

OPERATING INSTRUCTIONS

Cryostat MTC



CE

INS2200GB
07-2010-04

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1. INTENDED USE

The bench top cryostat MTC is intended for rapid freezing and cutting thin sections of frozen specimens for professional use in routine and research laboratories in the fields of biology, medicine and industry.

The system of knife advance operates very reliable from 1 to 25 µm with trimming function up to 25 µm. The MTC is an easily transportable instrument with space-saving design which makes it the perfect alternative for locations with limited space, increased mobility requirements or simply as an economic backup instrument.

2. SYMBOLS



Dangers, warnings and cautions are marked by this symbol



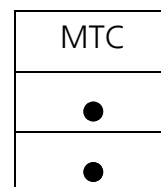
Special instructions regarding the operation of the instrument are marked by this symbol

3. SAFETY NOTES

The SLEE Medical bench top cryostat MTC is provided with the following safety features:

Hand wheel stop

Finger protection for Knife- and blade-holder



The institution which owns the unit and the persons working with the unit, servicing or repairing it have the responsibility for a hazard-free use.

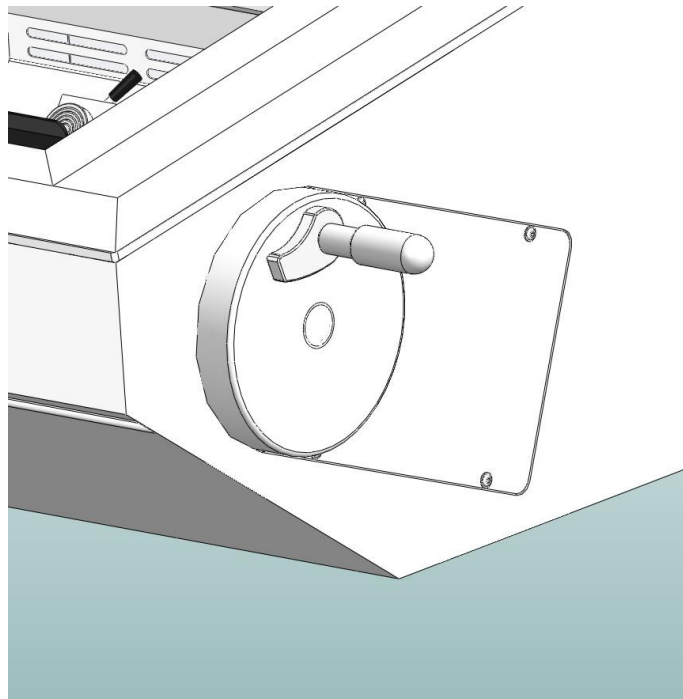
3.1 Hand wheel stop

Always use the finger protection with the knife-/blade holder and put hand wheel in stop position

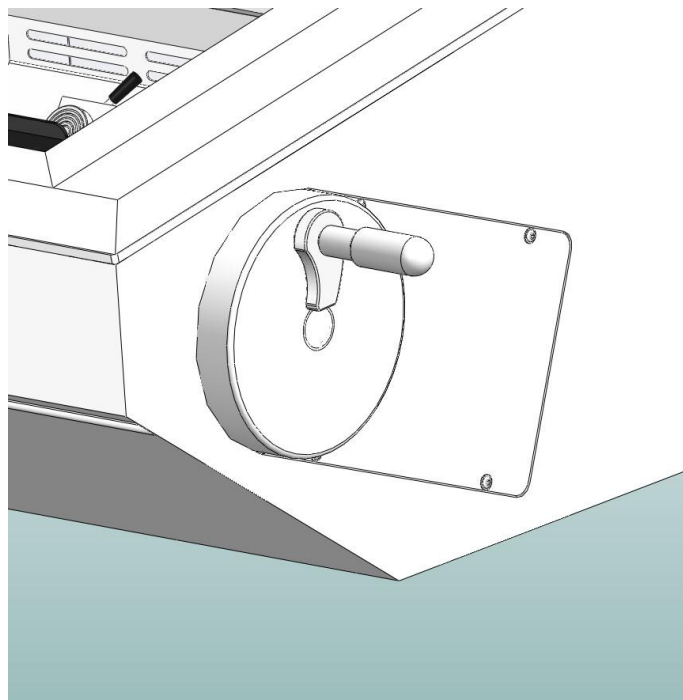
- before working with the knife or specimen
- before changing the specimen
- during break time

The hand wheel can be stopped in any position. For this purpose move the stop lever towards the centre.

For releasing the stop please turn the lever towards the outside again.



Hand wheel stop released. Movement.

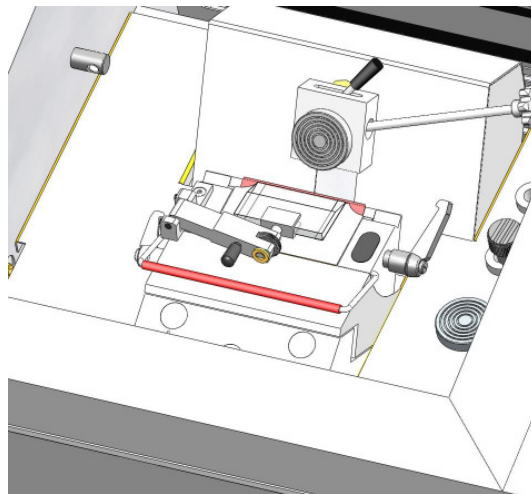


Hand wheel stop activated. No movement.

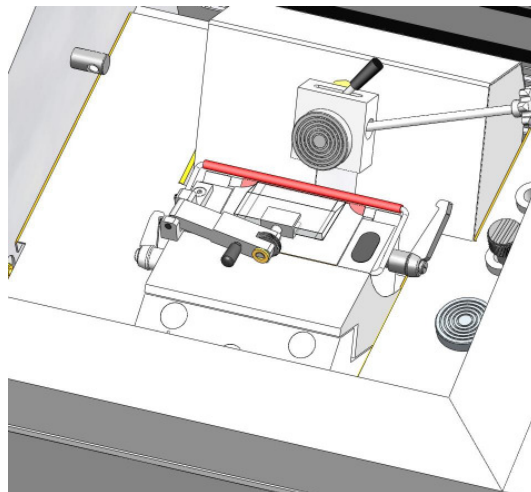
3.2 FINGER PROTECTION

Use the finger protection always

- Before you start any work with the knife or specimen
- Before changing the specimen
- During work break



Finger protection released.



Finger protection activated.

3.3 ELECTRICAL POWER CONNECTION

Do not use any extension lead.



Make sure that electric power is constant:

- This should be examined during installation of the unit by a competent person
- Use a dedicated fuse for the unit
- Do not connect another unit to the same power circuit.
- Before turning on the instrument, check if the voltage of the mains supply is identical with the name plate of the unit

3.4 WORKING WITH KNIVES AND DISPOSABLE BLADES

Microtome knives and disposable blades have extremely sharp edges and this can lead to injuries.

Please be extremely careful when handling microtome knives and disposable blades.



Do not place microtome knives or disposable blades at unsecured areas.

Never position microtome knives or disposable blades with the sharp edge pointing upwards.

Store blades in a covered container. Use a container that has guides to hold the blades rigid.

Never try to catch a falling microtome knife.

Always insert the specimen first and then the microtome knife or disposable blade.

To avoid compression or knife marks, ensure that the blade is clean.

