always wear heat-resistant work clothing and protective gloves during work!

8 System description

Planmeca PlanMill 60 S is a milling unit intended for the production of dental indications and has been specially developed to satisfy the requirements of the dental industry. Planmeca PlanMill 60 S is not suitable for the application of conventional milling techniques. Planmeca PlanMill 60 S is suitable for both for dry and wet processing using the materials listed in section "Materials" on page 22.

The tool magazine can be equipped with up to 10 tools and the milling unit kinematics enable simultaneous processing in 5 axes.

8.1 Materials

CAUTION

Processing other materials than those stated below is prohibited and requires separate approval and permission from Planmeca. For further information please contact your local Planmeca dealer.

CAUTION

The processing of highly flammable and inflammable materials is prohibited.

CAUTION

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.

The following materials can be processed with PlanMill 60 S milling unit:

Dry processing

- Zirconium dioxide
- Plastics
- Wax
- Cobalt chrome
- Composite

Wet processing

- Lithium disilicate
- Glass-ceramic
- Titanium prefabricated abutments

Workpieces suitable for Planmeca PlanMill 60 S are available from Planmeca. The workpiece diameters 98 mm and 98.5 mm have a 10 mm step for clamping into the workpiece holder. Depending on the material, workpieces up to a height of 30 mm can be machined.

For block materials and prefabricated abutments, appropriate workpiece holders must be used. These are necessary to clamp other geometries in the round workpiece holders.

8.2 Coolant lubricant

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

- Cooling liquid 1000ml (10036920)

8.3 Milling tools

The tools approved by Planmeca for use in the Planmeca PlanMill 60 S milling unit are listed in the table below.



WARNING

Only use tools that are approved by Planmeca or that have been retrospectively approved. If unapproved tools are used there is a risk of serious injury and substantial damage.

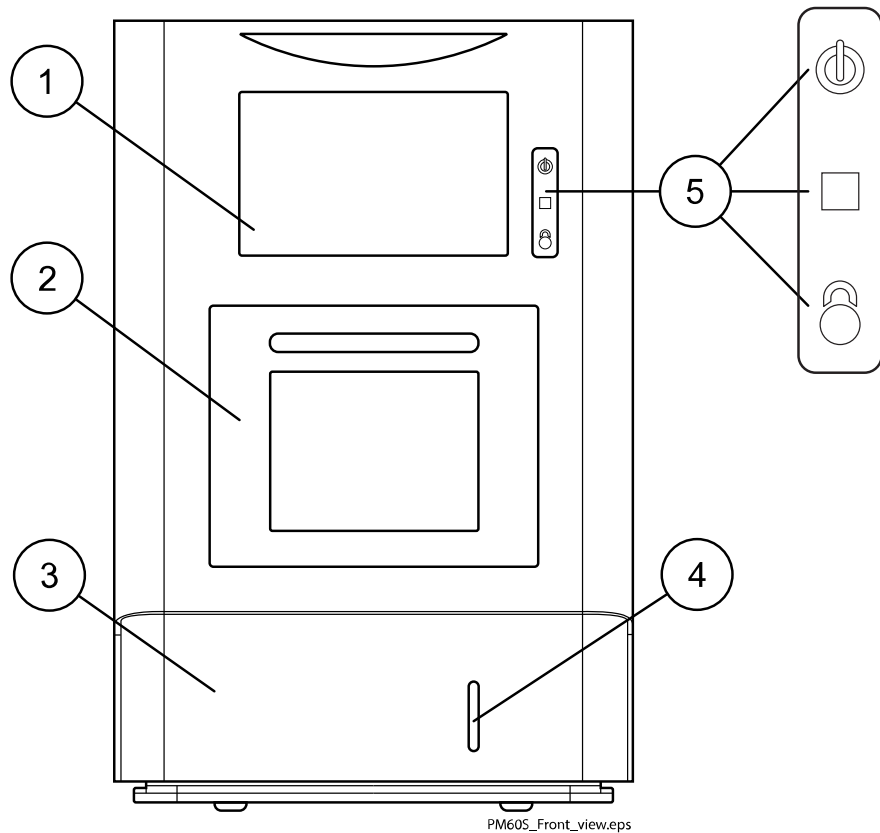
Please contact your local Planmeca dealer for the approval of other tools.

In order to process work-pieces, the milling unit must be equipped with at least one tool. The appropriate and ready-ringed tools for the direct change holder are available from your local Planmeca dealer.

Tool number	Diameter/geometry	Material(s) to be used with	Name on the user interface
2	2.0 mm / Radius	Ti	2.0 mm Ti Radius
3	1.5 mm / Radius	Ti	1.5 mm Ti Radius
4	1.0 mm / Radius	Ti	1.0 mm Ti Radius
7	2.0 mm / Radius	CoCr	2.0 mm CoCr Radius
8	1.5 mm / Radius	CoCr	1.5 mm CoCr Radius
9	1.0 mm / Radius	CoCr	1.0 mm CoCr Radius
11	2.5 mm / Radius	PMMA/Wax	2.5 mm PMMA-Wax Radius
12	1.0 mm / Radius	PMMA/Wax	1.0 mm PMMA-Wax Radius
13	2.5 mm / Radius	Zr/Al	2.5 mm Zr-Al Radius
14	1.0 mm / Radius	Zr/Al	1.0 mm Zr-Al Radius
15	0.6 mm / Radius, conical shaft	Zr/Al/PMMA/Wax	0.6 mm Zr-Al-PMMA-Wax Radius
17	1.5 mm / toric long shaft	Zr/Al/PMMA/Wax	1.5 mm Zr-Al-PMMA-Wax SHAFT
21	2.5 mm / Radius	Glass ceramic	2.5 mm ceramic Radius
22	1.0 mm / Radius	Glass ceramic	1.0 mm ceramic Radius
23	0.6 mm / Radius, conical shaft	Glass ceramic	0.6 mm ceramic Radius
31	3.0 mm / shaft milling tool	PMMA	3.0 mm shaft milling tool long

9 Planmeca 60 S milling unit

9.1 Front view



1 Touch screen

The milling unit is operated via the touch screen. Navigation and entry of data for the operating system and control software are done directly via the touch screen.

2 Protective door

The protective door provides access to the milling chamber. It protects the user and persons in the environment against dangers, dust and noise development during operation. During operation, the protective door of the machine interior is locked and cannot be opened (cover status display does not light up).

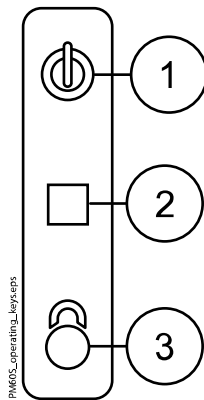
3 Front cover of coolant lubricant tank

The front cover provides access to the coolant lubricant tank so that it can be filled or cleaned.

4 Coolant lubricant level window

Ensure that the coolant lubricant level is always between MIN and MAX when performing wet milling.

5 Operating keys



Operating keys

1 Power button - blue

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 control software or after a prompt from the control software.

2 Stop button - red

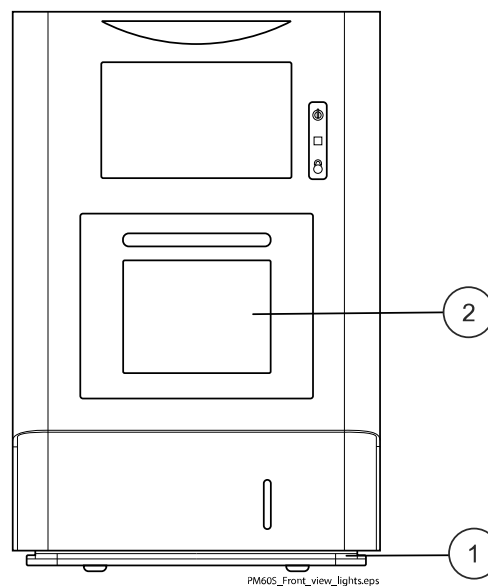
The stop button interrupts the movements of the machine. After pressing the stop button, the power electronics are disconnected from the power supply.

3 Protective door status display - white

The protective door status display lights up when the machine is not moving and the protective door can be opened.

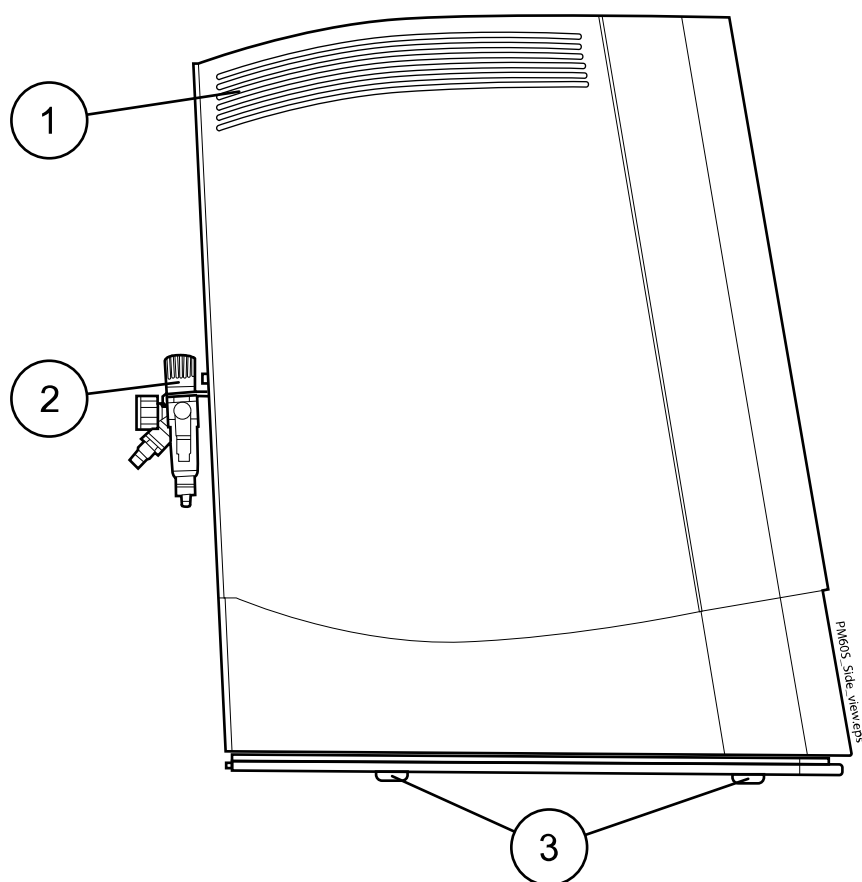
9.1.1 Light indicators

Light indicators on the socket (1) and in the milling chamber (2) display the state of the milling unit.



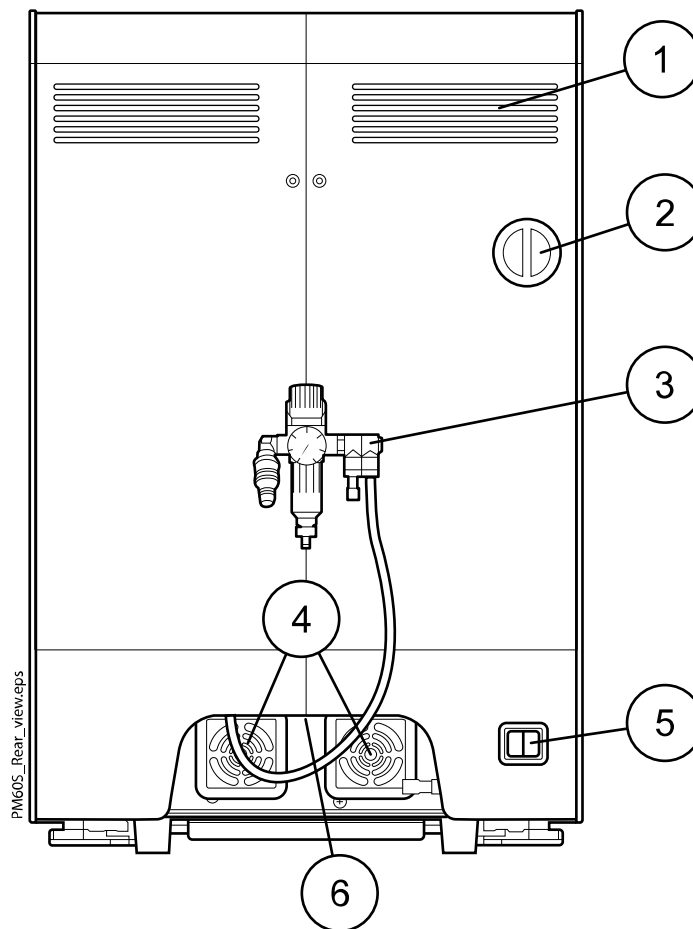
Colour	Condition
Yellow	Initialisation of control software. The milling unit performs a reference run.
White	Operational readiness.
Red	Fault.
Blue	The milling unit is processing a milling job.

9.2 Side view



- 1 Ventilation slits
- 2 Air pressure regulator
- 3 Milling unit feet

9.3 Rear view



- 1 Ventilation slits
- 2 Suction port for the extraction system
- 3 Air pressure regulator
- 4 Ventilation fans
- 5 On/off switch
- 6 Connection panel

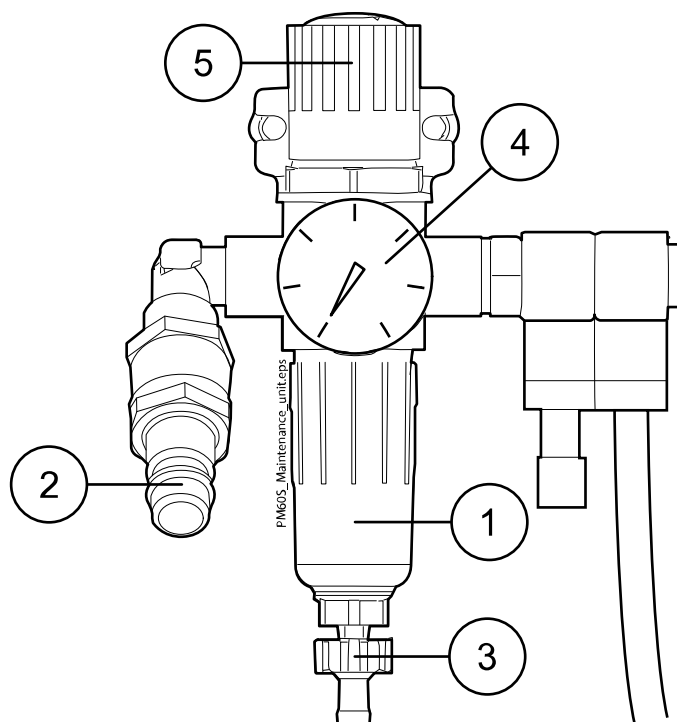
9.3.1 Air pressure regulator

The air pressure regulator with a condensate container for the compressed air is located on the rear of the machine. It separates any remaining moisture from the compressed air.

NOTE

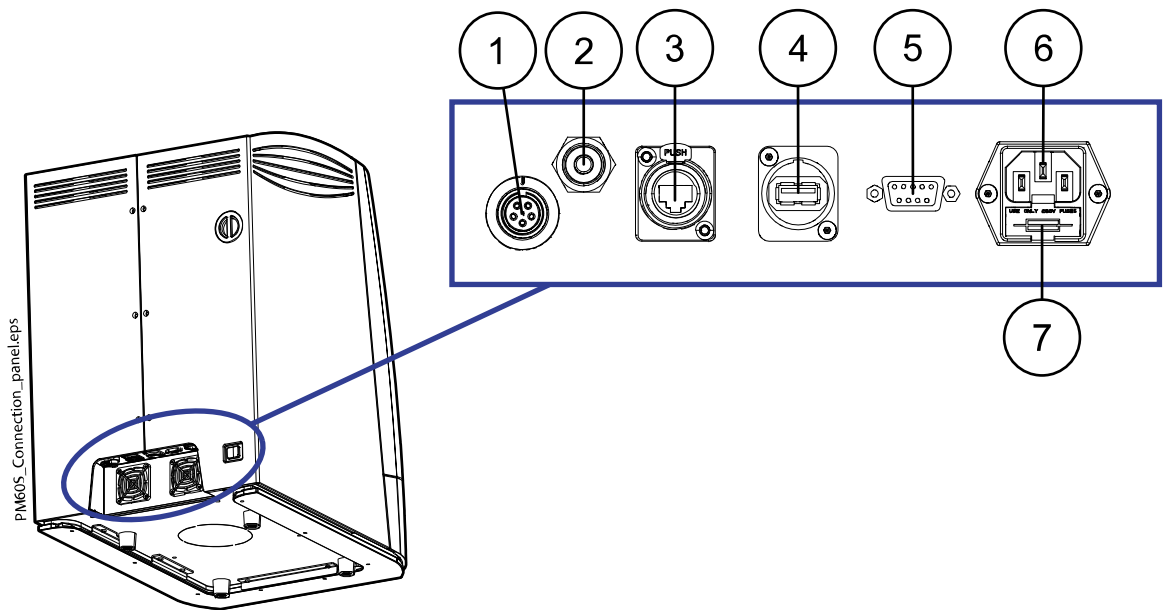
Only use clean, dry and oil-free compressed air.

If water should collect in the sight glass, a drainage screw is located beneath the sight glass. The condensate container can be emptied by turning the screw, see section "Condensate container" on page 85.



