

OPERATING INSTRUCTIONS

Manual Rotary Microtome TN6000



CE

INS1000-10GB
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1 INTENDED USE

The rotary microtome TN6000 is intended for cutting thin sections of soft paraffin-embedded and harder specimens for professional use in routine and research laboratories in the fields of biology, medicine and industry.

The system of specimen advance operates very reliable from 0.5 to 60 µm. The quality of cutting of this microtome is increased by the automatic retraction during the upstroke of the specimen, which avoids rubbing on the disposable blades or microtome knives. This stops rapid deterioration of the disposable blade or microtome knife.

2 SYMBOLS

	Dangers, warnings and cautions are marked by this symbol.
	This symbol indicates possible fire hazards.
	Special instructions regarding the operation of the device are marked by this symbol.
	Mechanical components that can lead to injuries during operation are marked with this symbol.

3 SAFETY NOTES

Tanner Scientific rotary microtomes are provided with the following safety features:

	TN6000
Hand wheel stop	•
Finger protection guard for knife- or blade-holder	•

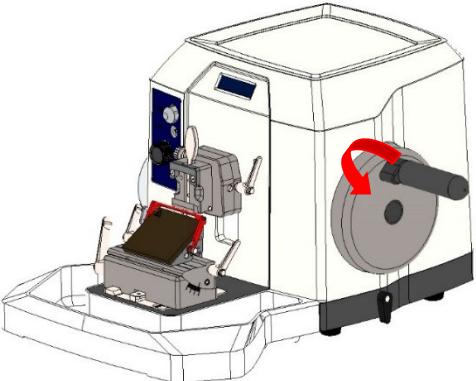
The institution which owns the unit and the persons working with the unit, servicing or repairing it have the responsibility for a hazard-free use.

MAGNIFIER WITH LIGHTING (OPTIONAL)

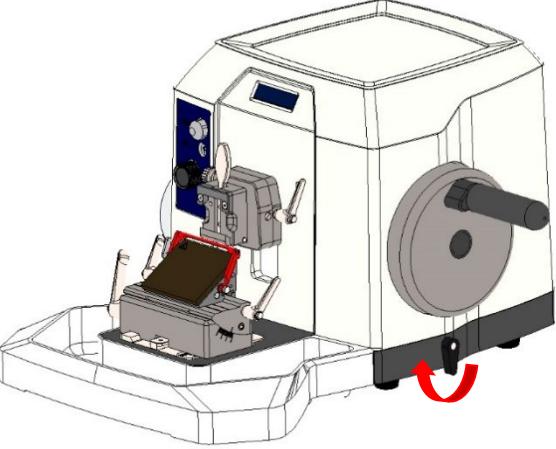
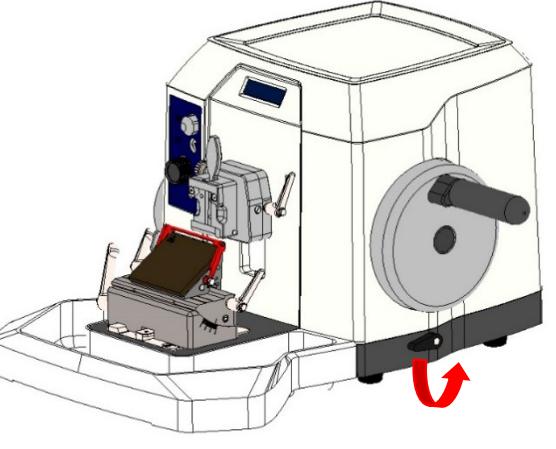
	Risk of glare and injury! Never look into the sun or any other bright light source with optical devices! Do not look directly into the light source.
	Fire hazard! Lenses in optical devices can cause considerable damage due to the "burning glass effect" if improperly handled or stored! Make sure that optical lenses are never left in the sun without a cover! Use the supplied cover!