4. COMPONENTS

The SLEE bench top cryostat MTC is provided with the following standard components:

	MTC
Basic unit with refrigeration system	●
Manual rotary microtome	●
Operation manual	●
2x Specimen holder (1x Ø 22mm; 1x Ø 35 mm)	●
<i>clear-cut</i> Brush	●
Anti-roll plate Ready to use	●
1x Bottle cryostat low temperature oil	●
4x 100 ml CryoGlue embedding medium	●
1 Box of disposable blades (50 pcs.) or 1 steel knife (12 cm C-profile)	●
Set of Allen keys	●

5. SPECIFICATIONS

Operating temperature range	+10 °C to +25 °C
Section thickness setting range	1 - 25 µm
Section thickness selection	MTC 0 – 10 µm in 1-µm-steps 10 - 25 µm in 5-µm steps
Horizontal specimen advance	25 mm
Vertical specimen stroke	52 mm
Dimensions and weight [width x depth x height]	550 mm x 730 mm x 470 mm
Weight without accessories	77 kg
Specimen orientation, horizontal	8°
Specimen orientation, vertical	8°
Specimen orientation, z-axis	360°
Trimming thickness	0 – 10 µm in 1-µm-steps 10 - 25 µm in 5-µm steps

6. UNPACKING AND INSTALLATION

6.1 UNPACKING THE INSTRUMENT

Remove the upper wooden cover.

Remove the upper supporting foams.

Lift the instrument out of the wooden transportation case.

For repacking use the original cases. Keep the packing material.

Place the instrument onto the selected bench.

6.2 INSTALLATION SITE REQUIREMENTS

The site for installation should meet the following requirements:

- Placement onto a plane, vibration-free surface.
- A maximum ambient temperature of 25 °C.
- Convenient and unobstructed access to the hand wheel.
- No direct sunlight into the cooling chamber.
- A minimum distance between wall and rear of the instrument of 10-20 cm should be guaranteed.
- A free ventilation of fresh air from the left-hand and right-hand side of the instrument should be guaranteed.

6.2 INSTALLATION

For opening the chamber push the window to the top.

Remove the transport security underneath the specimen holder and position the waste tray.

After installation, wait at least 4 hours before switching the instrument on. Failure to comply may result in severe damage to the instrument.

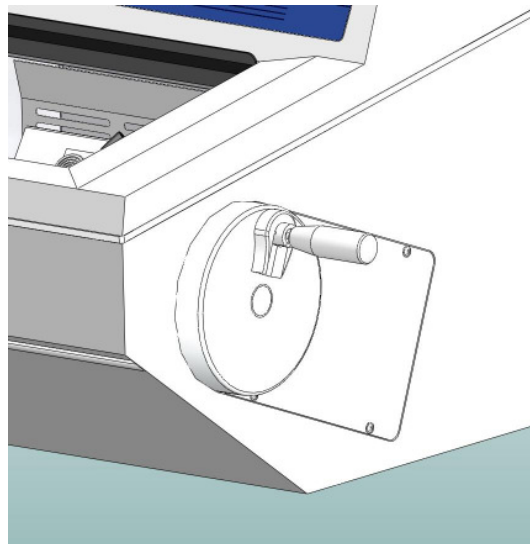
6.3 COLLAPSIBLE HANDWHEEL LEVER

The instrument is delivered with a ready to use hand wheel lever that is folded away for transport reasons.

- Before you start any work unfold the hand wheel lever by simply pulling the lever into a horizontal position.
- For folding the lever back, pull the horizontally orientated lever and fold it away.



Hand wheel lever in folded position.

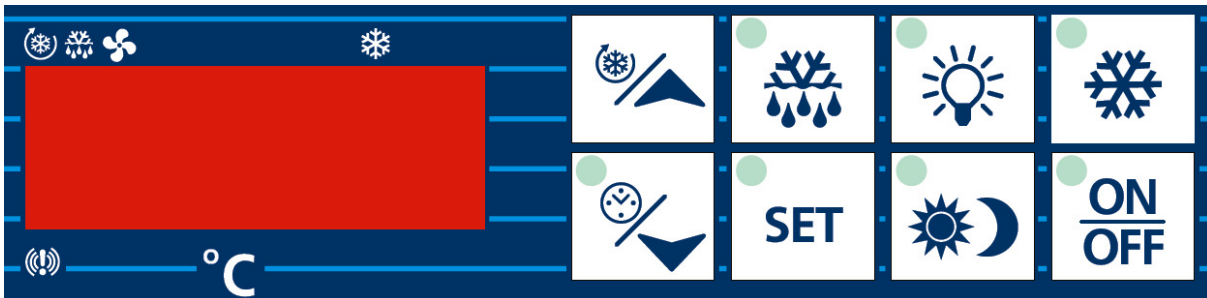


Hand wheel lever unfolded.

7. INITIAL OPERATION

7.1 MAIN DISPLAY AND CONTROL PANEL

Cooling unit and cryochamber settings can be operated with the control panel on the front side of the instrument.



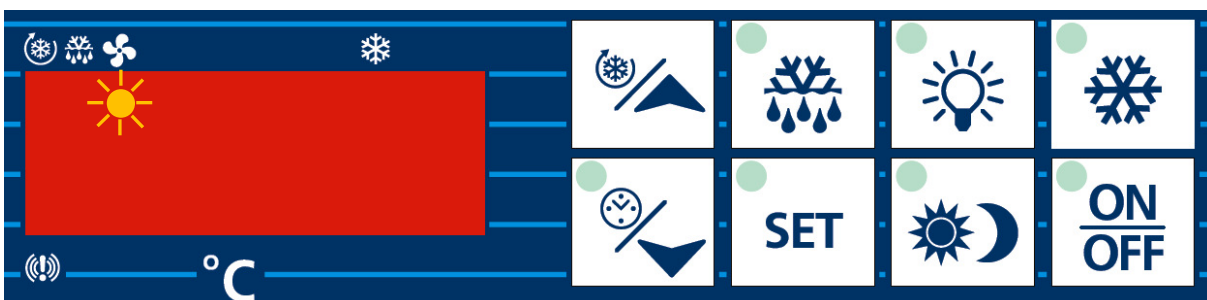
MTC Control Panel

7.2 LED SIGNALS




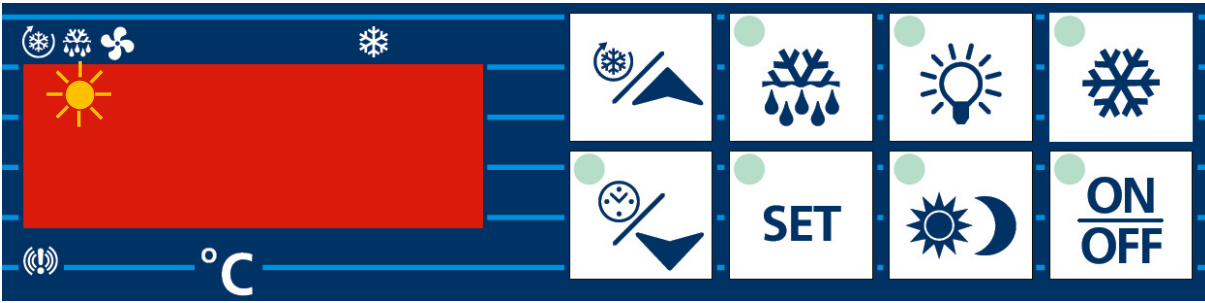
ON Activated cooling, the compressor of the cooling unit is running.