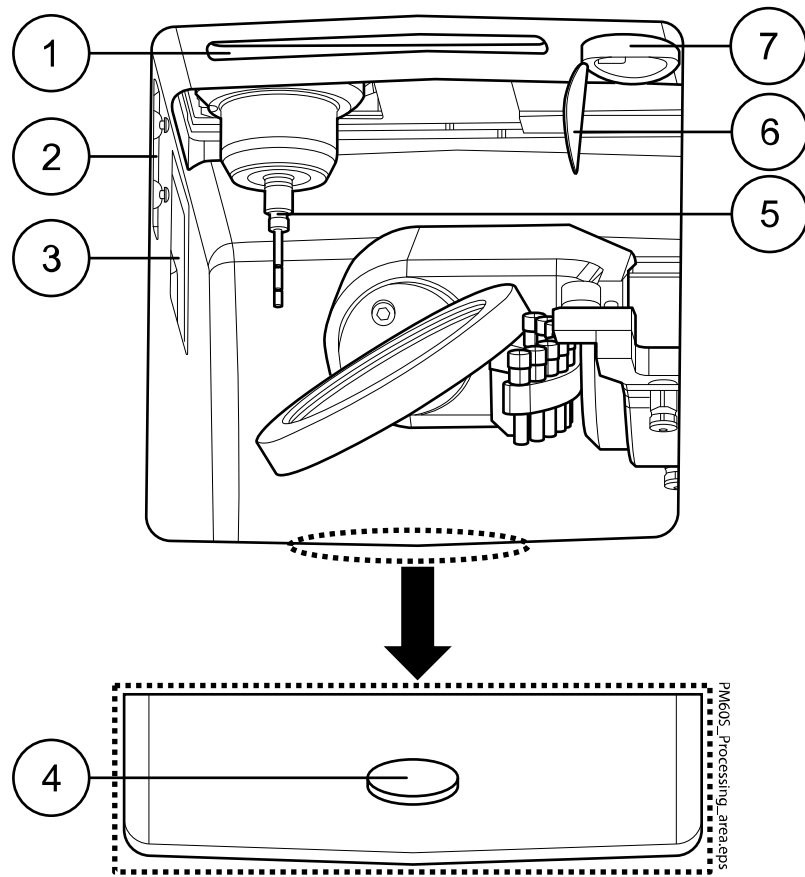
- 1 Condensate container
- 2 Compressed air connection (plug-in nipple NW 7.2 (quick connection))
- 3 Condensate outlet (tightens/loosens manually)
- 4 Pressure display (bar)
- 5 Pressure regulator

9.3.2 Connection panel



- 1 Connection for light indicators
- 2 Air connection for air pressure regulator
- 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 Mains connection socket for mains connection cable (IEC connection cable)
- 7 Access fine wire fuse

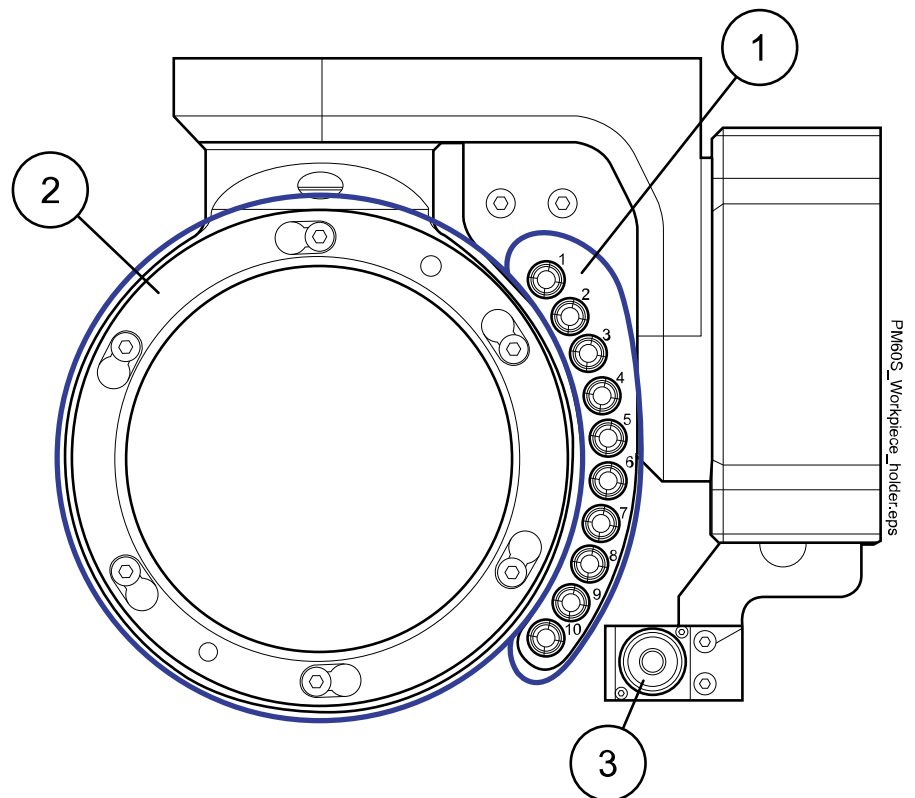
9.4 Processing area



- 1 Workspace lighting
- 2 Electronic connections for automatic calibration
- 3 Suction nozzles
- 4 Coolant lubricant runoff
- 5 Machining spindle
- 6 Ionizer seal
- 7 Ionizer

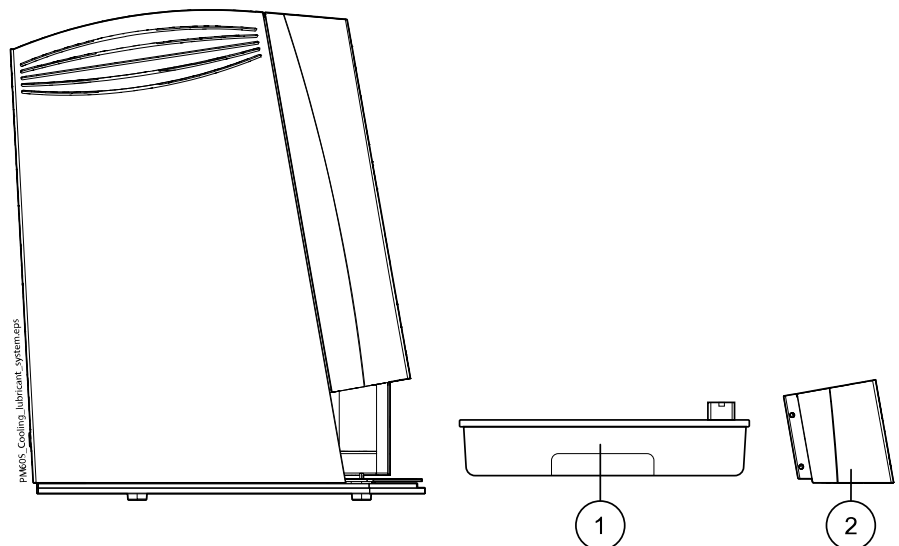
9.5 Workpiece holder with tool magazine

The milling unit's tool magazine contains a total of 10 tool positions for ready-ringed tools. The arrangement of the tool positions (1) is shown in the figure below. Next to the tool positions is a length measuring probe (3), which is used to measure the length of the tool currently in use. The workpiece holder (2) and the tool magazine are structurally combined in one assembly.



9.6 Coolant lubricant system

The coolant lubricant system is optimally tailored to the milling unit in the factory. Only use approved coolant lubricant from Planmeca, because this is optimally tailored to the requirements of the milling unit and guarantees a seamless processing sequence.



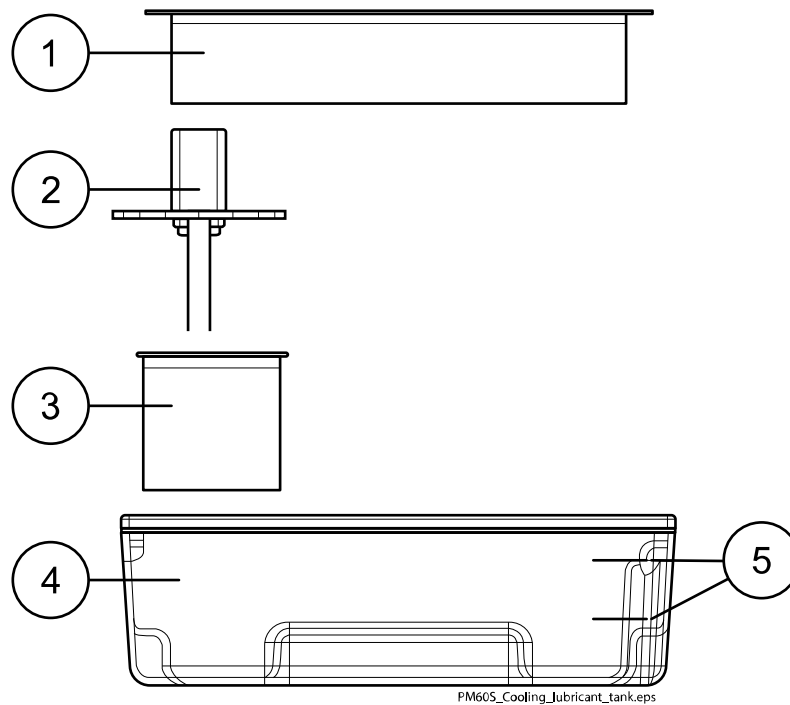
- 1 Coolant lubricant tank
- 2 Front panel

9.6.1 Coolant lubricant tank

The capacity of the Planmeca PlanMill 60 S milling unit's coolant lubricant tank is 3 litres. The tank consists of several components, see below. The

sieves filter milling dust from the used coolant lubricant and clean the liquid so that it can be used again for cooling and lubrication.

Check the level of coolant lubricant before each wet processing run. The fill level must be within the level indicator.



- 1 Sieve for filtering incoming liquid
- 2 Pump connection with cover
- 3 Sieve for filtering outgoing liquid
- 4 Tub
- 5 Fill level indicator (min - max)

9.6.2 Coolant lubricants

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

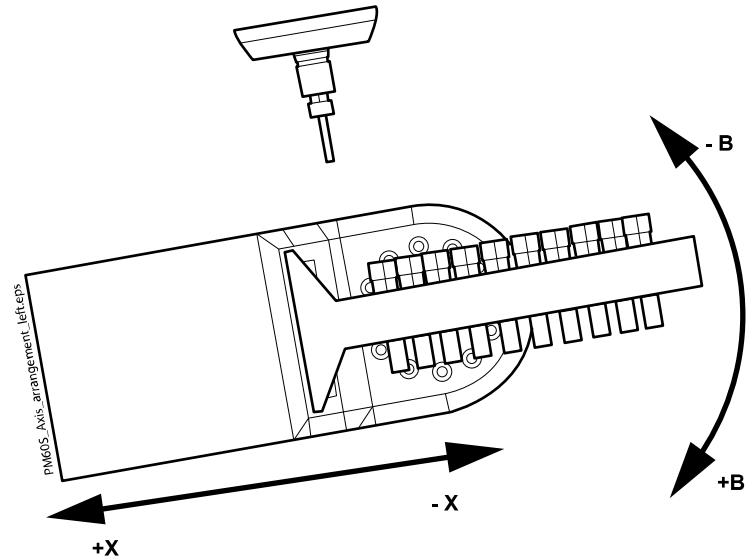
Always observe the legal regulations and safety data sheets when handling coolant lubricants. The milling unit user must ensure that the cooling lubricants are handled, stored and disposed of correctly.

When using cooling lubricants, always ensure sufficient ventilation!

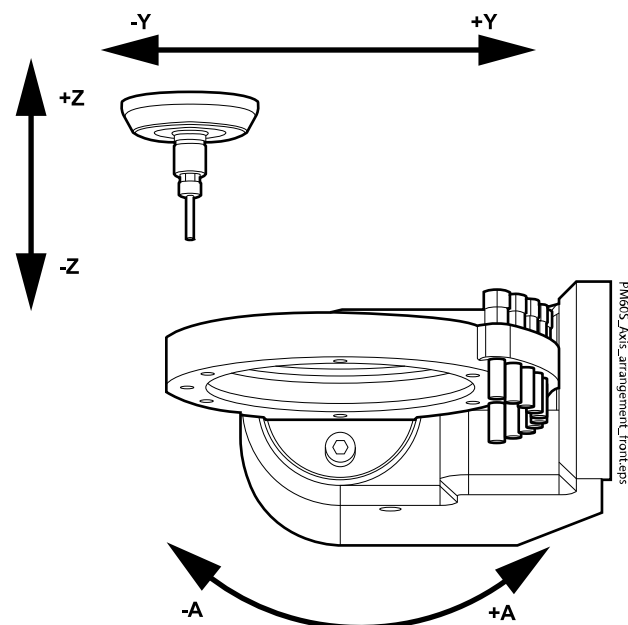
9.7 Axis arrangement

9.7.1 View of axis arrangement

View from left



View from front



9.7.2 Coordinate system

The linear axes are labelled with the letters X, Y and Z.

Rotary axes and swivel axes are generally labelled with the letters A, B, and C.

9.7.3 Assignment of 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	+Z upwards	-Z downwards
A	Rotating axis	+A counter-clockwise	-A clockwise
B	Rotating axis	+B clockwise	-B counter-clockwise

10 Extraction system



WARNING

The extraction unit provided by Planmeca is intended solely for the extraction of DRY milling dust. Do not extract any coolant lubricant with the extractor provided by Planmeca. This may lead to damage or even destruction of the extraction unit.

An extraction system is a type of vacuum that vacuums the dry milling dust from the milling unit when the dry milling technique is used. It is located in close vicinity to the milling unit and must be connected to the milling unit every time before dry milling is performed as the fine dust generated by dry milling is harmful to health.

11 Dry vs. wet milling process

The Planmeca 60 S milling unit handles both dry and wet milling.

The wet milling process uses a coolant lubricant to remove excess material from the cutting tool and milling material. During dry processing, the material is processed without a coolant lubricant system, and instead, an extraction system is used to vacuum the dry milling dust.

12 Switching milling unit on/off

12.1 Switching milling unit on

Steps

1. Press the on/off switch on the rear of the milling unit to switch the unit on.

The light on the switch lights up and the switch is in the | position. Also, the software starts up and is displayed on the touch screen.



2. When prompted by the software, press the power button on the milling unit front to switch on the milling unit's power electronics.

A reference run is automatically initiated. The reference run is indicated by a yellow light on the milling unit socket and the interior. Once the reference run is completed, the light changes to white and the milling unit is ready for operation.

3. If you are going to perform dry milling, activate the extraction system.
4. Ensure that the protective door is closed.

12.2 Switching milling unit off

Steps

1. Shut down the control software by pressing **Options** (three dots) > **Shut down** on the touch screen.
2. Wait for the operating system to shut down completely.
3. Press the on/off switch on the rear of the milling unit to switch the unit off.

The light on the switch goes off and the switch is in the 0 position.

4. Switch off the extraction system.

13 Control software

When you switch on the milling unit, the control software starts automatically and the *Jobs* menu opens on the milling unit's touch screen.

13.1 Top bar

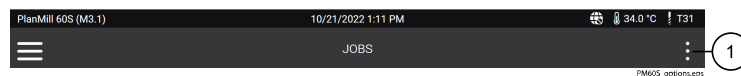
The top bar of the control software is always visible when the milling unit is switched on.



- 1 Menu selection
- 2 Milling unit name
- 3 Date and time
- 4 Active menu item
- 5 Network
- 6 Interior temperature
- 7 Tool in collet
- 8 Options

13.1.1 Options

The *Options* menu is opened by pressing the three dots (1) in the top bar.

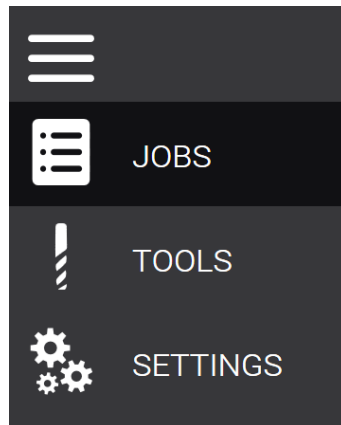


Options contains the following items:

- Shut down
Shuts down the milling unit.
- Restart
Restarts the milling unit.
- Help & Contact
Contains information for the support team to connect remotely to the milling unit
- Open log
Opens a log file where you can view all notifications/errors. The protocol logs relevant events of the control software for diagnosis in the event of problem cases.
- Open web browser
Opens the web browser.
- Check for updates
Requires Internet connection. Searches for updates for Smart Control Dental Studio software.
- Disable fullscreen
Disables full screen and allows to enter integrated PC running software. This menu item is password-protected only for Planmeca approved service technicians.

13.2 Menu selection

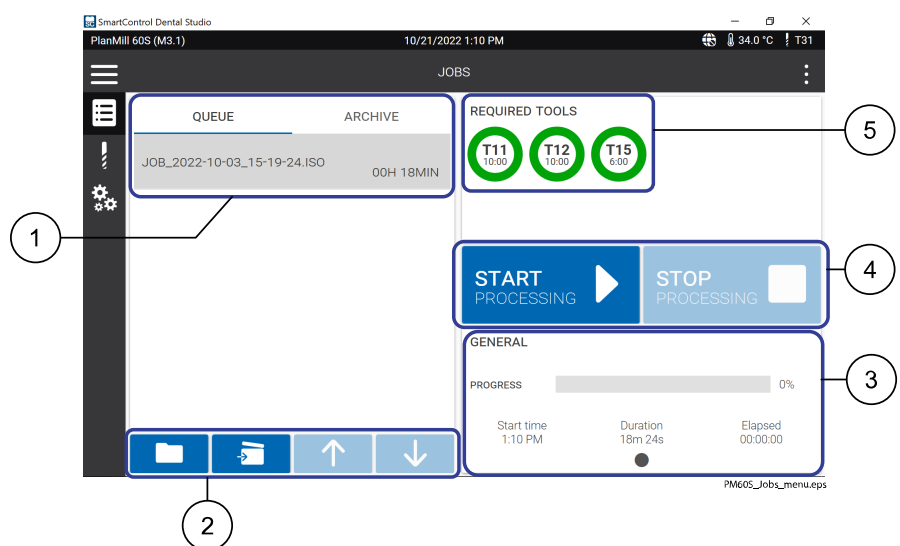
When the control software is running, the touch screen on the milling unit displays a menu selection where you can select and switch menus. There are three menu items: *Jobs*, *Tools* and *Settings*. To select a menu item, press on the corresponding button.



Usually only the menu icon is displayed without the menu name. To display the menu name, press the top icon with three horizontal lines.

13.3 Jobs menu

After starting the Smart Control Dental Studio software, the *Jobs* menu item will automatically open. This menu contains the functions and status displays before and during the milling process.



- 1 Milling files display
- 2 Options for milling files
- 3 Processing status display
- 4 Machining options
- 5 Required tools with status display

13.3.1 Milling files display

The milling files display shows the milling files that are in the queue to be milled next and the estimated milling process duration for each file. The milling process of a file in the queue is started by pressing the **Start** button.

After completion of the milling process, the file will be automatically moved to the archive where it can be found and restored later, if necessary, or deleted.

NOTE

To select whether the milling file should be archived, press **Settings > Jobs**, and then press the **Use archiving toggle** button in the *Archiving* field. You can also adjust the duration for how long the milling file is archived.

13.3.2 Options for milling files

In the options for milling files you can load milling files into the list of milling files. Milling files can also be prioritised and archived. From the archive the milling files can be deleted.



Load milling file into the list of milling files



Archive milling file *



Move the milling file up in priority

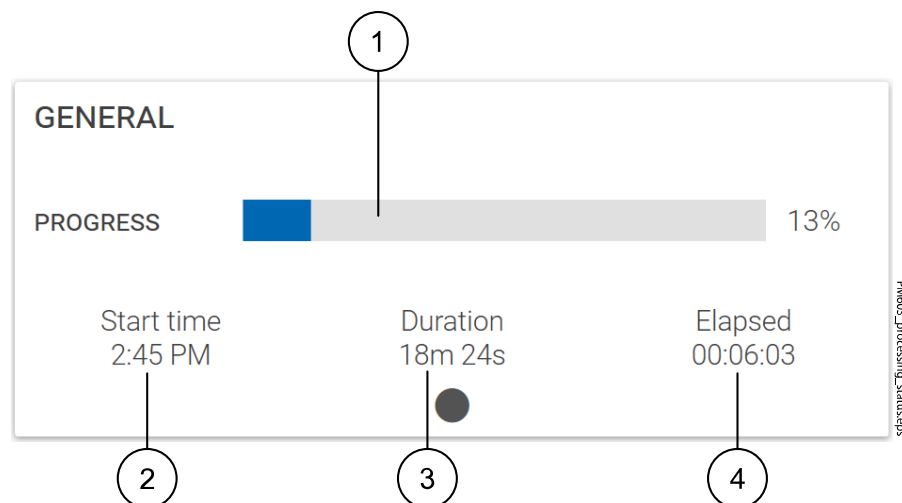


Move the milling file down in priority

* To select whether the milling file should be archived, press **Settings > Jobs**, and then press the **Use archiving toggle** button in the *Archiving* field. You can also adjust the duration for how long the milling file is archived.

13.3.3 Processing status display

The processing status display shows run times and percentage status for the currently ongoing milling file.



- 1 Percentage status of the current milling file
- 2 Start time of current milling file
- 3 Duration of the current milling file
- 4 Elapsed time of current milling file

13.3.4 Machining options

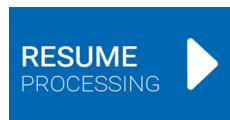
The machining options control the processing of the milling file.