3.1 HAND WHEEL STOP

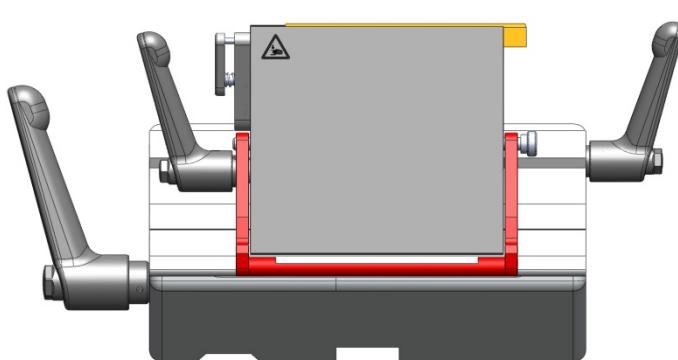
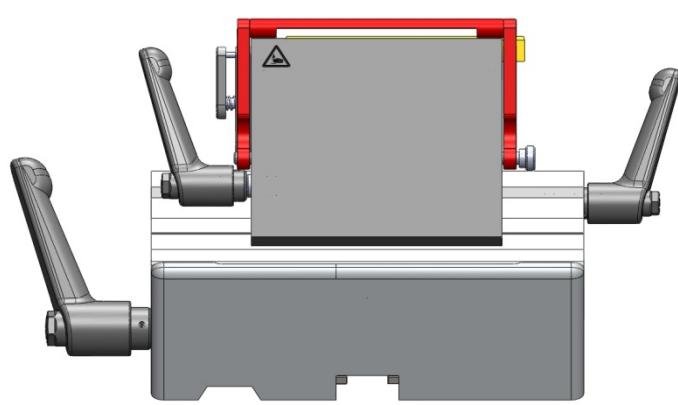
3.1.1 HAND WHEEL STOP WITH BRAKE ON THE HANDLE

Always use the finger protection guard with the knife- / blade holder and put hand wheel in stop position	
<ul style="list-style-type: none">• before working with the knife or specimen,• before changing the specimen,• during break time. <p>The hand wheel can be stopped in any position. For this purpose, move stop towards the center. To do this, turn the locking lever 90° counterclockwise.</p> <p>To release the handwheel lock again, turn the lever 90° clockwise.</p>	

3.1.2 HANDWHEEL STOP WITH BRAKE ON THE BASE (OPTIONAL)

<p>Always use the finger protection guard with the knife- / blade holder and put hand wheel in stop position</p> <ul style="list-style-type: none"> • before working with the knife or specimen, • before changing the specimen, • during break time. <p>The basic brake can be activated in every handwheel position. To close, turn the lever for 90° clockwise vertically (notch).</p>	 <p>Basic brake open</p>
<p>To release the handwheel lock, turn the lever 90° counter-clockwise.</p>	 <p>Basic brake closed</p>

3.2 FINGER PROTECTION GUARD

<p>Use the finger protection guard always</p> <ul style="list-style-type: none">• before you start any work with the knife or specimen,• before changing the specimen,• during work break.	 <p>Finger protection guard released</p>
	 <p>Finger protection guard activated</p>

	<p>Please note that the finger protection guard may be engaged throughout processing (exchange of blade, lateral displacement, trimming, cutting), thereby increasing operation safety!</p>
	<p>Do never move your fingers or hands above or behind the blade holder during operation of the microtome. For loading and unloading of the sample holders and exchange of disposable blades in the disposable blade holder, always activate the handwheel lock and activate the finger protection guard.</p>

3.3 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.

	<p>Do not place microtome knives or disposable blades at unsecured areas. Never position microtome knives or disposable blades with the sharp edge pointing upwards.</p> <p>Store blades in a covered container. Use a container that has guides to hold the blades rigid.</p> <p>Never try to catch a falling microtome knife.</p> <p>Always insert the specimen first and then the microtome knife or disposable blade.</p> <p>When applying the brake, ensure that it is tight. Most accidents occur when the brake slips and the operator's hand is drawn into the blade.</p> <p>To avoid compression or knife marks, ensure that the blade is clean.</p> <p>In case of multiple use of the knife or blade, use the finger guard.</p> <p>To increase the usage time of knives and blades, avoid increased wear and tear by cleaning the cutting edge and blade holder regularly.</p>
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4 COMPONENTS

Tanner Scientific rotary microtomes are provided with the following standard components:

	TN6000
Specimen orientation	•
Universal cassette clamp, orientable, alternatively standard specimen clamp, orientable	•
3-component knife holder, can be used for low profile blades as well as high profile blades	•
Section waste tray	•
Disposable blades (low profile, 50 pcs.), optional with disposable blades (high profile, 50 pcs.) or microtome knife 16 cm C-profile	•
Dust cover	•
Allen key, for fixation of specimen orientation to microtome	•
Manual	•

4.1 MAGNIFIER WITH ILLUMINATION, DIMMABLE (OPTIONAL)

Mounting:

The ring magnifier with illumination can easily be attached to the side of the microtome's base plate.