Flashing Programming phase (flashing with LED .



ON The fan is running.

Flashing Programming phase (flashing with LED .




ON The defrost is enabled.

Flashing Drip time in progress.





ON The fast freezing cycle is enabled.

7.3 SETTING OF CRYOSTAT TEMPERATURE

Press  for change of the cryostat temperature.




LED starts blinking and a new target temperature can be set.

Set new target temperature by pressing  and .



LED starts flashing and setting of new time, day and weekly holiday is possible.


Press  or wait for 10 seconds to store the new target temperature.

7.4 SETTING OF TIME, DAY AND WEEKLY HOLIDAYS

Press  for more than 3 seconds.






LED switches ON and the current time is displayed.
Hur (hour); Min (minute); dAY (day)




Press  to enter the setting mode for time, day and weekly holiday.






LED starts flashing and setting of new time, day and weekly holiday is possible.

Press  and  to set the current hour.
Press  to go to the next value.




Hur
Current hour (0...23 h)

Press  and  to set the current minutes.
Press  to go to the next value.




Min
Current hour (0...59 min)

Press  and  to set the current day.
Press  to go to the next value.




dAY
Current day (Sun...SAAt)

Press  and  to set the first weekly holiday.
Press  to go to the next value.



Hd1
First weekly holiday (Sun...SAAt)
To disable first weekly holiday, set it to "nu" (not used).

Press  and  to set the second weekly holiday.
Press  to go to the next value.

Hd2
Second weekly holiday (Sun...SAAt)
To disable second weekly holiday, set it to "nu" (not used).

Press  and  to set the third weekly holiday.
Press  to go to the next value.

Hd3
Third weekly holiday (Sun...SAAt)
To disable third weekly holiday, set it to "nu" (not used).


Press  and  or wait for 15 seconds to return to the main menu.

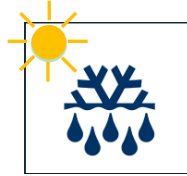
7.5 AUTOMATIC DEFROST SETTINGS

Press  for more than 3 seconds.



LED switches ON and the current time is displayed.

Press  to enter the setting mode for automatic defrost cycles.



LED starts flashing and setting of new defrost time is possible.

Press  and  to set the time for automatic defrost on working days.



Ld1...Ld8

Automatic defrost starting time on workdays (0...23 h 50 min.)

Press  to go to the next value.

These values define the time for automatic defrost cycles on working days. Up to eight times can be set. To disable a defrost cycle, set it to "nu" (not used).

(e.g. If Ld1 is set to 12.4, the first defrost cycle will start on working days at 12:40 h)

Press  and  to set the time for automatic defrost on holidays.



Sd1...Sd8

Automatic defrost starting time on holidays (0...23 h 50 min.)

Press  to go to the next value.

These values define the time for automatic defrost cycles on working days. Up to eight times can be set. To disable a defrost cycle, set it to "nu" (not used).

(e.g. If Sd2 is set to 13.3, the second defrost cycle will start on holidays at 13:30 h)


Press  and  or wait for 15 seconds to return to the main menu.

7.6 POWER SAVING SETTINGS

Press  for more than 3 seconds.






LED switches ON and the current time is displayed.

Press  to enter the setting mode for power saving settings.



LED starts flashing and setting of new power saving time and temperature is possible.



Press  and  to set the time for energy saving cycles on working days.

Press  to go to the next value.

ILE

Energy Saving cycle on workdays
(0...23h 50 min.)

This value defines the time at that during working days an energy saving cycle will be started.



Press  and  to set the duration of energy saving cycles on working days.


Press  to go to the next value.

dLe

Energy Saving cycle length on workdays
(0...24h 00 min.)

This value defines the duration of an energy saving cycle during working days.



Press  and  to set the time for energy saving cycles on holidays.


Press  to go to the next value.

ISE

Energy Saving cycle on holidays
(0...23h 50 min.)

This value defines the time at that during holidays an energy saving cycle will be started.



Press  and  to set the duration of energy saving cycles on holidays.


Press  to go to the next value.

dSE

Energy Saving cycle length on holidays
(0...24h 00 min.)

This value defines the duration of an energy saving cycle during holidays.

Press  and  to set the temperature increase for energy saving cycles.



Press  to go to the next value.

HES


Temperature increase for Energy Saving Cycle

This value defines the temperature increase to the target (working) temperature for the energy saving cycle.

(e.g. a cryostat temperature has been set to -25 °C as described in 7.3 and the energy saving cycle has been set to an increase of 15 °C. The energy saving temperature will be -10 °C.

Press  and  or wait for 15 seconds to return to the main menu.

7.7 LIGHT IN CRYOCHAMBER


Press  to activate the light in the cryochamber.

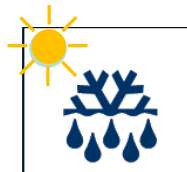


LED switches ON and the current time is displayed.

Press  again to switch off the light.

7.8 MANUAL DEFROST

Press  for more than 3 seconds to activate manual defrost.



LED switches ON and the instrument is defrosting.

The instrument will automatically return to normal cooling after defrost.

8. OPERATION OF MICROTOME

8.1 INSERTION AND ORIENTATION OF KNIFE

Activate hand wheel lock.

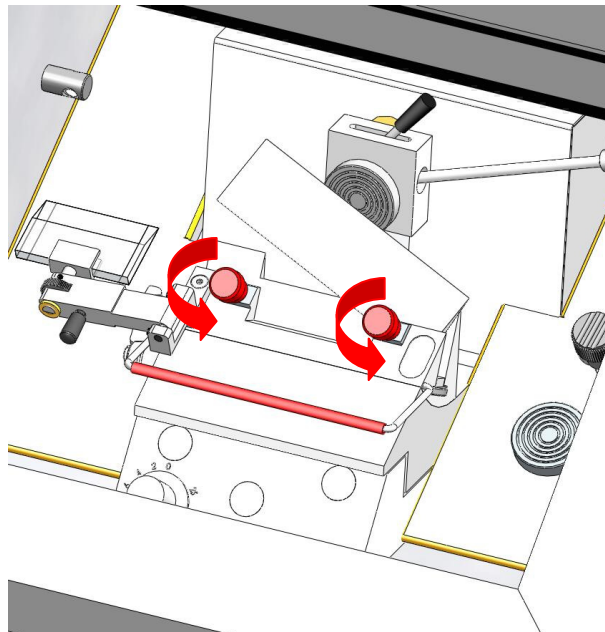
Loosen the knife fixation by turning two screws in the front of the knife holder counter clockwise

Remove/Insert knife

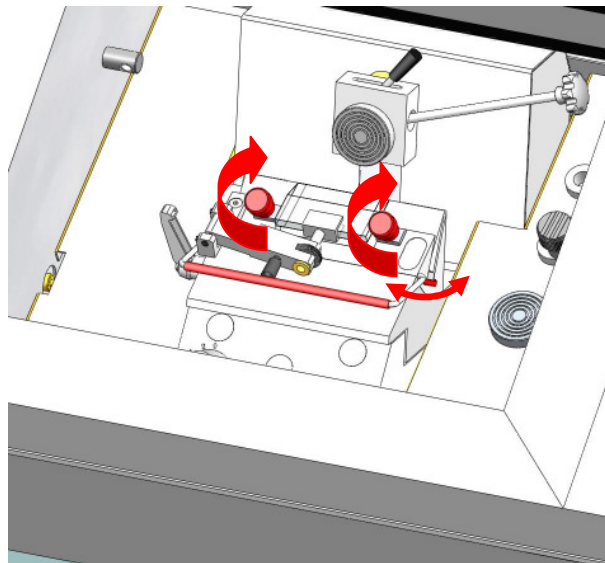
Adjust knife height by turning the wheels on the left and right side of the knife holder base.