Start processing the milling file



Pause processing of the milling file



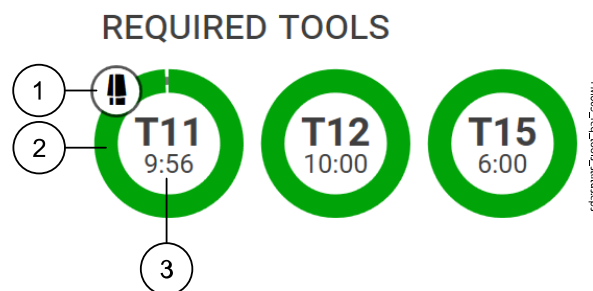
Resume processing of the milling file when process has been paused



Cancel processing of the milling file

13.3.5 Required tools with status display

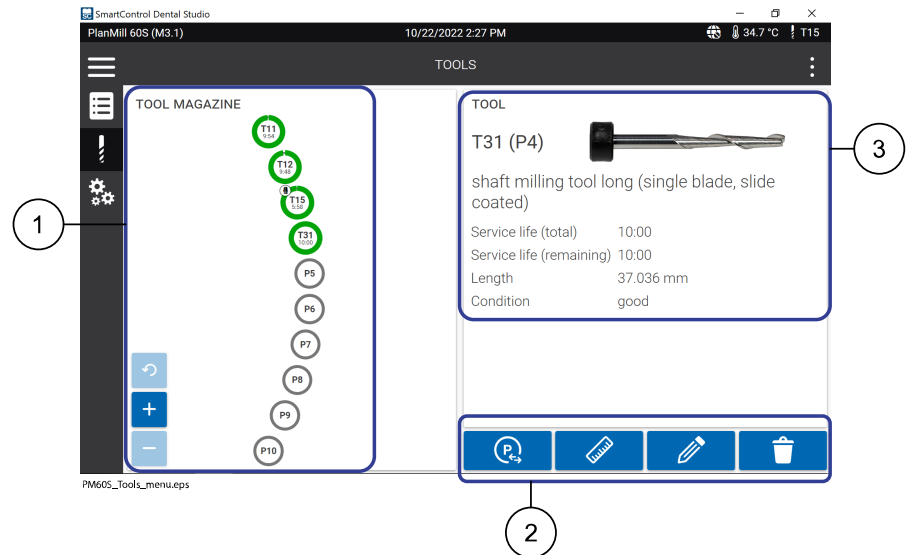
The *Required tools* field lists those tools that are needed for the current milling project. In addition, the user receives information on the status of the current tools and their remaining run time in the form of a countdown and a pie chart.



- 1 Tool currently clamped in the machining spindle
- 2 Remaining tool run time
Shows the remaining run time percentage of the tool. The colour of the pie chart can be green (> 40 % run time left), yellow (10-40 % run time left) or red (< 10 % run time left).
- 3 Remaining run time of the tool in hours and minutes

13.4 Tools menu

The *Tools* menu item contains information on the status and run time of the tools. In addition, you can edit the tools (tool stations).

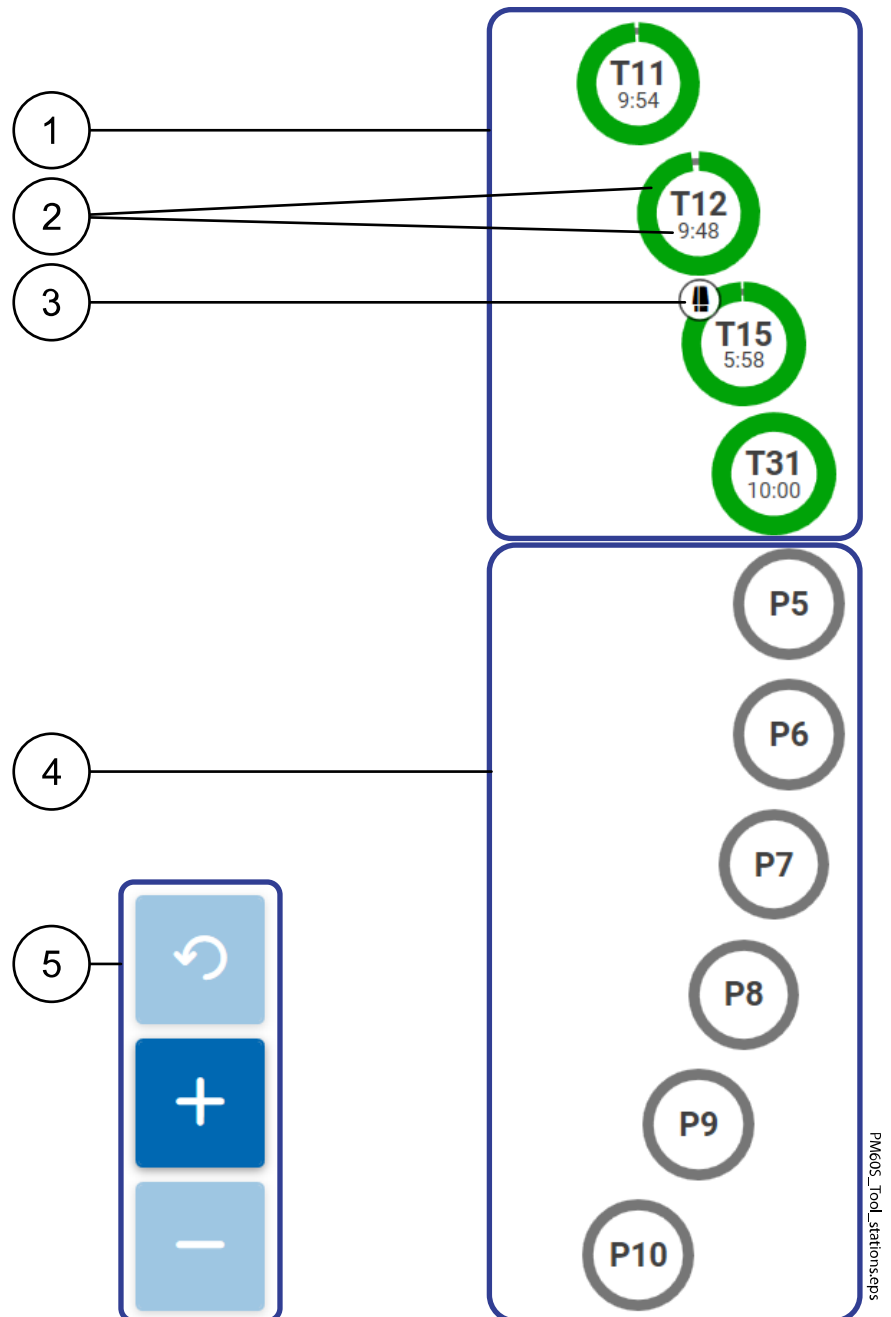


- 1 Overview of tool stations and assignment
- 2 Edit tool stations
- 3 Tool information

13.4.1 Overview of tool stations and assignment

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

The remaining run time is shown both as a pie chart (%) and in the form of a countdown (hours and minutes). The colour of the pie chart can be green (> 40 % run time left), yellow (10-40 % run time left) or red (< 10 % run time left).



- 1 Current tool assignment
- 2 Remaining tool run time
- 3 Tool currently clamped in the machining spindle
- 4 Free tool stations
- 5 Buttons for zooming
Press **+** to zoom in on the tool station overview, press **-** to zoom out, and press **Reset** to reset to the default zoom level.

13.4.2 Edit tool stations

In the *Tools > Edit tool stations* menu you can edit the tool stations used in the milling process.



Change the tool assignment for this tool station.



Clamp a tool (if not yet in spindle) and measure it.



Open the Edit tool where you can change the tool and adjust its service life.



Delete Assignment from this tool station.

13.4.3 Tool information

The *Tool information* field displays which tool type is currently clamped in the machining spindle and gives information on the tool's service life and condition.

13.5 Settings menu

13.5.1 Move to positions

The *Move to positions* menu is always available at the bottom of the touch screen when you are in the *Settings* menu. You can drive the machine into different working positions by pressing the corresponding button.

Home position

When you switch on the milling unit, it is in the home position.

Cleaning position

The machine is easier to clean when it is in the cleaning position.

Blank position 0°

The blank position is a position for loading the workpiece holder.

Blank position 180°

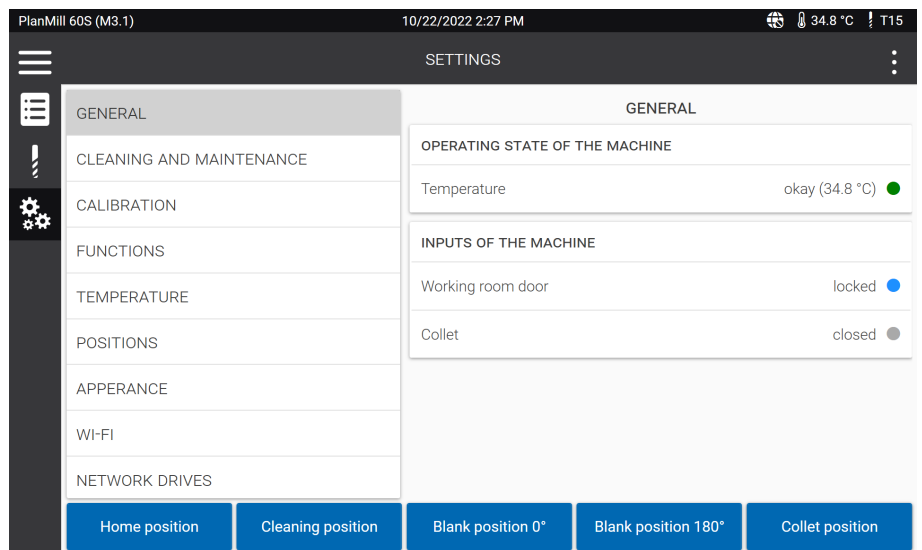
The blank position is a position for loading the workpiece holder.

Collet position

The collet position is a position for cleaning the collet.

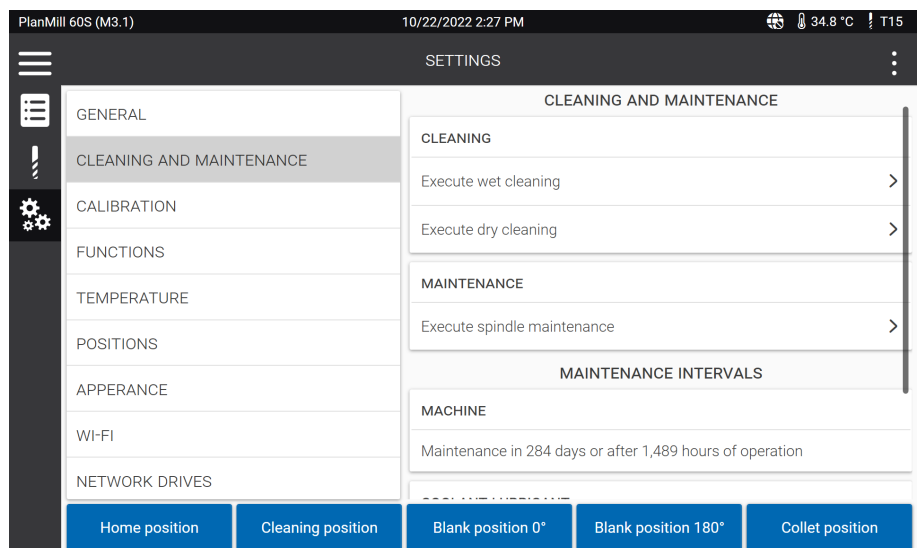
13.5.2 General

The *Settings > General* menu shows the inside temperature of the milling unit. It also shows whether the milling unit's protective door (= working room door) is unlocked or locked, and whether the collet is closed (tool is in collet) or open (no tool in collet).



13.5.3 Cleaning and maintenance

In the *Settings > Cleaning and maintenance* menu you can start wet cleaning, dry cleaning and spindle maintenance processes. The menu also shows you the time for the next annual maintenance and when coolant lubricant should be maintained, i.e. changed.



Cleaning and maintenance

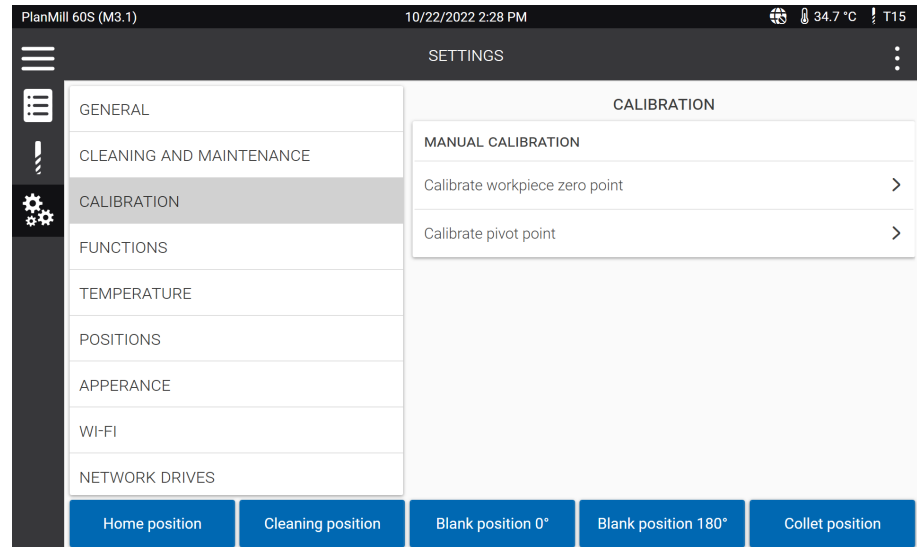
- Execute dry cleaning
Machine starts dry cleaning program using air and suction.
- Execute wet cleaning
Machine starts wet cleaning using coolant.
- Execute spindle maintenance
Machine drives spindle into a position that allows executing maintenance for spindle/collet.

Maintenance intervals

- Machine
Can be reset only by technician.
- Coolant lubricant
Can be reset by user by pressing the button when the lubricant is changed.

13.5.4 Calibration

The *Settings > Calibration* menu contains functions for calibrating the milling unit.

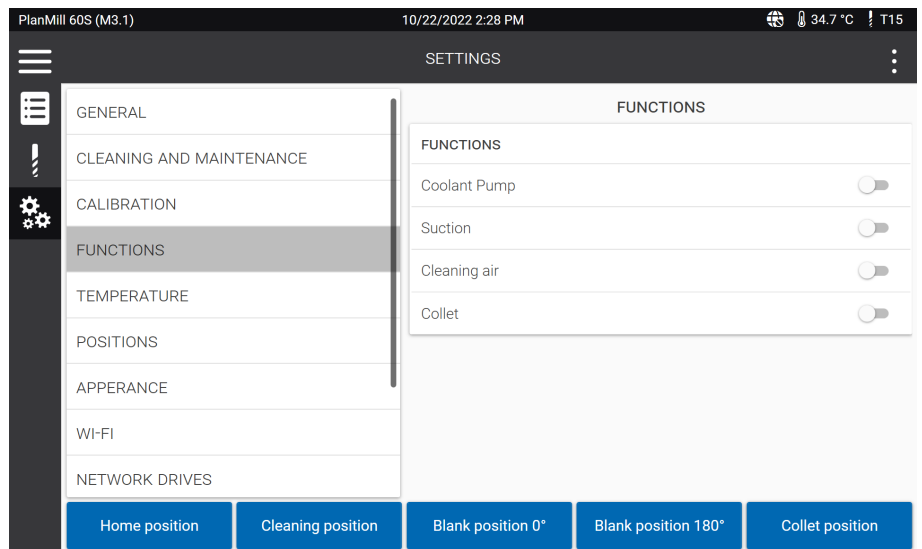


For calibration instructions, see section "Calibrating milling unit" on page 86.

13.5.5 Functions

In the *Settings > Functions* menu you can perform the following actions by pressing the toggle button:

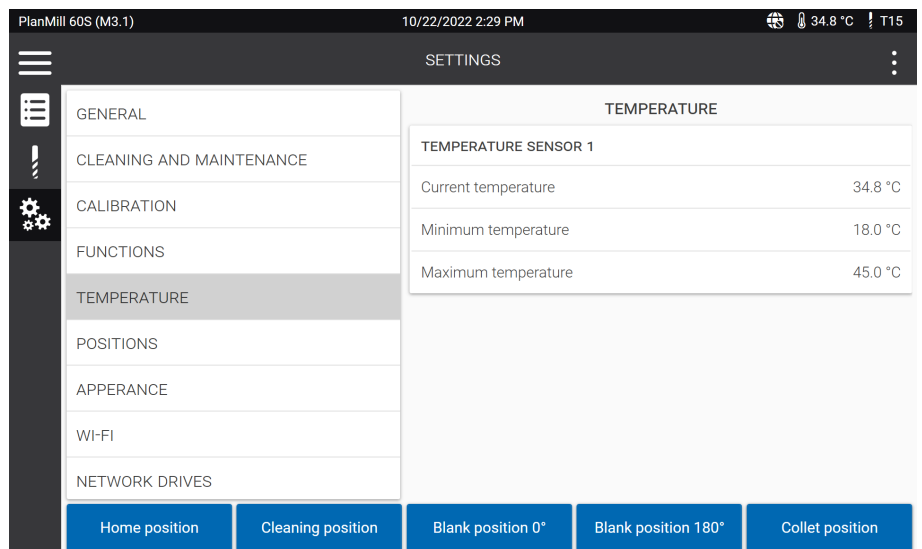
- switch on/off the coolant lubricant pump
- switch on/off the suction
- switch on/off the cleaning air
- open/close the collet.



13.5.6 Temperature

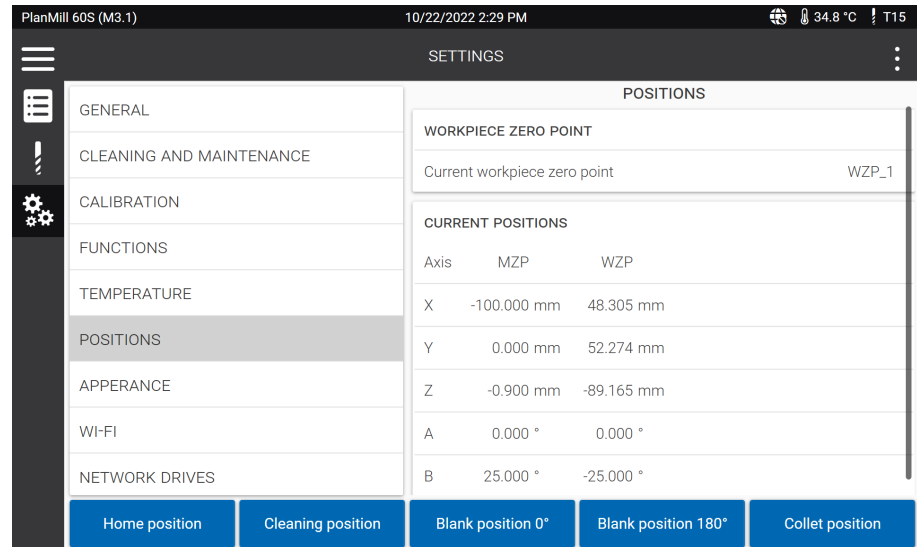
The *Settings > Temperature* menu shows the following temperatures:

- Current interior temperature
- Minimum interior temperature
- Maximum interior temperature



13.5.7 Positions

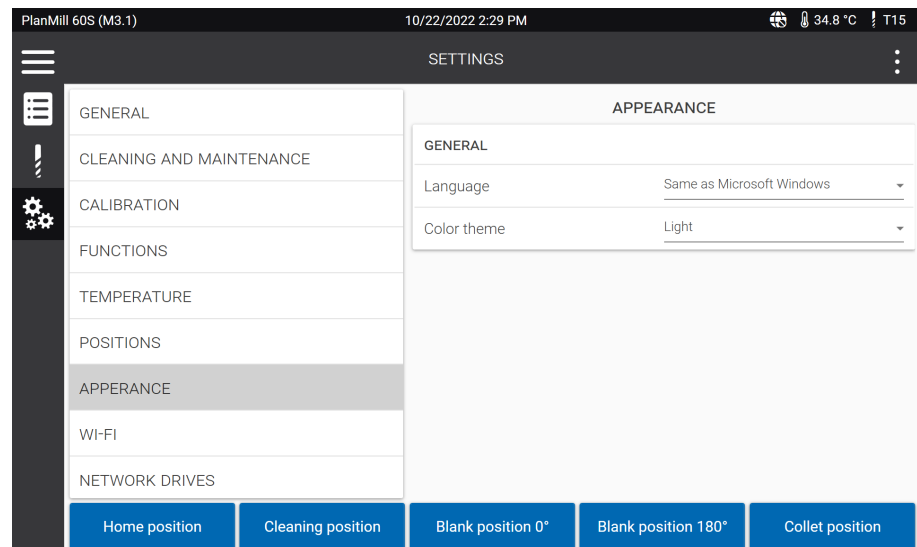
The *Settings > Positions* menu shows the current machine position and the workpiece zero point position of the axes.