Tighten the knife fixation by turning the two screws in the front of the knife holder clockwise.

Release hand wheel lock for cutting.



Loosening of knife fixation and insertion of new knife.



Fixation and height adjustment of knife.

8.2 INSERTION AND ORIENTATION OF DISPOSABLE BLADE

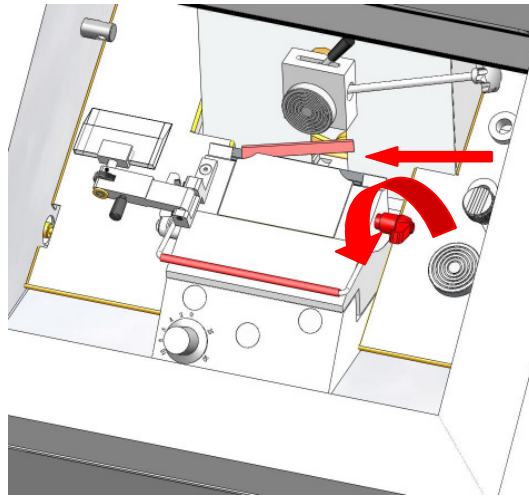
Activate hand wheel lock.

Remove finger protection.

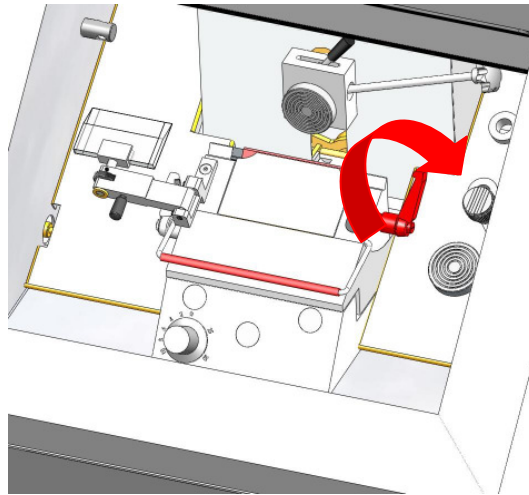
Loosen the blade fixation by turning the right lever counter clockwise.

Remove/Insert blade from one side.

Tighten the blade fixation by turning the right lever clockwise.



Loosening of blade fixation and insertion of new blade.



Fixation of blade.

Horizontal orientation

For adjustment of cutting area of the blade, loosen the blade holder fixation by turning the left lever on the blade holder base counter clockwise.

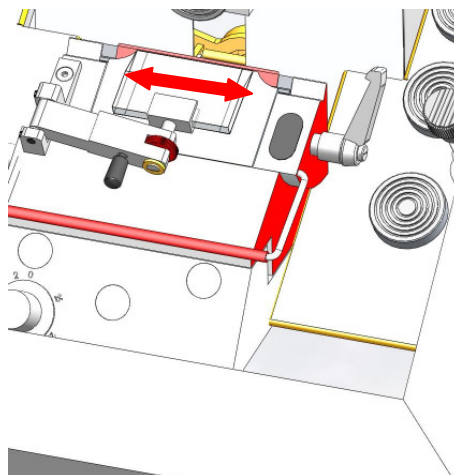
(see figure on following page)

Set new cutting area by moving the blade holder to the left or to the right.

Tighten the blade holder fixation by turning the right lever on the blade holder base clockwise.

(see figure on following page)

Release hand wheel lock for cutting.



Loosening of blade holder fixation and horizontal orientation of blade holder

Adjustment of Cutting Angle

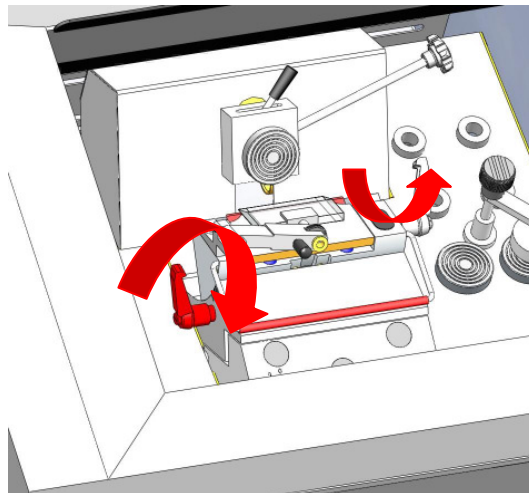
For adjusting the cutting angle of the blade, loosen the blade holder fixation by turning the left lever on the blade holder base counter clockwise.

Set new angle for cutting by manual tilting the blade holder. A tilt towards the object holder increases the cutting angle, a tilt away from the object holder decreases the cutting angle.

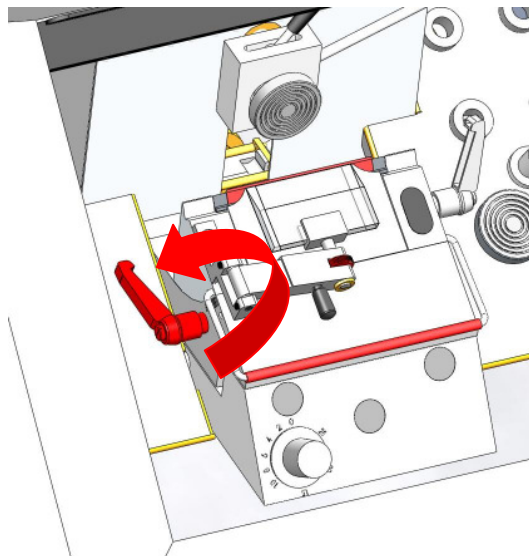
A scale on the right side of the blade or knife holder helps to find the correct orientation.

Tighten the blade holder fixation by turning the right lever on the blade holder base clockwise.

Release hand wheel lock for cutting.



Loosening of blade holder fixation and adjusting new cutting angle (increased cutting angle).



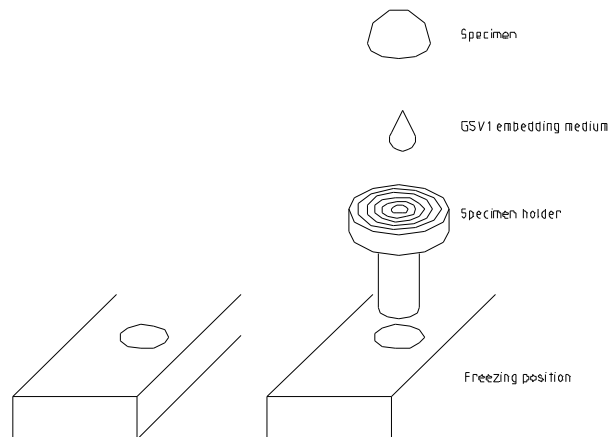
Fixation of blade holder with increased cutting angle.

8.3 SPECIMEN MOUNTING

The instrument is equipped with 6 freezing positions.