13.5.8 Appearance

The *Settings > Appearance* menu lets you change the language and colour theme of the touch screen.

The language can either be the same as in Microsoft Windows, or English or German, and the available colour themes are light and dark.

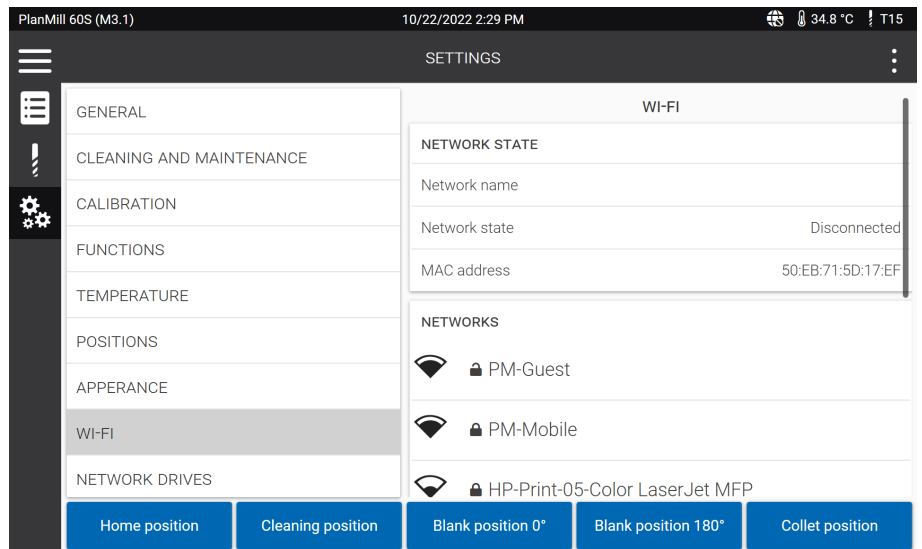


13.5.9 Wi-fi

NOTE

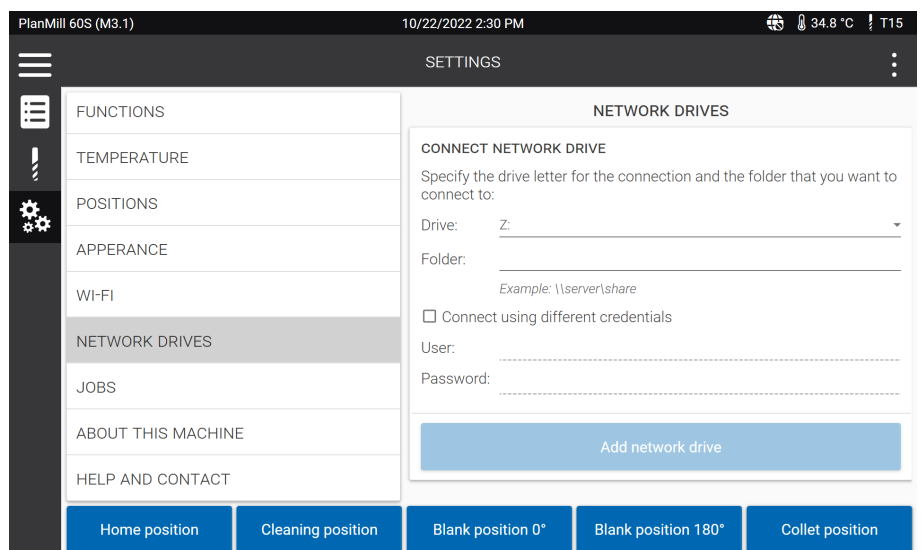
We recommend that the milling unit is connected to the network via an Ethernet cable as it provides a more stable connection than wi-fi.

The *Settings > Wi-fi* menu shows the network name, network state and MAC address of your milling unit. It also shows the available Wi-fi networks and lets you connect to a Wi-fi network.



13.5.10 Network drives

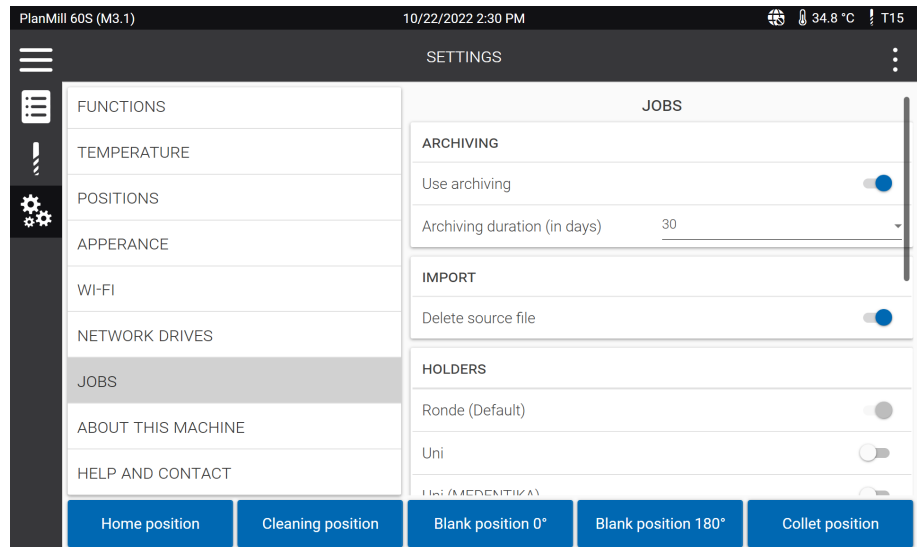
The *Settings > Network drives* menu lets you connect to a network drive and add a network drive.



13.5.11 Jobs

The *Settings > Jobs* menu lets you define the following parameters for job import:

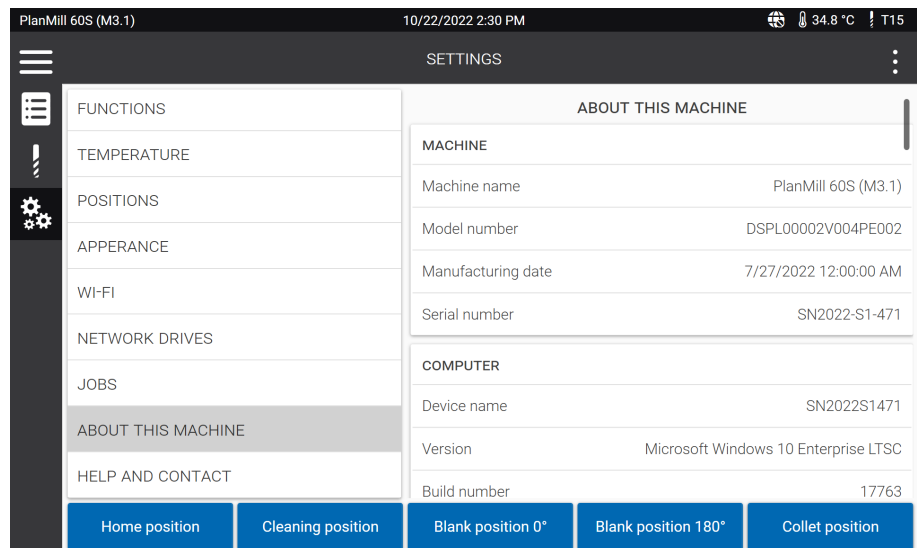
- archive or delete milling job after completion
- for how long is the milling job archived (default 30 days)
- should deleted milling job also be deleted from CAM PC
- activate/deactivate different types of holders



13.5.12 About this machine

The *Settings > About this machine* menu shows details about the milling unit (machine) as well as the computer and application connected to it.

About this machine also shows information on the milling unit distributor, a legal notice, and lists third party libraries.



Machine

- Machine name
- Model number
- Manufacturing date
- Serial number

Computer

- Device name
- Version
- Build number
- Architecture
- Language

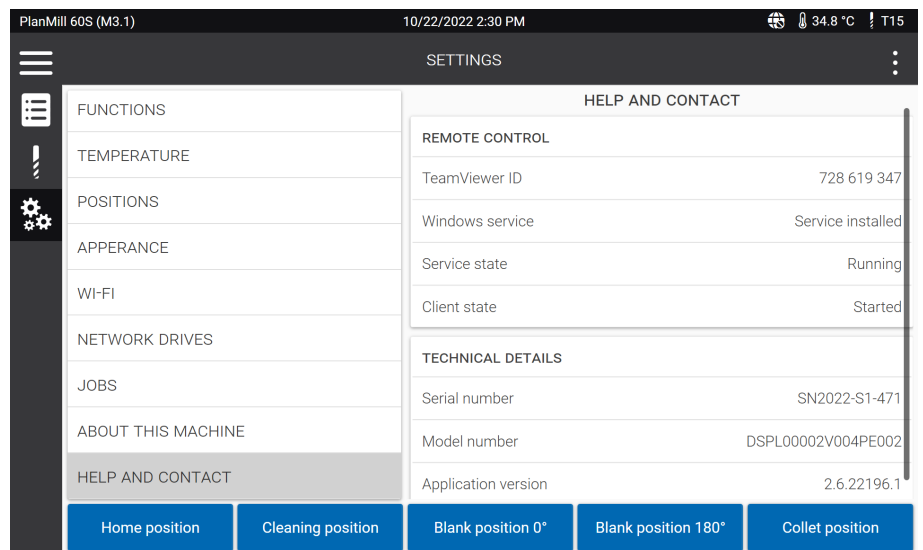
Application

- Name
- Version
- Architecture
- Configuration

13.5.13 Help and contact

The *Settings > Help and contact* menu contains information for situations when you need to contact service personnel. When requested, you can activate remote control so that service personnel can access the milling unit remotely.

The *Help and contact* menu also shows details about the service situation as well as technical details, such as serial number, model number and application version of the milling unit.



14 Planmeca PlanCAM software as part of milling process

The templates for components to be milled are transferred from CAD design software (e.g. PlanCAD Premium) as an STL file to Planmeca PlanCAM software. The components are positioned in a blank in Planmeca PlanCAM. Subsequently, settings such as process speed, insertion depth of the milling cutter, milling sequence and scaling are automatically specified for further processing. Planmeca PlanCAM generates the milling paths and calculates a milling file. The completed milling file is transferred to milling unit control software and after validation, the milling process can be started.

Milling file identifiers

After processing the workpiece to be produced in Planmeca PlanCAM software, a file is created with the ending `.iso`.

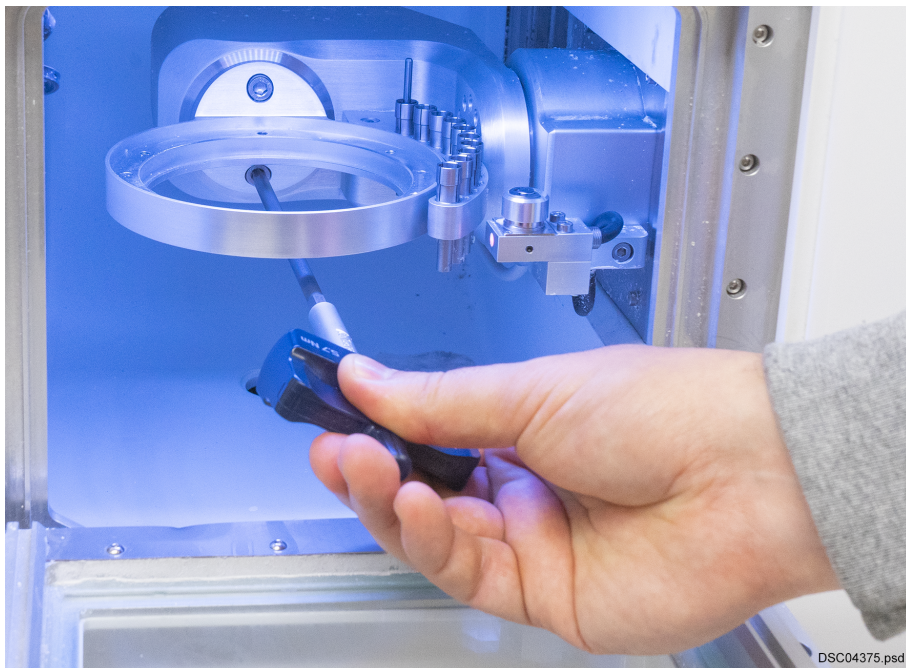
This file contains all relevant data that is required for executing the milling process. The created file name contains the date and time of creation.

15 Adapters

15.1 Attaching C-clamp adapter

Steps

1. Drive the milling unit into the home position.
2. Go to **Settings > Blank position 0°**.
3. When the cover status display lights up, open the protective door.
4. Remove the two bolts with the torque wrench included in the shipment.



5. Remove the workpiece holder.



6. Clean the mounting socket with a brush.



7. Clean the mounting plate of the C-clamp adapter with a brush.



There is a guide hole on the C-clamp adapter and a guide rod on the mounting socket.

8. Use the torque wrench to fasten the C-clamp adapter with the two bolts.



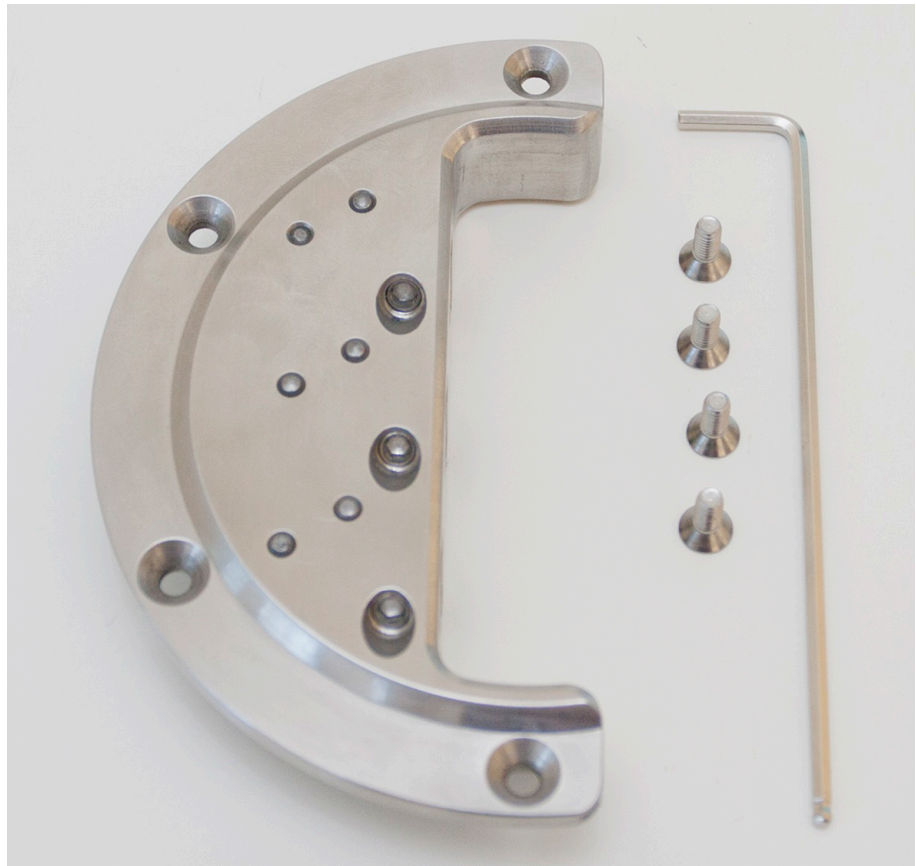
- 8.a. First, fasten both bolts loosely.
- 8.b. When both bolts are in place, apply the torque in tightening them.

15.2 Glass ceramic adapter

15.2.1 Attaching glass ceramic adapter

1. Detach the current adapter by removing the six attachment screws.

For attaching the glass ceramic adapter you'll need an Allen key and four screws.



2. Place the adapter on the left side of the adapter.
3. Insert the screws in the screw holes and tighten using an Allen key.
First, fasten the screws loosely, and when all screws are in place, tighten them firmly.

The glass ceramic adapter does not require any calibration before milling.



15.3 Adapters for premilled abutments

Before milling adapter calibration pieces, ensure that the milling unit is calibrated properly. See section "Calibrating milling unit" on page 86 for more information.

Pins for calibrating adapters can be ordered from your local premilled blank supplier.

The calibrating file for milling test pins is available from your local dealer.

15.3.1 DESS adapter

For instructions on fastening the screws, see "Attaching glass ceramic adapter" on page 55 .



15.3.1.1 General cleanliness and handling

The adapter has to be calibrated in the Planmeca PlanMill 60 S milling unit before the first use to ensure an optimal positioning of the DESS system. Therefore the following aspects must be considered:

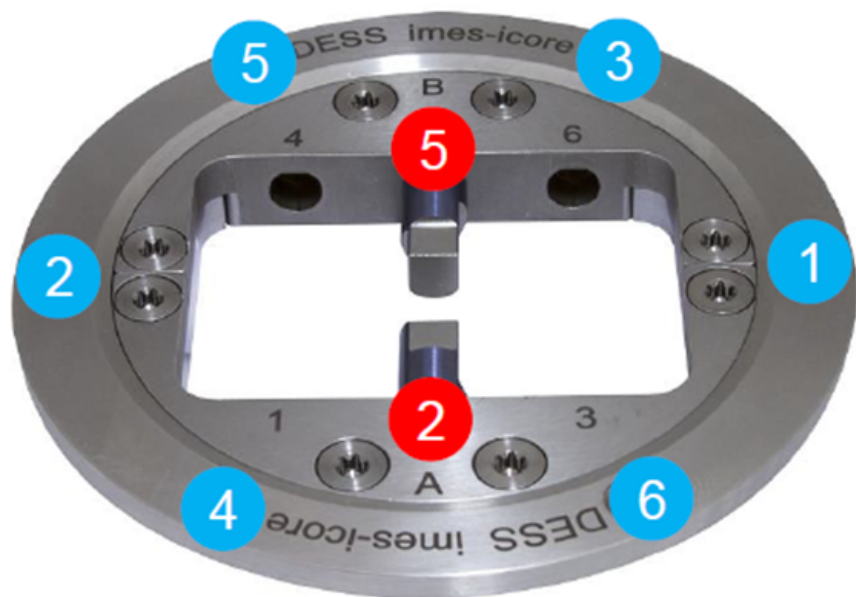
- Cleanliness of the blank adapter (milling unit) and of the DESS adapter
 - General cleanliness
 - No damages in the bearing surface
- The milling unit and its zero-point must be set correctly
- Always clamp the adapter in the same position
- Screw connections
 - The 6 screws should always be tightened in the same order for a reproducible positioning
 - Only screw the 6 countersunk screws loosely at first
 - Afterwards tighten the screws crosswise (always in the same order)

15.3.1.2 Preparing adapter for test milling

NOTE

Please follow directions on general cleanliness and handling.

- The two test pins, available from your local premilled blank supplier, are thoroughly inserted into the middle positions (2 + 5), pushed in to the limit, and firmly clamped with the clamping screw by using a torque wrench.
- The DESS adapter is then fixed into the clean milling unit reception. The screws should always be screwed in loosely at first and tightened afterwards in the same order, 1 - 6.
- The test pins are milled directly on the milling unit with the scripted test program available from your local dealer. A 2mm metal tool (T2) is required for the milling process.