In order to prepare a specimen for sectioning, place the specimen holder on a freeze point, add some drops of embedding medium (e.g.GSV1) on the holder and carefully press the object on top.

Wait until the object is frozen (mat surface or pressure).



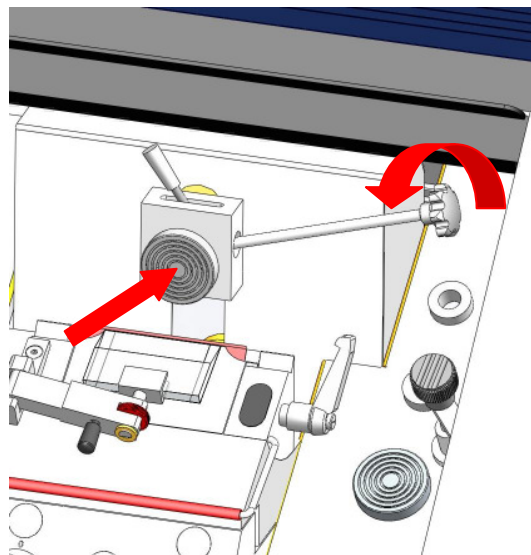
8.4 INSERTION OF OBJECT HOLDER

Turn hand wheel to its highest position and activate the hand wheel stop.

Release the object holder fixation by turning the right fixation lever counter clockwise.

Remove/Insert object holder.

Tighten the object holder by turning the right fixation lever clockwise.



Release of object holder fixation; removal and/or insertion of object holder.

8.5 SPECIMEN ORIENTATION ADJUSTMENT

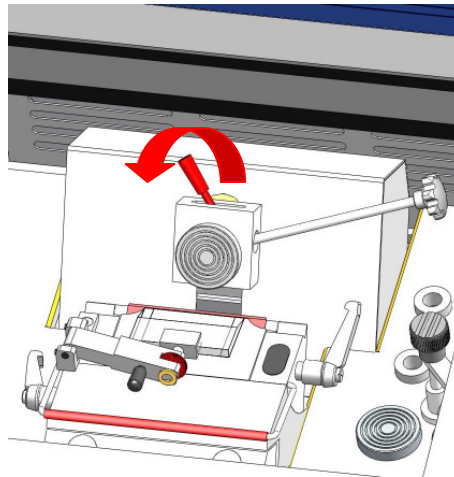
Turn hand wheel to its highest position and activate the hand wheel stop.

For orientation of the specimen, open the fixing lever by turning the fixation lever to the left.

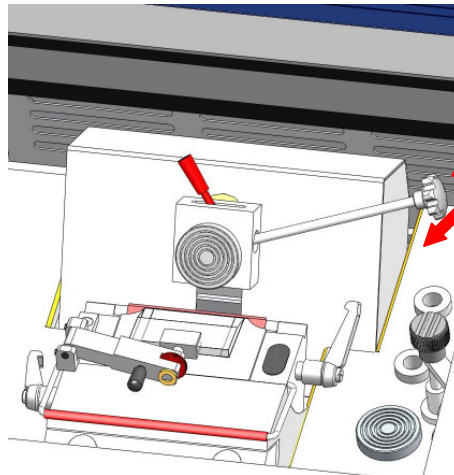
Orientate the specimen by manually moving the lever into the respective position.

Close the orientation fixation by turning the fixation lever to the right.

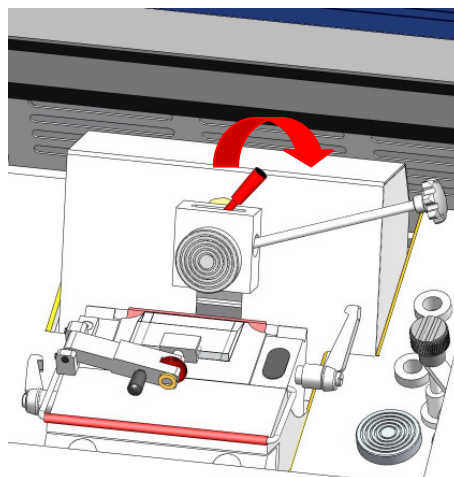
Release hand wheel lock for cutting.



Opening of orientation fixation lever.



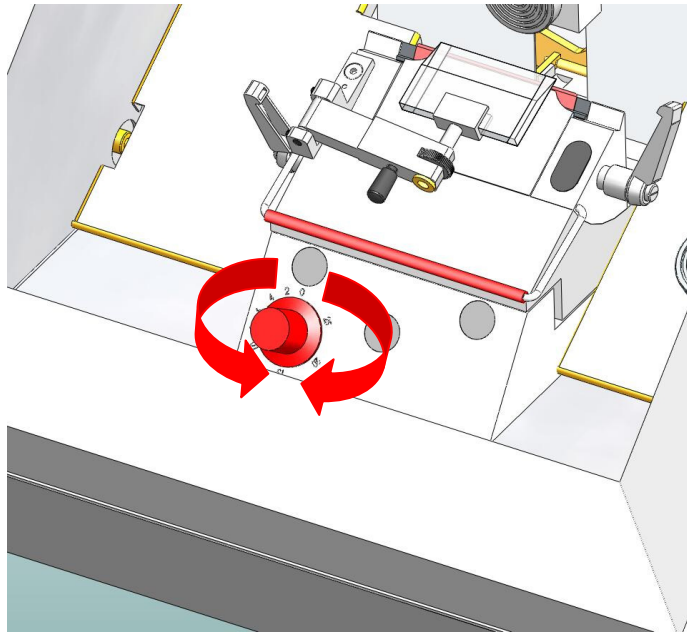
Manual orientation of object holder upwards/downwards and left/right.



Fastening of orientation fixation.

8.8 THICKNESS ADJUSTMENT FOR TRIMMING

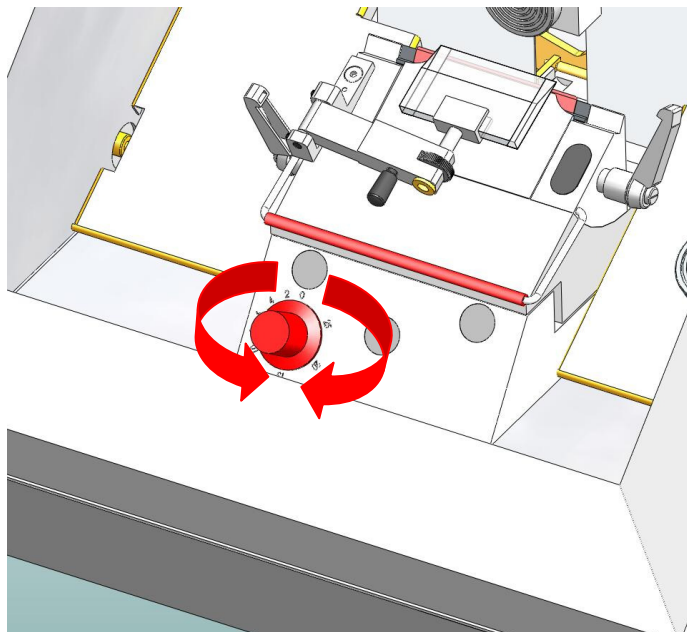
To change the cutting thickness, turn the knob in the front of the blade or knife holder to the respective position as indicated.



Manual thickness adjustment for trimming.

8.9 THICKNESS ADJUSTMENT FOR CUT

To change the cutting thickness, turn the knob in the front of the blade or knife holder to the respective position as indicated.

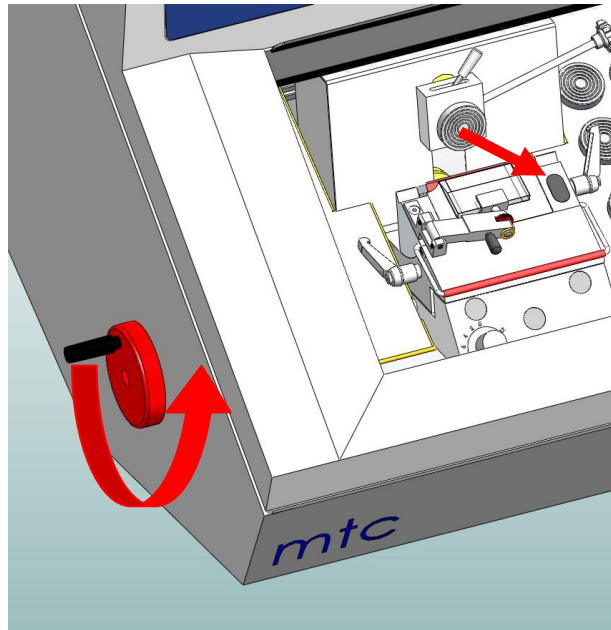


Manual thickness adjustment for cutting.

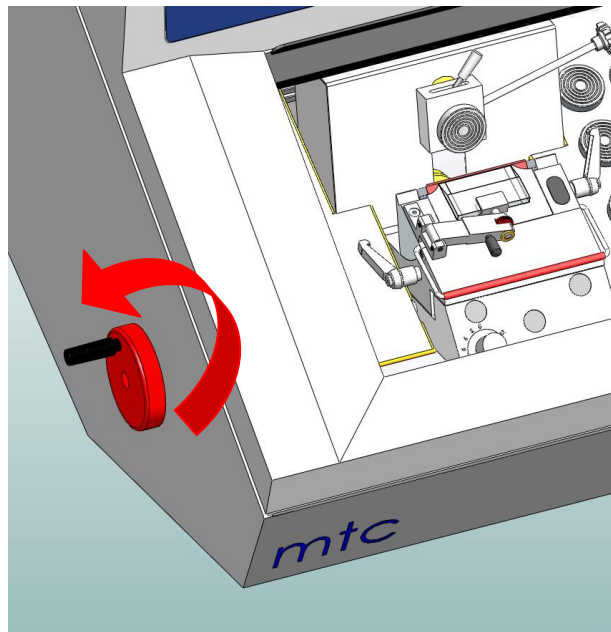
8.10 COARSE ADVANCE OF BLADE/KNIFE HOLDER

Turn hand wheel on the left-hand side of the instrument counter clockwise to move the blade or knife holder towards the specimen.

Turn hand wheel on the left-hand side of the instrument clockwise to move the blade or knife holder away from the specimen.



Coarse advance of blade or knife holder.



Backward movement of blade or knife holder.

8.11 MANUAL CUTTING

Release hand wheel stop.

Release the finger protection.

For cutting turn the hand wheel on the right side of the instrument evenly clockwise.

A counter clockwise movement of the hand wheel will also result in cutting and incremental advance of the specimen.

For trimming of specimen, select a higher cutting thickness with the knob on the front side of the blade or knife holder.

Select cutting thickness by turning the knob on the front side of the blade or knife holder to the respective position.

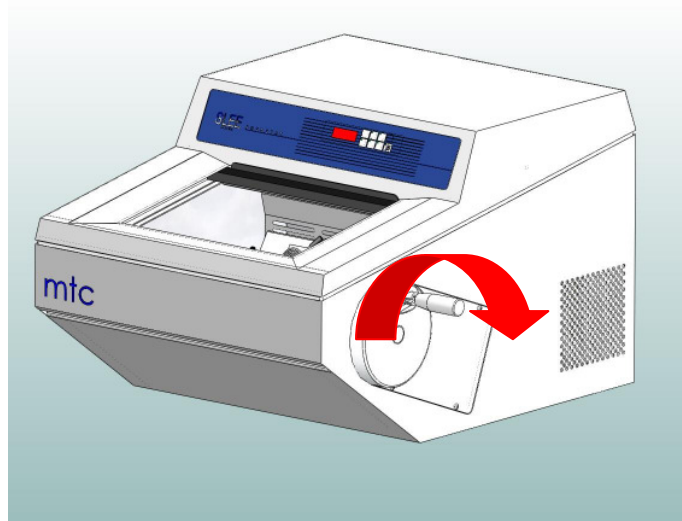
Turn hand wheel until some even sections have been obtained.

Clean the microtome knife or disposable blade (always away from the cutting edge) with a cold brush.

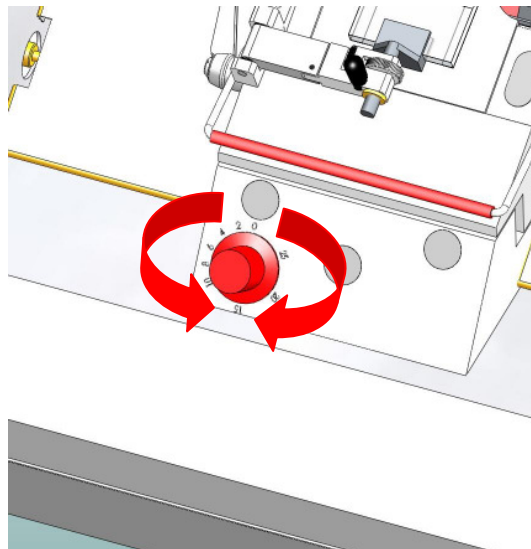
Position anti-roll plate onto the microtome knife or disposable blade and cut. If necessary readjust the height of the guide plate.

Leave hand wheel with handle at its lowest point (specimen holder underneath the microtome knife or disposable blade).

Transfer the section onto a slide.



Cutting of specimen.



Selection of trimming and cutting thickness.



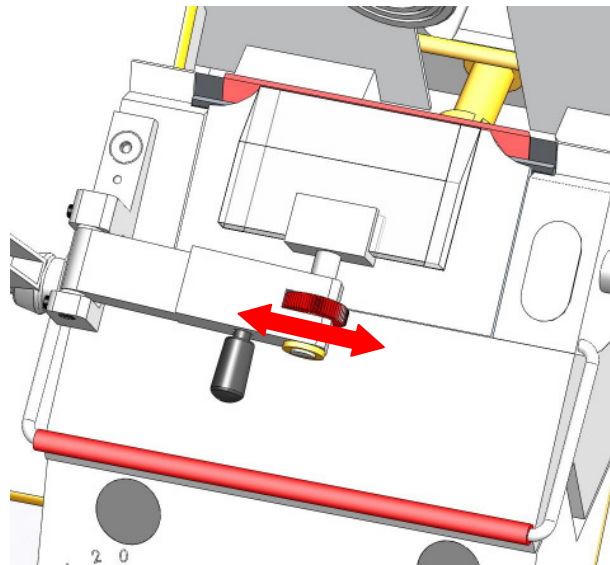
Leave brush always in the chamber to keep it cold.

8.12 ANTI-ROLL PLATE

Each instrument is equipped with an anti-roll plate.

To adjust the height of the anti-roll plate turn the wheel to the left or right.