15.3.1.3 Measurement

- The two test pins are unscrewed from the adapter
- The test pins have to be clean and free of burrs for measuring

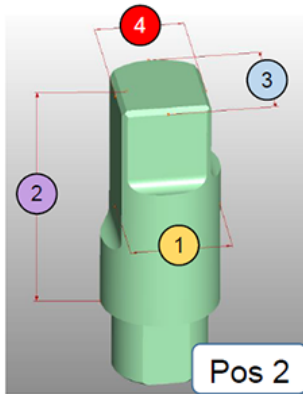


Measurements

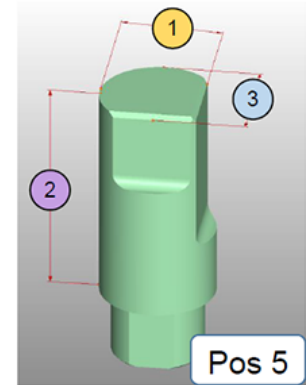
- width (X-axis) (1)
- length (Y-axis) (2)
- height (Z-axis) (3)
- width control measurement / only Pos 2 (4)
- customer:
- milling unit type:
- serial number:

Take the following measurements with a precision of 10 µm and send the results to your local dealer to be inserted into the offset calculation program.

- Position 2:
- Position 5:



Pos 2:		Pos 5:	
①	<input type="text"/>	①	<input type="text"/>
②	<input type="text"/>	②	<input type="text"/>
③	<input type="text"/>	③	<input type="text"/>
④	<input type="text"/>		



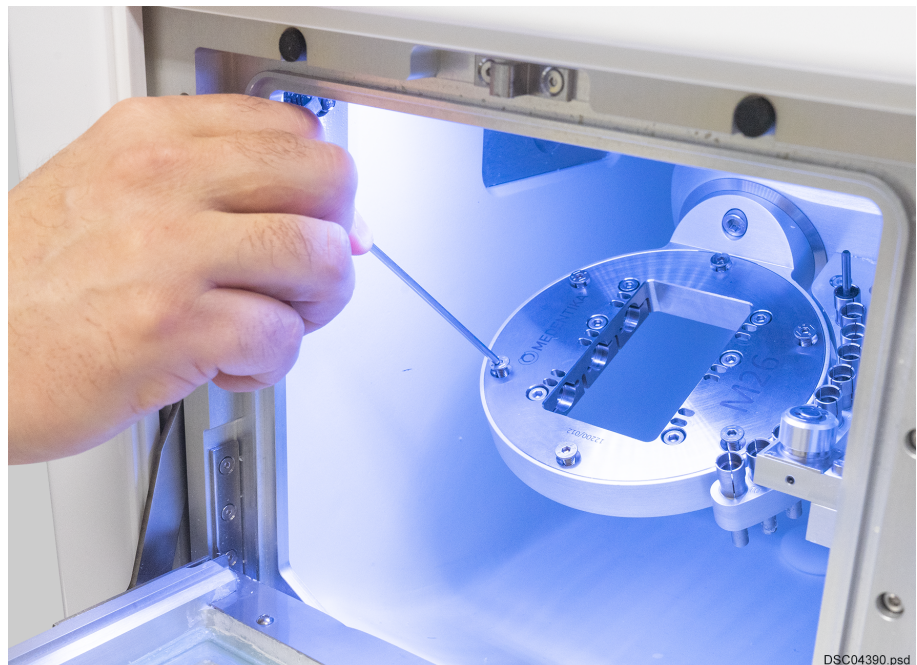
15.3.1.4 Calculation and data transfer

The offset values for the Planmeca PlanCAM software are determined after the measurement results are entered into the calculation program.

Please contact the local dealer of your Planmeca PlanCAM software to implement the offset data.

15.3.2 Medentika adapter

For instructions on fastening the screws, see "Attaching glass ceramic adapter" on page 55.



15.3.2.1 General cleanliness and handling

The adapter has to be calibrated in the Planmeca PlanMill 60 S milling unit before the first use to ensure an optimal positioning of the Medentika system. Therefore the following aspects must be considered:

- Cleanliness of the blank adapter (milling unit) and of the Medentika adapter
 - General cleanliness
 - No damages in the bearing surface
- The milling unit and its zero-point must be set correctly
- Always clamp the adapter in the same position
- Screw connections
 - The 6 screws should always be tightened in the same order for a reproducible positioning
 - Only screw the 6 countersunk screws loosely at first
 - Afterwards tighten the screws crosswise (always in the same order)

15.3.2.2 Preparing adapter for test milling

NOTE

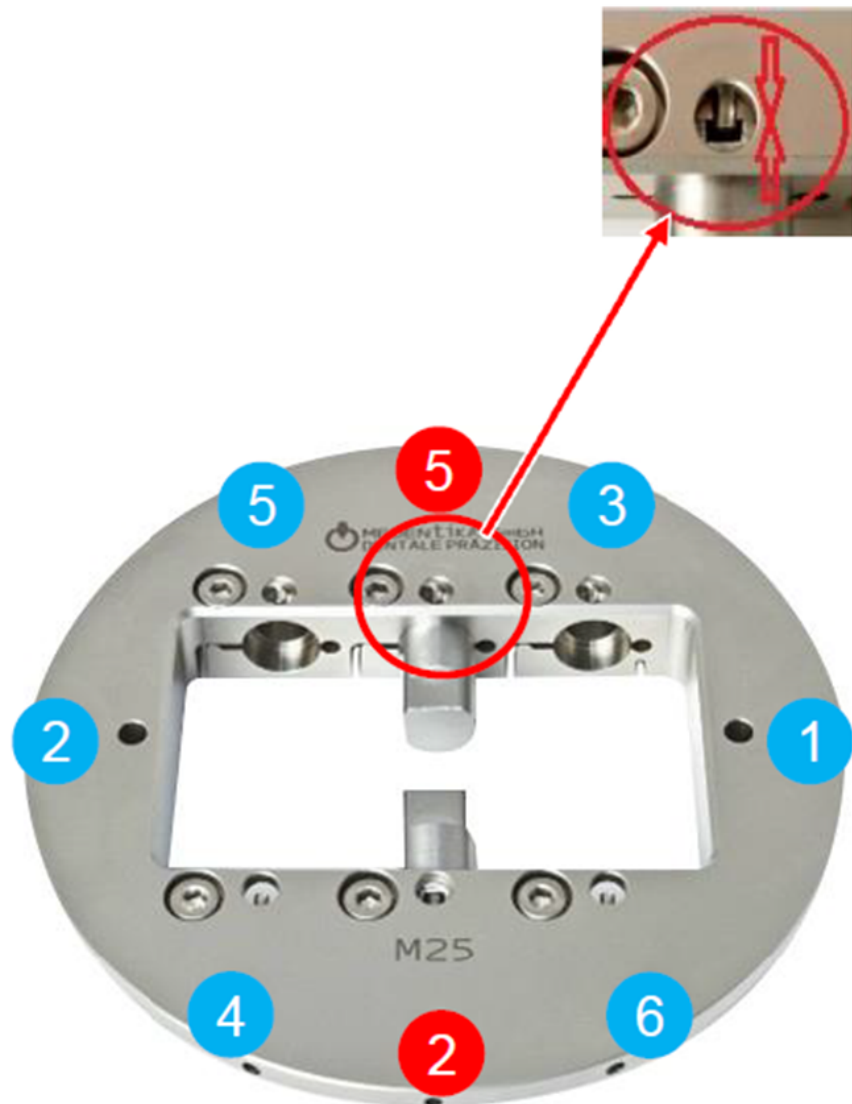
Carefully follow the directions on general cleanliness and handling.

The two test pins, available from your local premilled blank supplier, are thoroughly inserted into the middle positions (2 + 5), pushed in to the limit, and firmly clamped with the clamping screw by using a torque wrench.

Check that both test pins are attached directly without a gap to the supporting surface.



Fix the adapter into the clean milling unit reception.



NOTE

The screws should always be screwed in loosely at first and tightened afterwards in the same order.

The test pins are milled directly on the milling unit with the scripted test program available from your local dealer. A 2 mm metal tool (T2) is required for the milling process.

15.3.2.3 Measurement

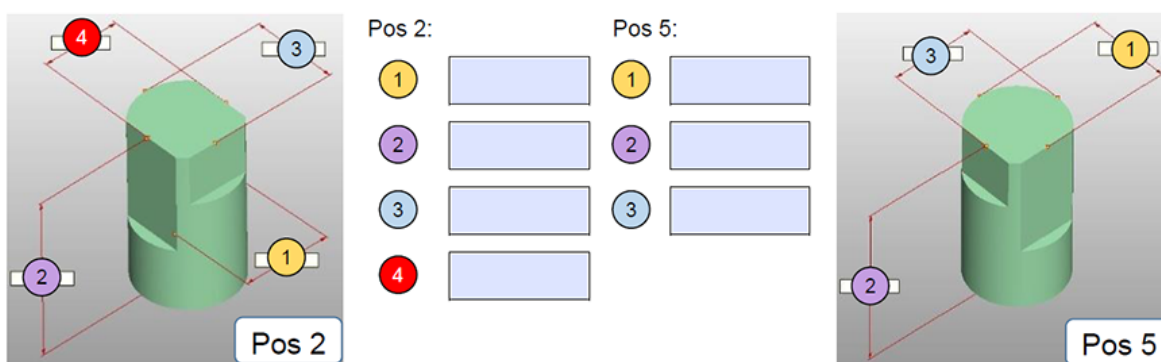
The two test pins are unscrewed from the adapter.

The test pins have to be clean and free of burrs for measuring.



- width (X-axis) (1)
- length (Y-axis) (2)
- height (Z-axis) (3)
- width control measurement / only Pos 2 (4)
- serial number:
- milling unit type:
- customer:

Take the following measurements with a precision of 10 μm and send the results to your local dealer to be inserted into the offset calculation program.



15.3.2.4 Calculation and data transfer

The offset values for the Planmeca PlanCAM software are determined after the measurement results are entered into the calculation program.

Please contact the local dealer of your Planmeca PlanCAM software to implement the offset data.

15.3.3 Nt-trading adapters

For instructions on fastening the screws, see "Attaching glass ceramic adapter" on page 55.



15.3.3.1 General cleanliness and handling

To ensure an optimal positioning of the nt-trading system, the adapter has to be calibrated in the Planmeca PlanMill 60 S milling unit before the first use. Therefore the following aspects must be considered:

- Cleanliness of the blank adapter (milling unit) and of the nt-trading adapter
 - General cleanliness
 - No damages in the bearing surface
- The milling unit and its zero-point must be set correctly
- Always clamp the adapter in the same position
- Screw connections
 - The 6 screws should always be tightened in the same order for a reproducible positioning
 - Only screw the 6 countersunk screws loosely at first
 - Afterwards tighten the screws crosswise (always in the same order)

15.3.3.2 Preparing adapter for test milling

NOTE

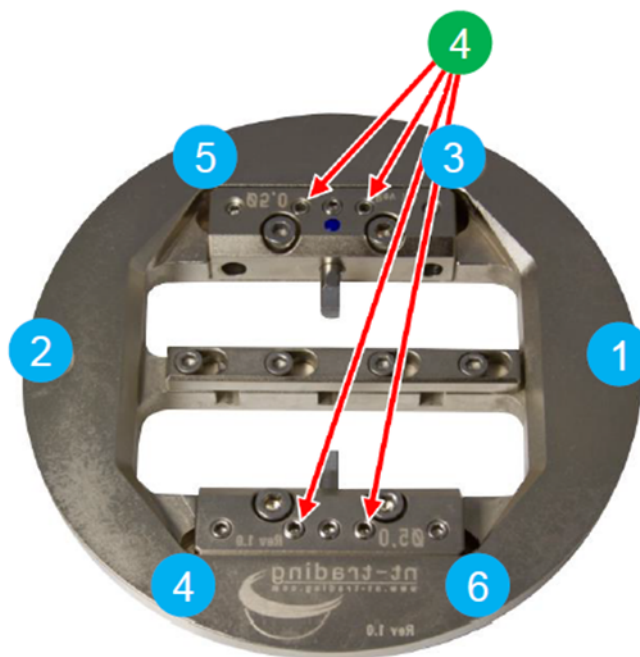
Carefully follow directions on general cleanliness and handling.

- The test pins, available from your local premilled blank supplier, are inserted into the middle positioning holes in the bars until the stop and are tightly fixed by screws (2) and (5).

- Both bars are then inserted into the nt-trading adapter and screwed tightly. The screws marked with (4) have to be turned back and are not allowed to have any contact to the adapter.
- The nt-trading adapter is then fixed into the clean milling unit reception.

NOTE

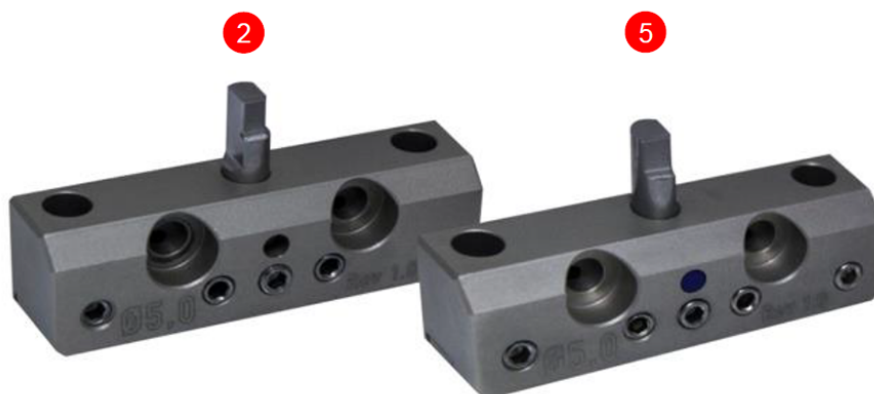
Always attach the screws loosely at first and then tighten in the same order (1) - (6).



- The test pins are milled directly on the milling unit with the scripted test program available from your local dealer. A 2 mm metal tool (T2) is required for the milling process.

15.3.3.3 Measurement

- The two test pins are unscrewed from the adapter
- The test pins have to be clean and free of burrs for measuring



- width (X-axis) (1)
- length (Y-axis) (2)

- height (Z-axis) (3)
- width control measurement / only Pos 2 (4)

Take the following measurements with a precision of 10 µm and send the results to your local dealer to be inserted into the offset calculation program.

Pos 2:	Pos 5:
1 <input type="text"/>	1 <input type="text"/>
2 <input type="text"/>	2 <input type="text"/>
3 <input type="text"/>	3 <input type="text"/>
4 <input type="text"/>	

15.3.3.4 Calculation and data transfer

- The offset values for the Planmeca PlanCAM software are determined after the measurement results are entered into the calculation program.
- Please contact the local dealer of your Planmeca PlanCAM software to implement the offset data.

16 Operating milling unit

CAUTION

The milling unit and components of the milling unit must only be operated when in an operationally safe and technically faultless condition.

CAUTION

Operation of the milling unit is only permissible if the protective devices are functioning correctly.

CAUTION

The milling unit must only be operated within the values specified in the technical specifications. For reference, see section "Technical specifications" on page 91.

CAUTION

The milling unit must be operated exclusively by authorised and trained specialist personnel without physical limitations.

CAUTION

When operating the milling unit, always wear protective work clothing, protective gloves, safety footwear, safety goggles and hearing protection.

16.1 Operating modes

16.1.1 Automatic mode

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

16.1.2 Setup mode



WARNING

In the milling unit's set-up mode there is an increased risk of injury due to sharp milling tools, protruding tools, sharp or pointed chips! Always wear protective gloves and safety goggles when operating in setup mode!

A safety interlocking system monitors the milling unit's interior. If the protective door is opened, the machine cannot be started and is in setup mode. The drives and machining 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 workpieces.

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

16.2 Inserting workpiece/blank

Steps



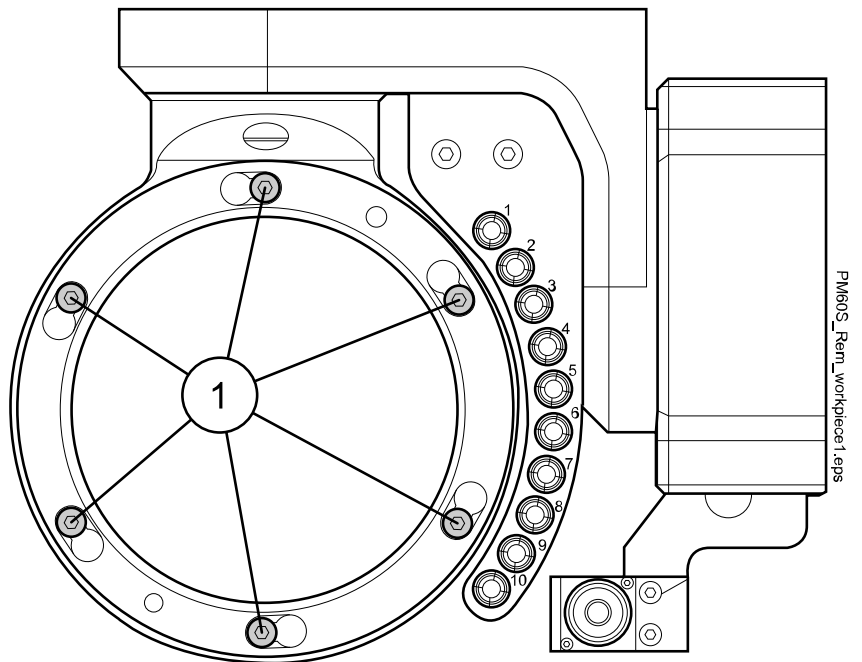
1. Press **Settings** in the *Options* menu.



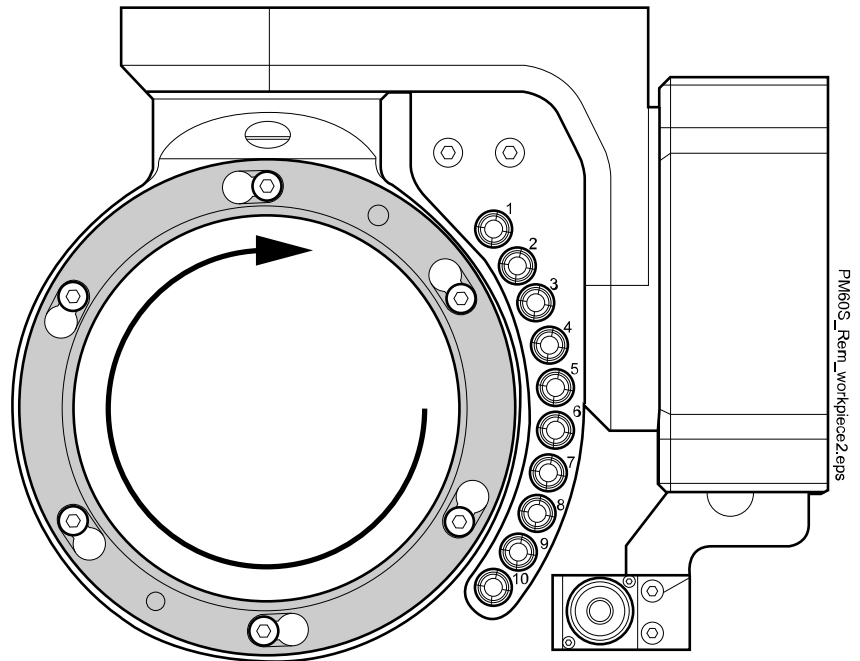
2. Press **Blank position 0°** to drive the milling unit to the blank change position.

3. When the cover status display lights up, open the protective door.

4. Loosen the clamping screws of the clamping ring (1) (do not remove) using a 3 mm Allen key.



- Remove the clamping ring by turning it in a clockwise direction to the right.



- Remove the workpiece in it, if present.
- Clean the tool holder using the cleaning brush.
- Insert the workpiece in the workpiece holder.
- Make sure the workpiece is correctly aligned and stable.
- Insert the clamping ring and turn it counterclockwise, until it stops turning.
- Tighten evenly the clamping screws of the clamping ring until hand-tight.
The clamping ring may not lift off. It must be flush with the workpiece holder on all sides, as if forming a single smooth surface.
- Check the secure seating of the workpiece.
- Close the protective door.