For pick up of the samples turn the anti-roll plate side wards with the help of the knob.



Height adjustment of anti-roll plate.



For height adjustment of the anti-roll-plate it is recommended to adjust the correct height during cutting.

8.13 TIPS AND TRICKS

It is common knowledge that the temperature of the cryostat plays an important role in the quality of the tissue sections obtained. Each type of tissue needs a different temperature as shown in the following list. The temperature ranges indicated in the table below are approximate values and may require adjustments for individual tissues.

Type of Tissue	Recommended temperature range at the knife or blade edge [°C]
----------------	---

Bone marrow	-16 to -25
Brain	-7 to -10
Breast with fat	-25 to -30
Breast without fat	-16 to -20
Cartilage	-13 to -20
Fat	-30 to -40
Heart	-20 to -25
Intestinal	-13 to -20
Kidney	-13 to -20
Larynx	-13 to -16
Lip	-10 to -20
Liver	-7 to -13
Lung	-13 to -20
Lymph-Node	-13 to -20
Lymphatic	-13 to -20
Lymphoid	-13 to -20
Muscle	-13 to -20
Nose	-13 to -20
Rectal	-13 to -20
Scrapings	-16 to -25
Skin with fat	-16 to -25
Skin without fat	-10 to -16
Spleen	-7 to -10
Testicle	-10 to -13
Tongue	-13 to -20
Uterine-Curettings	-7 to -10

For tissue, which has to be cut considerably below normal chamber temperature (e.g. fatty tissues) and in order to avoid cooling artefacts, an additional bench top CO₂ freezer is available.

Exceptionally freezing spray can be used.

9. OPERATION OF CRYOSTAT

9.1 UVC DISINFECTION [only applicable to instruments equipped with this feature]

UV-C radiation at 254 nm has an intense germicidal effect. Microorganisms, such as viruses, bacteria, fungi and yeasts are effectively destroyed in the area accessible to UV light without the addition of chemicals.

The cryostat MTC can be equipped with an UVC light source that is activated and deactivated manually by pressing **UV**.

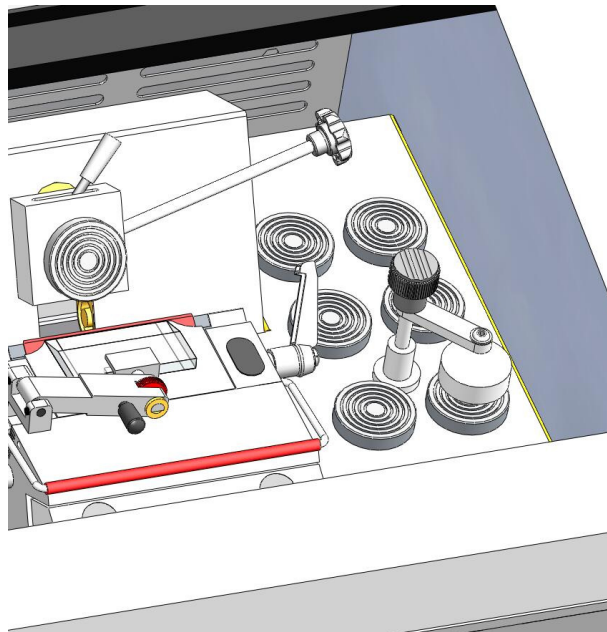


For safety reasons UV-C light will be switched off upon opening of the lid of the cryochamber. The UV-C disinfection will not be aborted and the UV-C light switches on upon closure of the cryochamber lid. For deactivation, please press **UV**.

9.3 HEAT EXTRACTOR

For a more rapid freezing process with improved structural preservation of tissues and a flattened block surface, the instrument is equipped with a heat extractor.

Apply the heat extractor on top of the specimen during the freezing process.



Heat extractor for four freezing positions.



Use of the heat extractor can lead to changed orientation of the specimen in the frozen block, especially for smaller samples. If precise orientation of the specimen is required, the freezing procedure should be performed without the heat extractor.

9.4 AUTOMATIC/MANUAL DEFROST

For optimum performance of the cooling unit a low thermal contact resistance at the cooling lamella is required. Upon frequent use of the instrument moisture will condensate and freeze on the surface of the cooling lamella and increase the thermal contact resistance. To avoid further build-up of the ice film, automatic defrosting cycles can be performed.

During an automatic defrost or an manual activated defrost hot gas from the cooling system is pressed through the evaporator. All ice which has built up is melted, the water drops into a heated tray below of the evaporator and from there it flows into a tray with hot tubes and evaporates inside the instrument.

The defrost will last till the system reaches a temperature of +20°C on the evaporator. The temperature inside the chamber is still below 0°C so that samples can be left on the cooling bar.



The default setting for automatic defrost is set to 00:00 o'clock (midnight) each day. For changing the settings, please refer to section 7.4.

9.5 COMPLETE DEFROST OF THE INSTRUMENT

It is highly recommended to completely defrost the instrument at least every 6 months. If the instrument is used regularly in warm tropical climate a more frequent complete defrost might be necessary.

Turn hand wheel to its highest position and activate the hand wheel stop.

Remove samples and tools from the cryochamber.

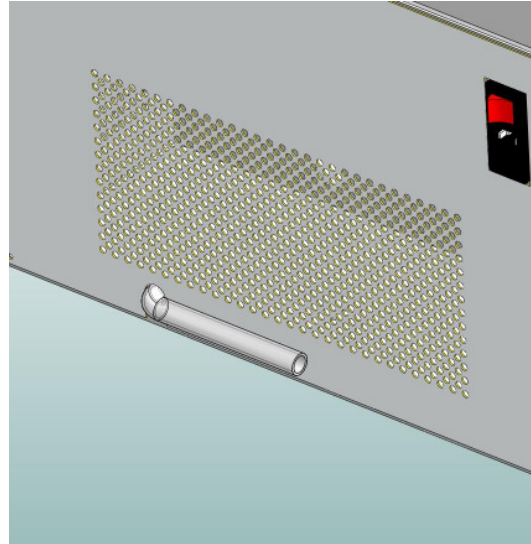
Switch off the instrument

Place a container at the flexible outlet hose to collect all the melt water.

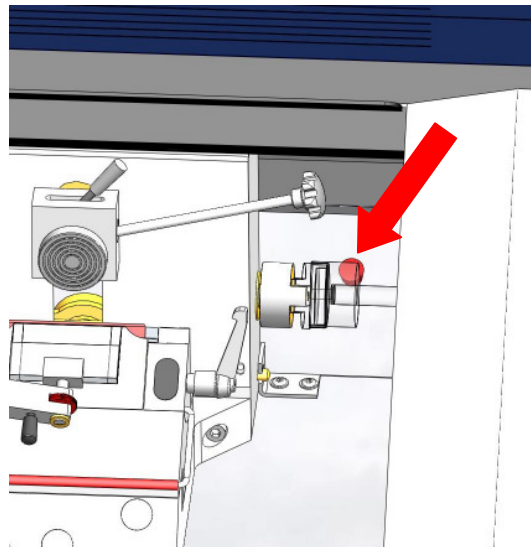
Remove the rubber plug at the right backward of the cryochamber.

Dry the inside of the cryochamber completely.

Switch on the instrument.



Flexible hose to drain out melt water.



Removal of rubber plug in cryochamber.

Before starting a complete defrost of the instrument, assure that all samples have been removed from the cryochamber.