16.3 Removing workpiece

Steps

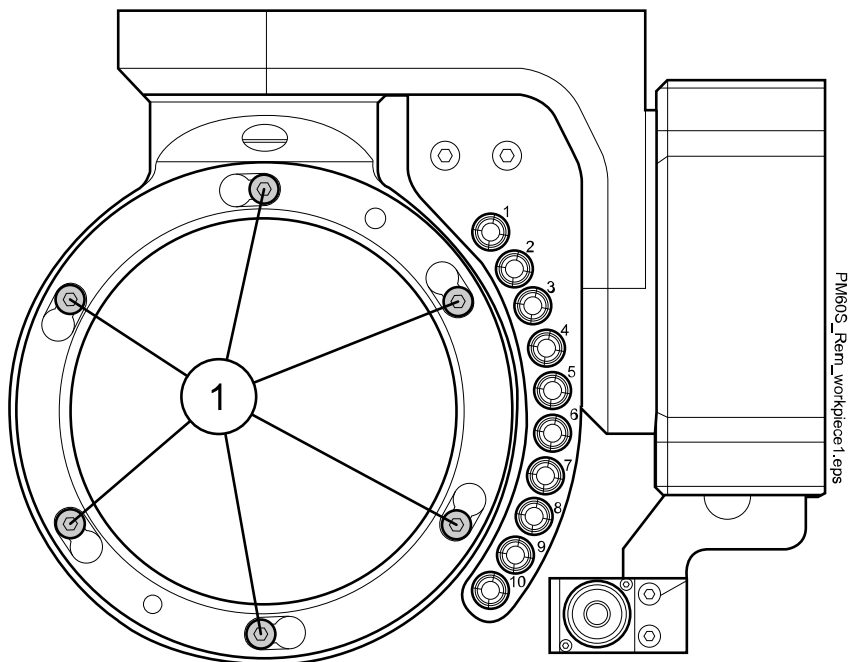


- Press **Settings** in the *Options* menu.

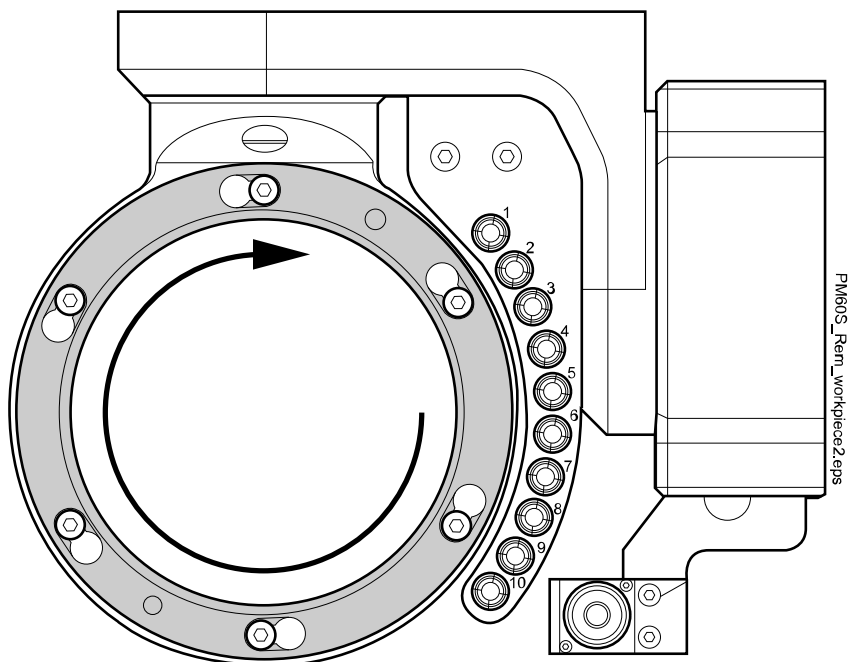
Blank position 0°

- Press **Blank position 0°** to drive the milling unit to the blank change position.
- When the cover status display lights up, open the protective door.

4. Loosen the clamping screws of the clamping ring (1) (do not remove) using a 3 mm Allen key.



5. Remove the clamping ring by turning it in a clockwise direction to the right.



6. Remove the workpiece.
7. Close the protective door.

16.4 Loading tool magazine

About this task

NOTE

A list of approved tools can be found in section "Milling tools" on page 23.

NOTE

Note regarding the assignment of the tool fields!

The software does not check whether the milling cutters in the tool fields are also physically inserted in the device. If an incorrect milling cutter type or no milling cutter type is stored, it can result in serious damage to the milling cutters, the material, or the milling unit.

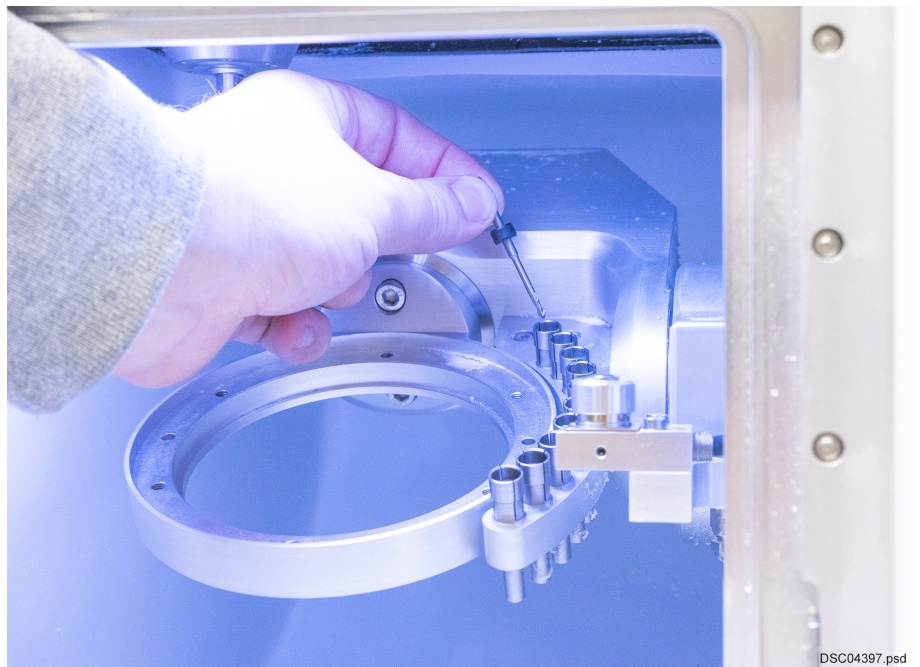
Only use milling tools from Planmeca. The milling tools from Planmeca are ready-ringed in the correct projecting length and are available from your local Planmeca dealer.

The tool magazine for this milling unit can be equipped with max. 10 tools. Each available tool position can be assigned an arbitrary tool type.

Steps

1. When the cover status display lights up, open the protective door.
2. Insert the tool into the corresponding tool station in the tool magazine so that the cutting edge is inside the tool magazine.

Make sure you do not strike or damage the tools during insertion. Ensure that the tool is correctly and securely seated in the tool changer.



3. Close the protective door.
4. Check the control software to ensure that the tool assignment in the tool changer matches with the assignment in the software.

For more information see section "Assigning tools" on page 72.

16.5 Assigning tools

About this task

Tool assignment means that a tool type is allocated to a tool station in Control software.

Steps



1. Press **Tools** to open the *Tools* menu item.

2. Select a tool station number.

The tool station number of the tool in the machining spindle cannot be selected.



3. Press **Position** to open the *Load* menu.

4. Select the new tool from the list of tools.

5. Press **Continue**.

6. Press **OK** to confirm your selection.

16.6 Changing tools in spindle

About this task

NOTE

Only instructed personnel are permitted to change tools.

NOTE

In order to perform a tool change, the user must be familiar with the fundamental operation of the milling unit and the control software.

When you want to change the tool that is already in the machining spindle to another tool that is in the tool station, the machining spindle must first place the active tool in the tool station and then pick up the new tool from the tool station.

Steps



1. Press **Tools** to open the *Tools* menu item.

2. Select a tool number to be picked up by the machining spindle.



3. Press **Measure**.

4. Press **Yes** to confirm your selection.

16.7 Replacing tools in magazine

About this task

NOTE

Only instructed personnel are permitted to replace tools.

NOTE

In order to replace a tool, the user must be familiar with the fundamental operation of the milling unit and the control software.

The run time of the tools is logged during machining. The preset maximum service life of the tools is a recommendation and may vary depending on the material used. The service life can be adjusted in the *Edit tool* screen.

If the runtime of a tool has expired, it must be replaced. The tool must also be replaced if it breaks.

Steps



1. Press **Tools** to open the *Tools* menu item.

2. In the *Tool magazine* field, select the tool number of the tool to be replaced.

If the old tool is in the machining spindle, change the tool to any other tool in tool changer (see section "Changing tools in spindle" on page 72).



3. Press **Edit** to open the *Edit tool* screen.



4. Press **Reset** next to *Service life (remaining)*.

5. Click **Save**.

6. When the cover status display lights up, open the protective door.

7. Remove the old tool from the corresponding tool station.

8. Insert the new tool.

9. Close the protective door.

16.8 Milling

16.8.1 Before milling

Every time before starting to mill:

- Check the milling unit 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 seated
- Check that the workpiece is secure so that it cannot become loose during processing
- Check the ambient temperature; this should correspond with the information provided in the technical data

- Make sure the stop button is not activated.
- Make sure that all necessary accessories (e.g. extraction system) are correctly connected and ready for operation
- Make sure that milling units with a coolant lubricant system have sufficient coolant lubricant in the coolant lubricant tank and that the filters/screens are clean
- Check that the tools required are in the milling unit's tool changer and that the assignment corresponds with the assignment in the control software
- Check the milling unit interior for any loose parts and tools lying around
- Check the alignment and correct fastening of the workpiece
- Ensure that successful referencing of the milling unit has taken place - the software automatically performs a reference run when the milling unit is switched on

16.8.2 Preparing for dry milling

About this task

CAUTION

Dry processing with this milling unit shall only take place with an extraction system that vacuums the dry milling dust. Only use extraction systems that are supplied or approved by Planmeca.

CAUTION

Extraction systems supplied or approved by Planmeca are only suitable for dry dust and are intended to vacuum dry milling dust only. Do not vacuum coolant lubricant residue with the extraction systems supplied. This can lead to serious damage and even destruction of the extraction system.

During dry processing, the material is processed without a coolant lubricant system.

As such, fine dust and gases can be produced, which may have harmful effects on health. Furthermore, the dust that is not extracted may damage the milling unit and result in an increased risk of fire. The connection and operation of an extraction system approved by Planmeca is therefore required for the dry processing of materials.

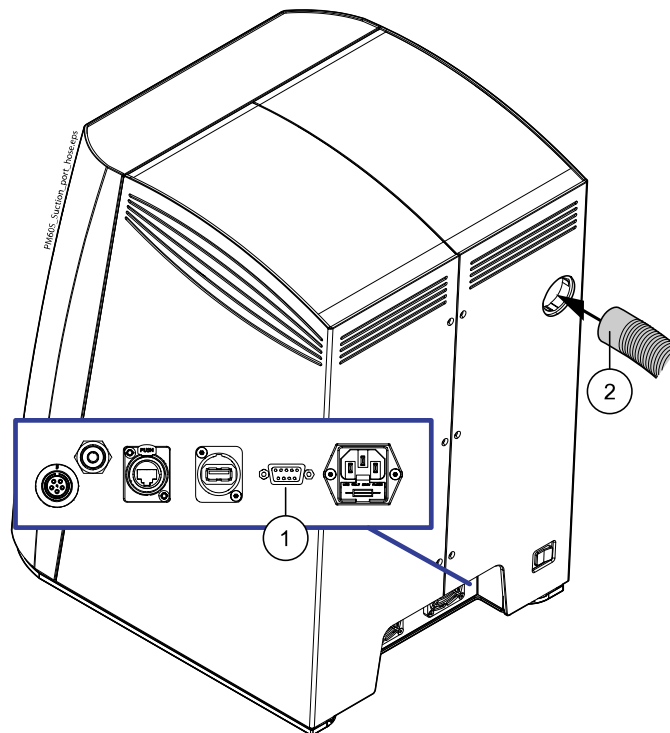
The following materials are usually dry processed:

- Zirconium dioxide
- Plastics
- Wax
- Cobalt chrome
- Composite

Steps

1. Ensure that the extraction system is connected to the control connection (1) on the milling unit with the control cable that was supplied with the extraction system.

2. Plug the hose of the extraction system into the suction port (2).



3. If you are using another extraction system than that provided by Planmeca, check that the extraction system is correctly connected.

What to do next

Start the milling process with the extraction system switched on. See section "Starting milling process" on page 77.

16.8.3 Preparing for wet milling

About this task

CAUTION

The milling unit must only be operated with approved coolant lubricants from Planmeca. Do not use running water for cooling/lubrication.

CAUTION

Wet processing with this milling unit shall only take place without an extraction system that is switched on.

Always when wet milling is performed, the extraction system must not be used. If the extraction system is connected to the milling unit, switch it off before starting milling and ensure that it does not start during the milling process.

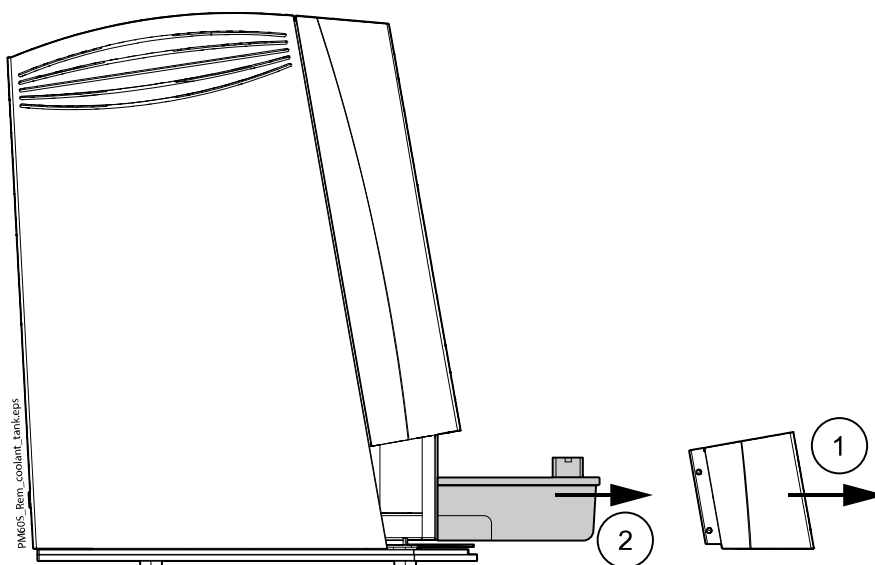
Generally the following materials are wet-processed using a coolant lubricant:

- Lithium disilicate
- Glass-ceramic
- Prefabricated titanium abutments

The coolant lubricant prevents the workpiece from overheating. The coolant lubricant is stored in a tank in the milling unit and before starting wet milling, ensure that there is enough coolant lubricant in the tank. The fill level must be between the two markings MIN and MAX.

Steps

1. Put on protective gloves and safety goggles.
2. Open the protective door.
3. If the milling unit has last been used for dry milling, thoroughly clean the milling unit interior, the filter fleece chips and dry milling dust.
4. Remove the access door (1) to the coolant lubricant tank by pulling it off.
5. Remove the coolant lubricant tank (2).



6. Thoroughly clean all filters and the sump of contaminants.
7. Fill the sump with 3.0 litres of diluted coolant lubricant mixture.
Observe the mixture ratio according to the coolant lubricant system description.
8. Reinsert the coolant lubricant tank.
9. Close the access door to the coolant lubricant tank.

What to do next

Start the milling process with the coolant lubricant system switched on and without an extraction system. The milling unit automatically starts cooling when the milled material requires cooling. See section "Starting milling process" on page 77.

16.8.4 Switching between wet and dry milling



WARNING

Thoroughly clean the interior of the milling unit when changing from wet to dry milling and vice versa, or at least once a day, to prevent the build-up of material residue and to ensure the proper functioning of the system. Avoid any mixing of dry dust with the coolant lubricant as the dust / coolant lubricant mixture can lead to severe contamination of the unit.



WARNING

The extraction unit provided by Planmeca is intended solely for the extraction of DRY milling dust. Do not extract any coolant lubricant with the extractor provided by Planmeca. This may lead to damage or even destruction of the extraction unit.

Use disposable towels to remove any residual coolant lubricant from the unit.

Do not use compressed air to remove milling dust from the unit. This may cause fine dust to get into the mechanics of the unit and lead to the unit being damaged or destroyed

Cleanliness and regular cleaning will increase the service life of the unit.

16.8.5 Starting milling process

Steps

1. Insert the workpiece.
For instructions, see section "Inserting workpiece/blank" on page 68.
2. If you are wet milling, check the coolant lubricant fill level.
3. Close the protective door.
4. Open the *Jobs* menu item.



5. Press **Load milling file** to open the *Select job* menu.



6. Select the milling file.
7. Confirm your selection.

Wait until the milling file has been validated. If problems arise during validation, follow the instructions on the screen.

- 8.



When the file has been successfully validated and all necessary tools are available, press **Start processing**.

17 Cleaning and maintenance

CAUTION

When cleaning and servicing the milling unit, always wear protective work clothing, protective gloves, safety footwear, respiratory protection and safety goggles.

CAUTION

Cleaning with compressed air is prohibited, because fine dust can penetrate the machine mechanism and damage or destroy it.

Regular cleaning and maintenance of the milling unit increases the service life on individual parts and prevents malfunctions.

Cleaning and daily maintenance is to be performed by a trained milling unit user. Annual maintenance can only be performed by a Planmeca authorised service technician.

Automatic cleaning programs can be used to make daily cleaning procedures easier. They can be started from the *Cleaning and maintenance* view in Control software (select **Settings > Cleaning and maintenance**).

Note, however, that automatic cleaning programs do not replace or eliminate the need for manual cleaning.

17.1 Cleaning and maintenance plan

CAUTION

Before maintenance, set the milling unit into a safe state for maintenance work.

NOTE

Cleaning and maintenance intervals for the milling unit and its accessories must be complied with.

Before every start-up

- Check general cleanliness.
- Clean the interior of the unit, the workpiece holder, the tool holder, the shaft of all tools, and the tool measure sensor. See section "Milling chamber" on page 81.
- Clean the coolant lubricant tank and filter. Also check the coolant lubricant fill level and top up, if necessary. See section "Coolant lubricant tank" on page 84.
- Visually inspect the power and compressed air supply lines for damage, any leaks in the coolant lubricant system and for damage to the protective door.

During the visual inspection, observe especially signs of corrosion or fatigue in part fastenings and cables. Report any irregularities to your local Planmeca dealer.

Daily

- Check the condensate container in the air pressure regulator
- Check that the protective door functions properly
- Check the milling unit for housing and insulation damage

Weekly or after tool breakage

- Remove the collet, clean it and inspect for damage
- Clean collet retainer with the provided cleaning brush
- Coat the collet in the front conical area on the outside with a thin film of grease using the chuck grease provided
- Clean the inner cone of the shaft (machining spindle) with the felt cone provided
- Replace the collet if it has visible damage or traces of wear
- Clean or replace the ventilation fan filter
- Clean the milling unit completely as described above in section *Before every start-up*

Every two weeks

- Replace the entire coolant lubricant

Monthly

- Calibrate the milling unit, see "Calibrating milling unit" on page 86.

Yearly**NOTE**

The annual maintenance is performed by an authorised service technician.

- Testing of earthing resistances.
- Replacement of unlisted and worn wear parts.