Before switching on the instrument ensure that the instrument is completely dry, otherwise ice built up can damage mechanical parts.

10. CLEANING AND MAINTENANCE

10.1 CLEANING

The recommended frequency of cleaning of the cryostat chamber depends on how frequently the instrument is used.



Wear protective clothing and disposable gloves according to Good Laboratory Practices.

Please take note of the safety aspects of the instrument.

Do not use acetone or xylene for cleaning the unit. Only use alcoholic media.

Never spray or use cleaning medium directly onto the touch panels.

10.2 RECOMMENDED MAINTENANCE AND SERVICE SCHEDULE

Daily Remove frozen section waste from the cryostat chamber after every day of usage.

Disinfection if necessary.

Weekly Cleaning of blade holder (see section 10.3).

Cleaning of window.

Monthly Check of temperature sensor in cryochamber.

Cleaning of cryostat ventilation (see section 10.4).

Yearly Complete Service (performed by authorized SLEE service technician)

- check of all functions
- complete defrost
- removing of microtome
- oiling of movable parts
- check of cooling system
- check of driving system
- complete disinfection / cleaning / drying

10.3 CLEANING OF BLADE HOLDER

Turn hand wheel to its highest position and activate the hand wheel stop.

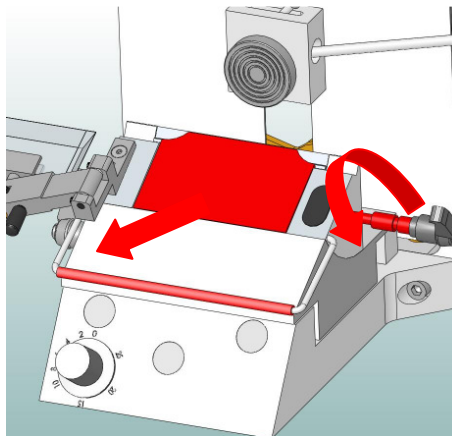
Release the blade fixation by turning the fixation lever counter clockwise.

Remove blade fixation plate.

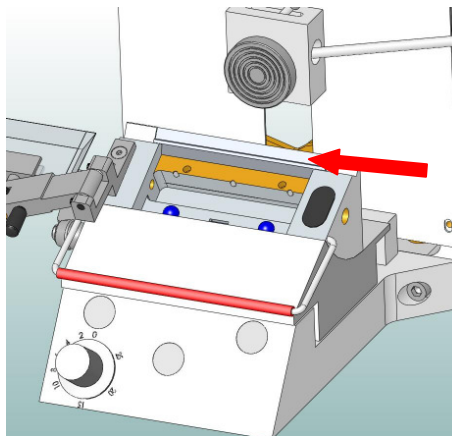
Clean blade holder with a brush or dry paper cloth.

Reassemble blade fixation plate and fasten blade fixation.

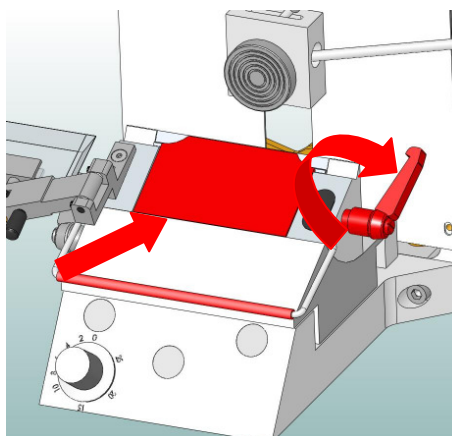
Release hand wheel lock for cutting.



Loosening of blade fixation and removal of fixation plate.



Cleaning of blade holder.

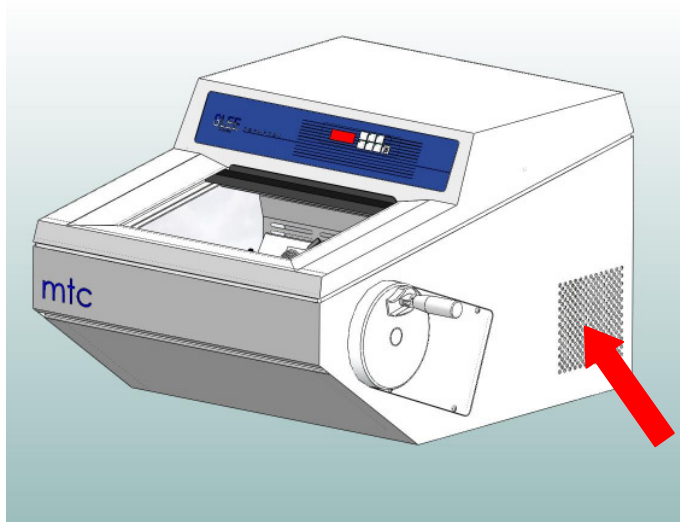


Reassembly and fastening of blade fixation.

10.4 CLEANING OF CRYOSTAT VENTILATION

During usage of the instrument dust will deposit on the ventilation of the cooling unit. This can negatively affect the cooling performance of the instrument.

Remove dust from the ventilation grill on the right and left side of the instrument with a regular vacuum cleaner monthly.



Cleaning of cryostat ventilation with vacuum cleaner.

11. SERVICE

Internal components should only be serviced by technicians authorized by SLEE.

If technical service or spare parts are necessary, please contact your local SLEE Medical distributor. Please have the following information available:

- Complete contact details
- Type of instrument and serial number
- Place of instrument and name of user
- Purpose of service call
- Delivery date of the unit

If it is necessary to return the instrument, it must be cleaned and disinfected before delivery. It must be returned in its original packing.

If the instrument or parts thereof are sent back in a dirty or non-disinfected condition, SLEE reserves the right to return the parts to the debit of the customer.

12. OPTIONAL ACCESSORIES

Standard Knife Holder

#10146000

Disposable Blade Holder (low profile)

#10147000

Disposable Blade Holder (high profile)

#10148000

UV disinfection

#10169000

Object holder (Ø 22 mm)

#30000002

Object holder (Ø 35 mm)

#30000000

Cork plate (100 pcs.; Ø 20 mm)

#30001001

CryoGlue embedding medium (4x 100 ml)

#30001100

***clear-cut* Brush**

#30001030

Anti-roll plate

#30001006

Disposable blade (low profile; 50 pcs.)

#28407000

Disposable blade (high profile; 50 pcs.)

#28408000

Freezing spray (173 g)

#30001010

Cryostat low temperature oil (50 ml)

#30001011

Bench top CO₂ freezer

#10100002

13. WARRANTY

SLEE Medical GmbH guarantees that the product delivered has been subjected to a comprehensive quality control procedure, and that the product is faultless and complies with all technical specifications and/or agreed characteristics warranted.

SLEE Medical GmbH guarantees that the instrument is manufactured under an ISO 9001 quality management system.

Unauthorized modification or repair by third party persons will void the warranty.

Only original SLEE spare parts must be used.

Guarantee claims can be put forward only if the instrument is used according to this manual and for the purpose described.

Mistakes and errors which occur because of improper use cannot be accepted.

14. DISPOSAL

The instrument or parts of the instrument must be disposed of according to existing local applicable regulations.

SLEE medical GmbH

Carl-Zeiss-Str. 49

55129 Mainz / Germany

Tel. +(49) 61 31/9 58 71-0

Fax +(49) 61 31/9 58 71-722

mail@slee.de

<http://www.slee.de>