17.2 Safety instructions for cleaning and maintenance**WARNING**

Before performing cleaning, maintenance and servicing work, switch off the milling unit's main switch and unplug the mains plugs in order to prevent the milling unit from being switched on accidentally. Wait for a few minutes before beginning cleaning and/or maintenance.

**WARNING**

There is a risk of injury and death when reaching into the milling unit interior due to sharp-edged or pointed tools.
Always wear protective gloves when reaching into the milling unit's interior.

**WARNING**

There is a risk of injury when reaching into the coolant 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 coolant lubricant tank and filter.



WARNING

The combination of oil mist and air can produce a highly explosive mixture! Therefore refrain from blowing out the milling unit with compressed air or oxygen and avoid naked flames (smoking)! When cleaning the milling unit never use flammable cleaning products as these can cause a milling unit fire.



WARNING

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 user's manual.

CAUTION

When cleaning the milling unit, only use suitable lifting aids and tools.

CAUTION

When cleaning the milling unit, your airways may be contaminated by gases and dusts. Avoid inhalation of gases and dusts and always wear suitable respiratory protection.

NOTE

Cleaning with compressed air is prohibited because fine dust can penetrate the system mechanism damaging or destroying it.

17.3 Suitable cleaning products

CAUTION

Cleaning products can contain substances that are harmful to health. Always observe the instructions of the respective manufacturer!

Only use suitable cleaning products to clean the milling unit. Never use any abrasive, aggressive, caustic or flammable cleaning products. Cleaning products can contain substances that are harmful to health. Observe the instructions of the respective manufacturer in this regard.

Do not use cleaning agents that damage hoses, cables, seals, paints, rubber, plastics and gaskets.

17.4 Surfaces

Clean the surfaces daily with a damp cloth and, if necessary, a suitable cleaning product (liquid cleaner).

17.5 Protective door

NOTE

Never use abrasive cleaning products on the protective door. Only an approved glass cleaning product must be used.

Clean the protective door daily so that the machining process can be monitored.

17.6 Milling chamber

The workpiece holder, the tool holder, the shaft of all tools, and the tool measure sensor must be kept clean of dust and chips in order to guarantee a faultless tool change. Clean the milling chamber every morning using a suitable brush and optionally the extraction system hose. Ensure that no dirt penetrates the milling unit mechanism and damage or destroy it.

Clean the workpiece holder, the tool holder, the shaft of all tools, and the tool measure sensor with a suitable brush. Be careful when you clean around the tools so that they will not bend.

The measuring surface of the sensor must be kept clear of contaminants at all times, because this is of elementary importance for the precision of the milling unit.

To make cleaning easier, move the machine into cleaning position by pressing the **Cleaning position** button in the *Settings* menu. After you have brushed all dust into a pile, you can use the suction to clean out the dust from the milling chamber.

To use the suction:

1. Disconnect the extraction system hose from the suction connector at the back of the milling unit.
2. Select **Functions** in the *Settings* menu and turn on suction by pressing the **Suction** toggle button.
3. Use the extraction system hose to suck out the dust from the milling chamber.

When you are finished, stop the suction and attach the extraction system hose to the suction connector.

Defective or worn tool holders must be replaced. In this case, contact your local dealer.

17.7 Milling spindle

NOTE

Never spray with spray oils, liquids or compressed air directly onto the centrifugal disc of the spindle nose because moisture or dirt can penetrate right to the bearing.

In order to guarantee a long service life of the main spindle drive, the following points must be observed when handling:

- Proceed with 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 spindle will be impaired.
- The spindle nose and tools used must be clean. Dirt and the increased centrifugal forces that arise from this result in a heavy load on the spindle bearing, which significantly increases the spindle wear.
- The hybrid ball bearing of the 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, remove the tool and check the collet for damage, corrosion or soiling (deposits).

17.8 Collet

CAUTION

Never close the spindle without a collet inserted. The spindle may be destroyed if rotated without a collet inserted.

CAUTION

There should always be a tool in the collet. If the collet is repeatedly closed without a tool inserted, it may lose its accuracy and will have to be replaced.

The collet must be removed and cleaned at least once per week and after every tool breakage. The collet must be checked for damage during cleaning.

Use the collet maintenance kit supplied for cleaning and maintaining the collet. The figure below shows the accessories included in the collet maintenance kit.

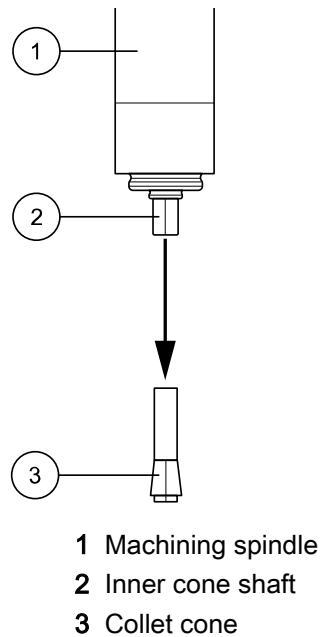


- 1 Chuck grease
- 2 Wrench
- 3 Dummy tool
- 4 Turning piece
- 5 Thin cleaning brush
- 6 Thick cleaning brush

CAUTION

Long-term contact with chuck grease may cause irritation to the skin and/or dermatitis.

Avoid long and intensive contact with the skin, and ensure that the skin is thoroughly cleaned after work and before breaks. The use of a skin protection cream is recommended.



17.8.1 Cleaning collet

Steps



Collet position

1. Ensure that the shaft of the machining spindle does not turn.
2. Press the **Settings** menu item to open the *Settings* menu.
3. Press **Collet position** to move to the position where you can clean the collet.
4. Grasp the ring of the clamped tool with your thumb and index finger. Then open the collet and remove the tool.
Open the collet by first selecting **Settings > Functions** on the touch screen and then pressing the **Collet** toggle button.
5. Use the pin and the collet tool to screw the collet counterclockwise out of the machining spindle.
6. Clean the inner cone of the machining spindle with a felt cone.
7. Clean the inside of the collet using the brush intended for this. Ensure that there is no dirt in the collet and that no dirt penetrates the collet during cleaning.
8. If a tool breaks and a piece is left in the collet, you can remove the residue with the help of the ejector pin.
9. Apply a light film of grease to the cone of the collet using the chuck grease.
10. Screw the collet back into the machining using the pin and the collet tool. Tighten the collet until it is hand-tight.
11. Use your thumb and index finger to grip the ring of the tool that was unclamped in step 5. Insert the tool into the machining spindle and close the collet.

17.9 Guide rails and drive shafts

The guide rails and drive shafts are provided with long-term lubrication and are maintenance free. If necessary, they will be re-lubricated during maintenance by a qualified Planmeca service technician.

17.10 Extraction systems

The optional extraction systems supplied by Planmeca serve exclusively to vacuum dry milling dust. It is prohibited to vacuum coolant lubricant residues with the optional extraction systems supplied by Planmeca, and this leads to damage and even destruction of the extraction system!

The optional extraction systems from Planmeca must be cleaned and maintained regularly. Observe the separate operating and maintenance instructions depending on the selected extraction system! Dispose of contaminants that have collected in the filter and collection container professionally and correctly, in accordance with the legal provisions and local regulations!

17.11 Lights

The interior of the milling unit is illuminated by special LED strips. These must be wiped clean with a dry cloth regularly, or when needed.

If the interior lighting fails, the machine must be shut down because the machining process must be able to be monitored at all times. The machine may only be started up again when the interior lighting has been replaced or fixed by an authorised Planmeca service technician.

17.12 Ventilation fan filters

The two ventilation fan filters located on the rear side of the machine in the connection panel must be removed and cleaned regularly, or when needed. You can access the fan filter by carefully taking off the black plastic cover by hand. Clean the filters by brushing and/or vacuuming them.

New ventilation filters can be ordered from your local Planmeca dealer, if needed.

17.13 Coolant lubricants

Only use coolant lubricants approved by Planmeca. Coolant lubricants approved by Planmeca must be used in accordance with the manufacturer's instructions. It is essential to strictly observe the data sheets and safety instructions of the manufacturer in this regard. The required intervals for replacing the liquids must always reflect the manufacturer's instructions.

When cleaning coolant lubricant residues from inside the machine, we recommend the use of disposable wipes.

Always dispose of operating substances correctly, in accordance with the legal provisions and local regulations! The coolant lubricant is available from Planmeca.

17.14 Coolant lubricant tank

Empty and clean the coolant lubricant tank at least every two weeks. For heavier use, the coolant lubricant tank must be emptied and cleaned at shorter intervals.

Also clean the filter of the coolant lubricant tank regularly or replace this to guarantee the correct flow of the cooling lubricant. Ideally, clean the filter last of all, so that any loosened dirt does not enter into the coolant lubricant tank.

Always dispose of coolant lubricant residues and contaminants in accordance with the legal provisions and local regulations.

17.15 Condensate container

The air pressure regulator's condensate container must be checked at least once daily and emptied if necessary.

1. Switch off the compressed air supply and make sure the air pressure regulator is pressure-free.
2. Turn the condensate outlet of the condensate container counterclockwise.
3. Wait until the condensate container is completely empty.
4. To close the condensate container, turn the condensate outlet clockwise until hand-tight.

NOTE

In the case of contamination it is essential to have the compressed air supply checked.

17.16 Periodic inspections

Inspect the machine periodically (at regular time intervals) for wear (signs of fatigue/corrosion) of the components. Also check general machine functions, such as safety devices.

17.17 Annual maintenance tasks

NOTE

The annual maintenance is performed by an authorised service technician.

Visually inspect the milling unit's earthing connections every 6 months.

We recommend that milling units in multi-shift operation be subjected to semiannual maintenance and milling units in single-shift operation be subjected to annual maintenance of the milling unit by a Planmeca approved service technician.

All mechanical components and machine parts are subject to increased (natural) wear.

We recommend performing annual maintenance after approx. 12 months, replacing the customary wear and tear parts, in order to guarantee seamless and long-term functionality.

18 Calibrating milling unit

Calibrate the milling unit once a month to ensure accurate operation of the milling unit.

During the calibration two bodies are milled to check the workpiece zero point.

18.1 Milling calibration bodies

Before you begin

Note the following issues before starting the calibration.

- For calibration workpiece, use the Calibration disc (part number 10036901).
The correct type of workpiece is available from your local Planmeca dealer.
- An intact milling-tool T11/T13 (2.5mm/3.0mm/Zr PMMA/WAX) must be available and equipped to the tool magazine.

Steps

1. Insert the workpiece.
See section "Inserting workpiece/blank" on page 68.
2. Open the milling program for the test body.
Select **Jobs > Load milling job > Calibration**.
3. Check that the required tool T11 is available and intact.
4. Close the protective door.
5. Start processing the milling program.
See section "Milling" on page 73.
6. After completing the milling work, open the protective door.
7. Remove the workpiece.
See section "Removing workpiece" on page 69.
8. Remove the milled calibration bodies from the workpiece.

18.2 Setting calibration bodies

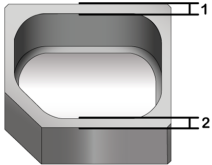

Before you begin

Thickness gauge, accuracy of at least 0.01 mm must be available.



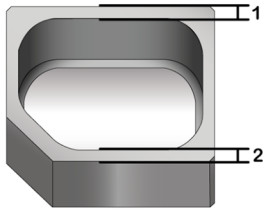

Steps

1. Enter **SETTINGS** menu.
2. Select **CALIBRATION > Calibrate Workpiece zero point**.
3. Enter the measurement results for calibration body 3 in the left column.
Calibration body 3 is marked with 3 boxes on the bottom of the body.

Calibration body 3	Calibration body 12		
<u>Measuring point 1</u> mm	<u>Measuring point 1</u> mm		
<u>Measuring point 2</u> mm	<u>Measuring point 2</u> mm		
<u>Measuring point 3</u> mm	<u>Measuring point 3</u> mm		

PM60S_Calibration_body3.psd

4. Enter the measurement results for calibration body 12 in the left column.

Calibration body 12		
<u>Measuring point 1</u> mm		
<u>Measuring point 2</u> mm		
<u>Measuring point 3</u> mm		

PM60S_Calibration_body12.psd

5. Save the entries.

19 Troubleshooting

19.1 Safety instructions for troubleshooting



WARNING

Before troubleshooting, disconnect the machine from the mains power supply first and wait for a few minutes before starting work.



WARNING

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.



WARNING

Rotating components and/or components with linear movements can cause serious injury. Switch off all moving components of the machine before starting work on moving components, and wait until all moving components have come to a standstill.



WARNING

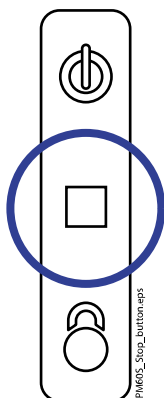
Incorrectly performed troubleshooting work can result in serious physical injuries and significant property damage. It is therefore essential to put the machine into a safe state before starting work. This work must be performed by Planmeca authorised service technicians.

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.

CAUTION

When troubleshooting, use protective work clothing, protective gloves, safety footwear, and eye protection.

In the event of faults



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

1. Immediately stop all processing by pressing the stop button on front of the milling unit (circled in adjacent picture).
2. Evacuate the hazardous area.
3. Determine the cause of the fault.
4. Switch off the milling unit and unplug the mains plug of the machine, if work in the hazard area is necessary. Secure the milling unit against being switched on again while work is being performed in the hazard area.
5. Have the fault rectified, see section "Troubleshooting table" on page 89. The fault may have to be rectified by authorised personnel.

After troubleshooting

After the fault has been rectified and the maintenance or service work has been completed, the milling unit can be put back into operation after you have calibrated the milling unit.

19.2 Troubleshooting table

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

20 Disposal

CAUTION

Comply with all applicable regulations when disposing of waste materials from Planmeca products.



In order to reduce the environmental load over the product's entire life cycle, Planmeca products are designed to be as safe as possible to manufacture, use and dispose of.

Parts which can be recycled should always be taken to the appropriate processing centres, after hazardous waste has been removed. Disposal of obsolete devices is the responsibility of the possessor.

All parts and components containing hazardous materials, such as oil and heavy metals, must be disposed of in accordance with local and national waste legislation and instructions issued by the environmental authorities. The risks involved and the necessary precautions must be taken into account when handling waste products. For more detailed information, consult your Planmeca representative.

Batteries must be disposed of following the requirements of Directive 2006/66/EEC and in accordance with waste legislation and instructions issued by the environmental authorities.

This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their electrical and electronic waste equipment by handing it over to an approved reprocessor, or by returning it to Planmeca for reprocessing. For more information on where you can send your waste equipment for recycling, please contact your local city office or Planmeca.

21 Technical information

21.1 Technical specifications

Manufacturer

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

Distributor

Distributor	Planmeca Oy
Address	Asentajankatu 6 00880 Helsinki Finland
Telephone	+358 (0) 20 779 5500
Internet	https://www.planmeca.com/

Machine

Specification	Value
Dimensions (W x H x D)	422 x 644 x 556 mm (16.6 x 25.4 x 21.9 inches)
Weight (gross)	~ 75 kg (~ 165 lbs)
Drive type	High-torque stepper motors
Control	Stepper motor control IME 481
Protective door	Flap door downwards (vertical)
Guides	Precision steel guides in X, Y, Z axis
Max. dimensions of the workpieces	ØH 94 x 30 mm (3.7 x 1.2 inches) LWH 40 x 20 x 20 mm (1.6 x 0.8 x 0.8 inches)
Tool changer	10-slot direct tool changer
Cooling lubricant tank	3.0 litres
Maximum installation height	2000 metres (1.25 miles) above sea level
Maximum setting angle	A-axis: 30° / B-axis: 25°
Monitor	10" touchscreen

Machining spindle

Specification	Value
Tool change	Electric direct tool changer

Specification	Value
Collet clamping range	3 mm (0.1 inches)
Maximum speed	100 000 rpm
Weight	~ 2.3 kg (~ 5.1 lbs)

Connection values

Specification	Value
Voltage	110 / 230 V
Nominal current	Max. 1.5 A
Frequency	50 / 60 Hz
Nominal power	Max. 500 W
Required air pressure	3 to 4 bar
Required air flow rate	50 l/min
Main fuse	6 A

Environmental requirements

The individual components of the machine possess varying expansion coefficients. Imprecision during processing can only be ruled out with an ambient temperature from +18 to +25°C. If your ambient temperatures are not within this range, we recommend an air conditioner. Contact your local Planmeca dealer for this purpose.

Requirement	Specification	Value
Operation	Temperature range	+18 to +25 °C +64 to +77 °F
	Max. humidity	60 %
Storage	Temperature range	+10 to +50 °C +50 to +122 °F
	Max. humidity	80 %
Transport	Temperature range	-10 to +55 °C +14 to +131 °F
	Max. humidity	80 %

Requirements for compressed air connection

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

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

Air purity

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

Specification	Class	Value
Solid contaminants	Class 3 - filter grade for solids	Better than 5 µm
Water content	Class 4 - maximum pressure dew point	+3 °C (+37 °F)
Total oil content	Class 3 - maximum oil content	1 mg / m ³

Noise emission

NOTE

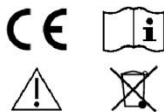
The noise pressure level may vary depending on the material and milling parameters.


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

Type plate


 imes-icore® GmbH
 Im Leibolzgraben 16
 36132 Eiterfeld Germany

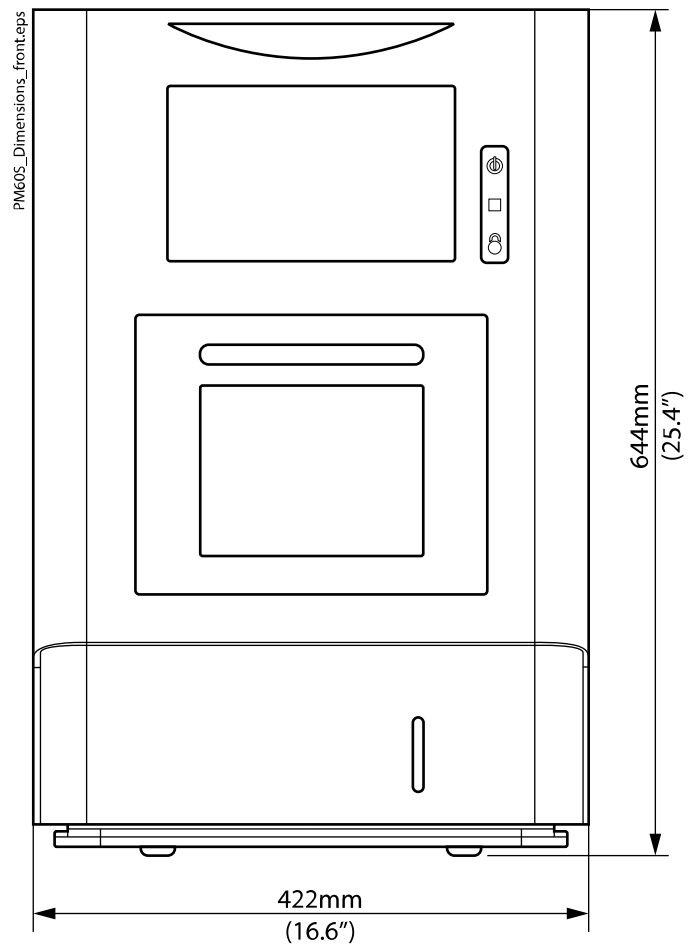
Indoor use only!
 Read instructions before use!
 When opening the unit always
 pull off the main plug!



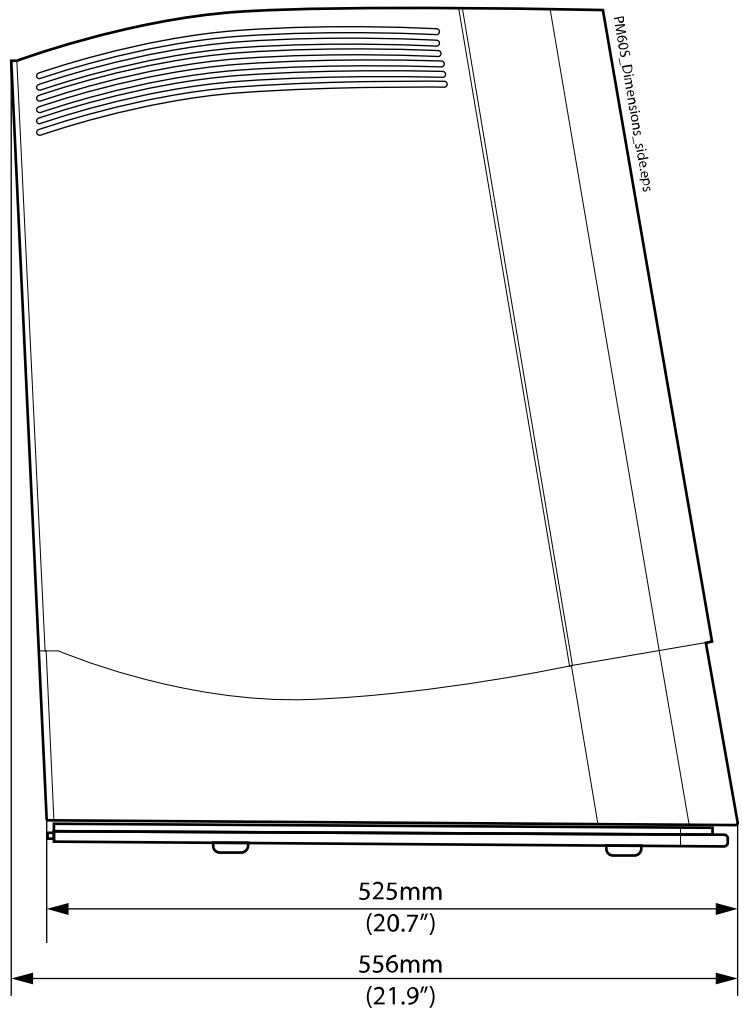
Type	PlanMill 60 S
Model	M3.1
REF	511017 201514
SN	2022-S1-471
	.09.2022
Voltage	100 - 240 V ~
Frequency	50 / 60 Hz
Power	480 W
Main Fuse	T 6 A 230 V
Air Pressure	3-4 bar
Air Volume	50 L / min

21.2 Dimensions

Front view



Side view

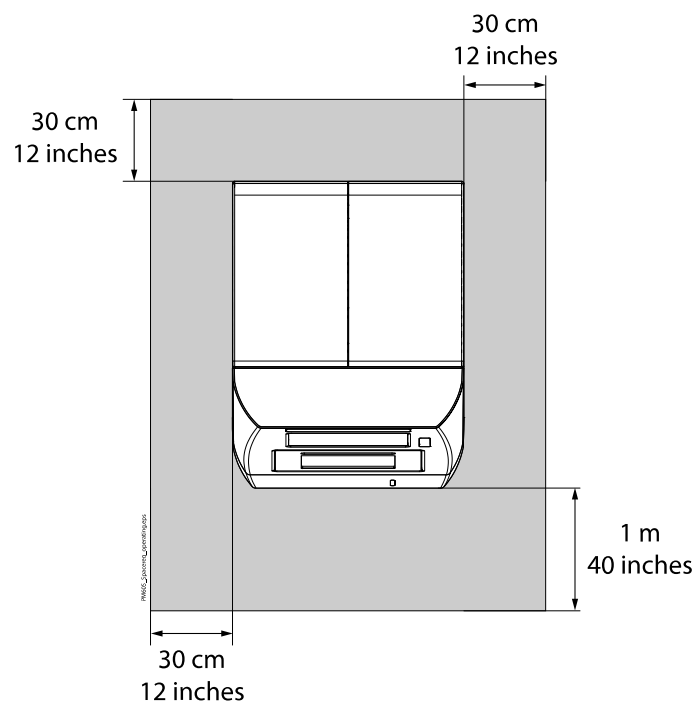


21.3 Space requirements

21.3.1 Operating space requirements

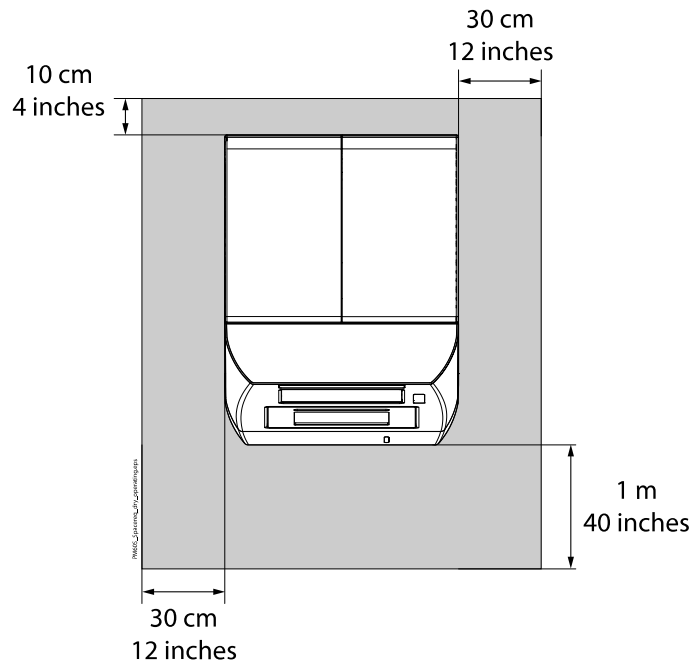
Operating space (dry milling used)

If dry milling is used, the milling unit must be positioned for operation as shown in the figure below; distance of 1 meter (40 inches) in front, and 30 cm (12 inches) on other sides of the unit must be available as a minimum.



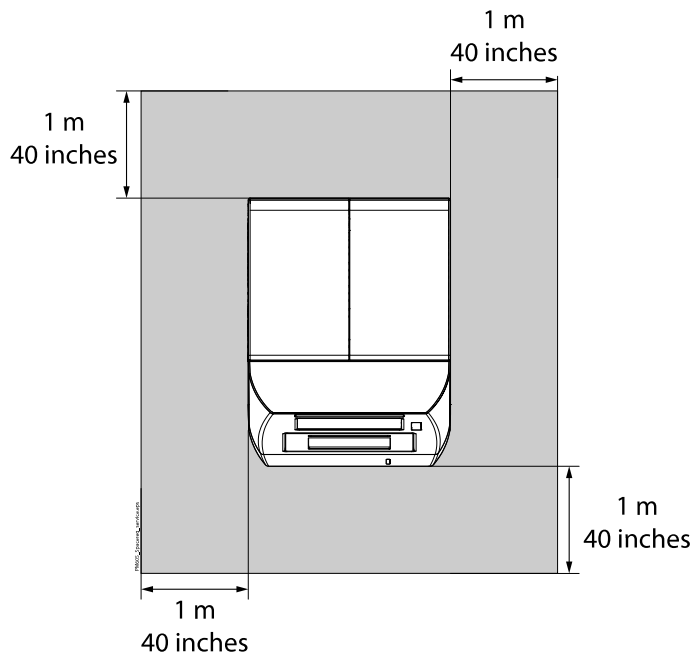
Operating space (if only wet milling used)

If **only** wet milling is used, the milling unit must be positioned for operation as shown in the figure below; distance of 1 meter (40 inches) in front, 30 cm (12 inches) on left and right sides and 10 cm (4 inches) on the back side of the unit must be available as a minimum.



21.3.2 Service and maintenance space requirements

Before service and maintenance works the milling unit must be positioned as shown in the figure below. There must be a safety distance of 1 meter (40 inches) around the machine to guarantee an unobstructed area in the workplace, so that the unit is freely accessible from all sides during service and maintenance work.



Appendix A: Extraction system (optional)

A.1 Safety instructions

A.1.1 Symbols used



WARNING

Refers to a possibly dangerous situation. If it is not avoided, it could result in death or severe injury. Please consult the manual where this symbol is displayed.

CAUTION

Refers to a possibly harmful situation. If it is not avoided, damage could be caused to the product or to something in its environment.

NOTE

Refers to handling tips and other particularly useful information. This does not signify a dangerous or harmful situation.

A.1.2 Electrical safety

This extraction unit is designed to meet the safety requirements of the Low Voltage Directive 2006/95/EC (previously numbered 73/23/EEC).



WARNING

During works with the pump/motor housing open, live, 230/115 volt components are accessible. Make sure that rules and regulations for work on live components are always observed.

NOTE

To reduce the risk of fire, electric shock or injury always isolate the system from the mains power supply before removing the pump/motor panel.

Use only as described in the manual.

Connect to a properly grounded outlet.

A.1.3 Dangers to eyes, breathing and skin

Once used, the filters in the extraction unit may contain a mixture of particulates, some of which may be sub micron size. When the used filters are moved it may agitate some of this particulate, which could get into the breathing zone and eyes of the operative.

Additionally, depending on the materials being used, the particulate may be an irritant to the skin.

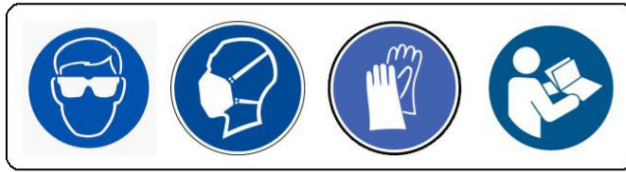
CAUTION

When changing used filters always wear mask, safety glasses and gloves.

A.1.4 Warning and information labels

The following figures show the labels and symbols and list their location on the unit.

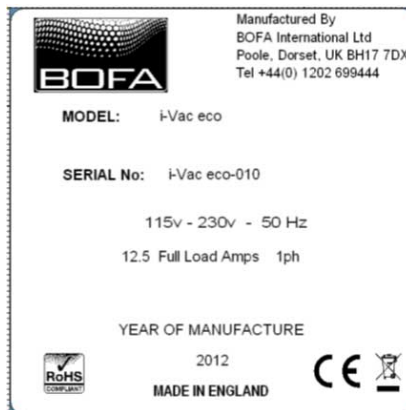
Inside filter door (at top):



Top left of rear panel:



Rear of unit, next to power connection:



Above motor cooling on rear of unit:



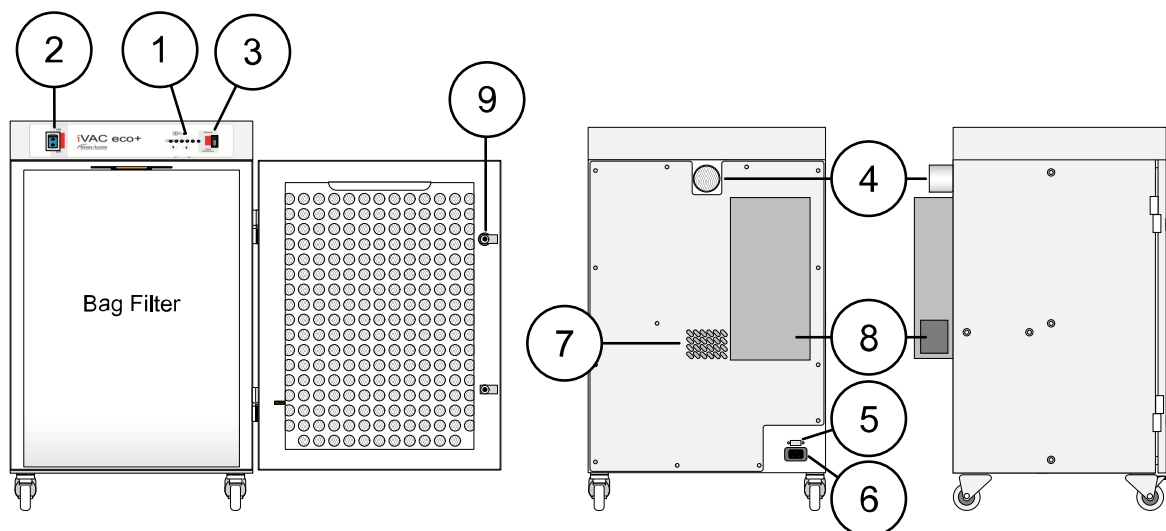
Top left of front door:



A.2 Installation

A.2.1 Extractor overview

This unit provides extraction and filtration of the fume generated by marking, milling, cutting, etching or engraving. The units are of robust design and feature ease of use with minimal maintenance. The main components are shown below.



1. Unit/filter condition display	2. On/off switch	3. Motor function switch
4. Hose inlet connection 50mm	5. Signal / interface connection	6. Power inlet
7. Cooling air inlet	8. Exhaust/cooling air outlet	9. Filter door catch

A.2.2 Installing extractor

CAUTION

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Read all instructions in this manual before using this extractor.

1. Move the unit to the location where it is going to be installed and remove the unit from its packaging. The unit should be installed in a well ventilated room.

CAUTION

Due to the weight involved the extractor unit should only be lifted using suitable lifting equipment and with regard to appropriate safety precautions. (See Appendix for product weight details).

2. Ensure that a 0.5m space is available around any louvered areas of the unit to ensure adequate air flow. Lock the two braked castors, if fitted.

CAUTION

Do not block or cover any louvers or cooling holes on the unit as this severely restricts air flow and may cause damage to the unit.

CAUTION

Under no circumstances should the exhaust outlet/s be covered as this will restrict the airflow and cause overheating.

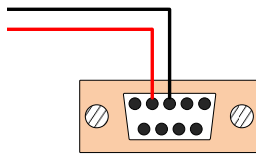
3. Check filters are located in their correct position and carefully replace lid/close door.
4. Connect the extraction ducting between the extractor inlet and the fume capture device.

A.2.3 Filter blocked signal

With this, the extraction unit has been fitted with a pressure switch to monitor the condition of the filters. This is displayed via the Red LED on the front of the unit. This circuit will not directly stop the extractor motor.

A.2.4 Remote stop/start

This enables the extractor unit to be turned on and off by a signal from the customer. Pins 3 & 4 of the connector need to be connected to a 24v dc supply to start the unit. However the mains power switch must be in the “on” position for the signal to be effective.



Remote operation can be overridden by using the override switch, which is mounted on the front the unit.



A.2.5 Electrical supply connection

Check the integrity of the electrical power cable.

Connect the power cable to an isolated electrical supply. The mains socket outlet should be installed near the equipment and be easily accessible. The cable run to the unit should be arranged so as not to create a trip hazard.

CAUTION

Check that the mains input at the isolated supply is the same as the voltage Supply detail on the Serial Number label before plugging the extractor unit in.

A.2.6 General safety requirements

CAUTION

Do not block or cover the cooling vents on the unit, as this severely restricts airflow and may cause damage to the unit.

CAUTION

This unit is over 18 kg in weight and should only be lifted with suitable lifting equipment.

CAUTION

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Read all instructions in this manual before using this extractor.



WARNING

Mains voltage. Dangerous voltages exist in this equipment. Ensure all covers are fitted before operating this equipment.

The unit is now ready for use.

A.3 Operation

A.3.1 Manual operation

The extraction unit is turned off and on by means of an illuminated rocker switch on the front of the unit.



Filter condition signal – indicators and component controls

The LED on the front panel (see above Fig) indicate when the filter is blocked.

The right switch will allow the vacuum motor to be either On/Off/Auto. Auto will require a voltage input to the interface connector on the rear of the unit. (see Fig 3)

A.4 Maintenance

User maintenance is limited to cleaning the unit and replacing the filters with new. Only Planmeca trained maintenance technicians are authorised to carry out component testing and replacement. Unauthorised work or the use of unauthorised replacement filters may result in a potentially dangerous situation and/or damage to the extractor unit, and will invalidate the manufacturer's warranty.

A.4.1 Cleaning unit

The powder coated finish can be cleaned with a damp cloth and non aggressive detergent. Do not use an abrasive cleaning product as this will damage the finish.

The cooling inlets and outlets should be cleaned once a year to prevent build up of dust and overheating of unit.

A.4.2 Replacing filters

The filter package needs attention when the filter change LED is illuminated or, when the unit no longer removes the fume efficiently.

A log of filter changes should be maintained by the user.

All filters are tested to BS3928. A certificate on conformity for each filter is available on request.

It is recommended that a spare set of filters are kept on site to avoid prolonged unit unavailability. Part numbers for replacement filters can be found on the filters fitted in your system. Alternatively, refer to the consumable spares table.

CAUTION

To prevent overheating, units should not be run with a blocked filter condition, or with dust obstruction of inlets or outlets.

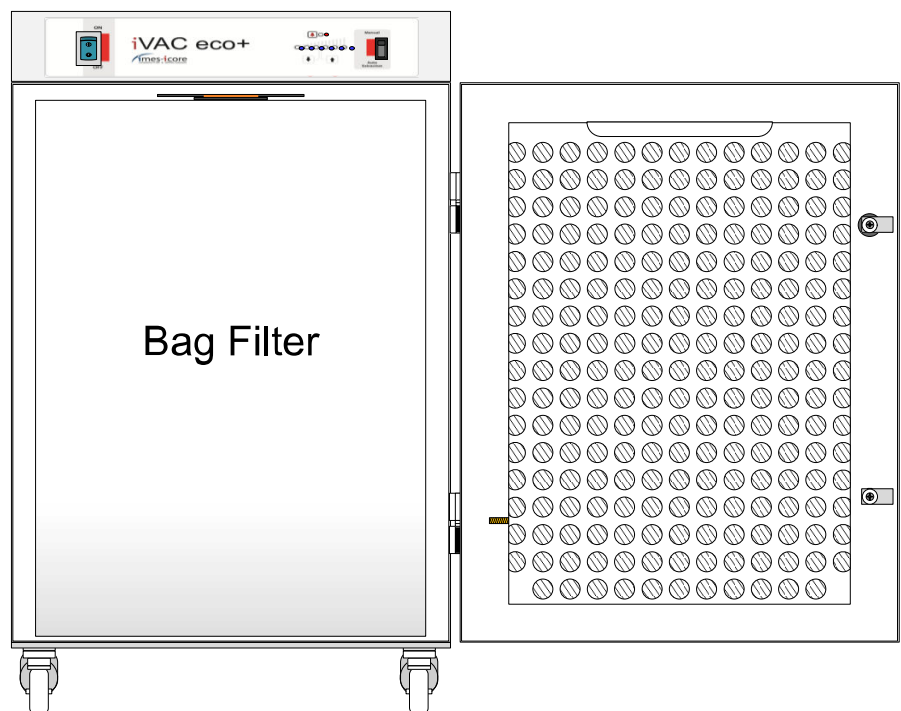
CAUTION

When changing used filters always wear mask, safety glasses and gloves.

A.4.3 Pre filter replacement

The pre filter needs changing when the filter change is illuminated. Isolate the electrical supply to the extractor.

1. Undo the filter compartment latches on the front of the unit.
2. Remove the pre filter by lowering the supporting plate and replace with a new pre filter.
3. Push the supporting plate back up so it clips in place, close and fasten filter compartment latches.
4. Reconnect the electrical supply.



A.4.4 Consumable spares

Unit	Part number	Description
iVAC eco+	513002 0050	5 layer bag filter

Exhauster	Centrifugal blower
Electrical supply	115-230v 1ph 50/60Hz
FLC	12.5 A
Noise level	Below 75dB (A)
Filters	Pre filter
Efficiency F8	95% @ 0.9 μ
Environmental operating range	
Temperature	+5°C to +40°C (41°F to 104°F)
Humidity	Max 80% RH up to 31°C (88°F) to Max 50% RH at 40°C (104°F)
Altitude	Below 2000m (6562 ft)
Pollution degree	2

PLANMECA

Planmeca Oy | Asentajankatu 6 | 00880 Helsinki | Finland

tel. +358 20 7795 500 | fax +358 20 7795 555 | sales@planmeca.com | www.planmeca.com