2 M5x12 countersunk screws (supplied) are screwed into the base plate from below.



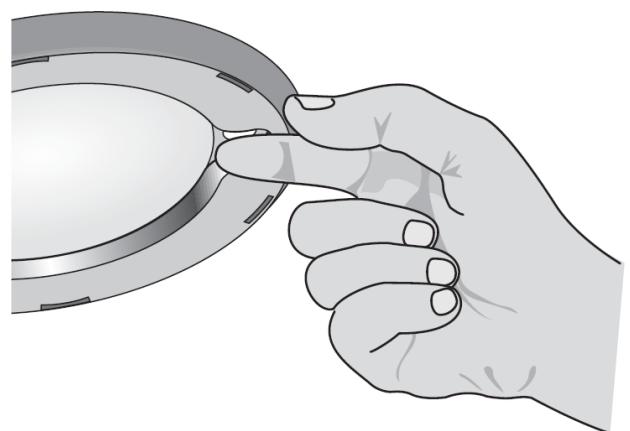
Switching on / off:

The light can be switched on and off via the sensor switch on the light head.

Switching on: Touch the sensor for a brief moment -> the light will be switched on (switch-on value is the last dimming value).

Switching off: Touch the sensor again for a brief moment -> the light will be switched off.

Dimming: Touch the sensor until the desired brightness is obtained. To reverse the dimming direction, briefly interrupt touching the sensor.



Note:

The illumination is equipped with overheating protection. In case the luminaire is switched off because of a risk of overheating, the luminaire must be cooled down, before being put back into operation.

Warning: Fire hazard!

When not in use, cover the magnifier against solar radiation. To do this, use the bag included in the scope of delivery.



Specifications magnifier with illumination:

Protection class	II
Protection type	IP 20
Operating mode	Continuous operation
Technical safety check	EN 60 598-1
Light head	ca. Ø 122 x 13 mm
Magnifier	6.0 dpt. approx. Ø 72
Rated voltage	100 - 240 V AC
Frequency range	50/60 Hz
Power consumption	approx. 6 W

5 SPECIFICATIONS

Operating temperature range	+10 to +35 °C
Operating humidity	max. rel. 80 % non-condensing
Storage temperature range	+5 to +55 °C
Storage humidity	max. rel. 80 % non-condensing
Section thickness range	0.5 - 60 µm
Section thickness settings	0.5 - 2 µm in 0.5-µm steps 2 - 10 µm in 1-µm steps 10 - 60 µm in 2-µm steps
Trimming thickness settings	10 µm, 20 µm, 30 µm, 40 µm
Horizontal advance	28 mm (via coarse feed handwheel)
Vertical stroke	60 mm
Maximum specimen size	50 x 50 mm
Knife holder basis - north-south axis	35 mm
Specimen retraction on return stroke	automatic
Specimen orientation, horizontal	8°
Specimen orientation, vertical	8°
Specimen orientation horizontal / vertical	optionally clockwise or counter clockwise (Standard: When turning counter clockwise, the sledge moves out.)
Specimen orientation, z-axis	360°
Section counter	strokes (optional)
Dimensions [width x depth x height]	560 mm x 550 mm x 325 mm incl. handwheel and waste tray
Weight without accessories	33 kg

6 UNPACKING AND INSTALLATION

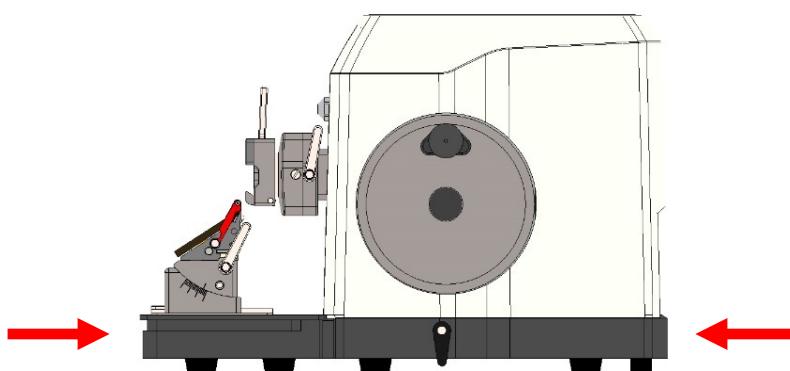
6.1 UNPACKING THE DEVICE

Remove the upper wooden cover.

Remove the upper supporting foams.

Lift the device out of the wooden transportation case.

Grasp the device underneath the base plate from the rear and front as shown in the figure below.



Do not transport the device by holding it on the hand wheel shaft, the object head, the cover or the tray.

Save the packaging material for later transport purposes, as the microtome should be transported in its original packaging to avoid transport damage.

Set up the microtome at its destination.

6.2 INSTALLATION

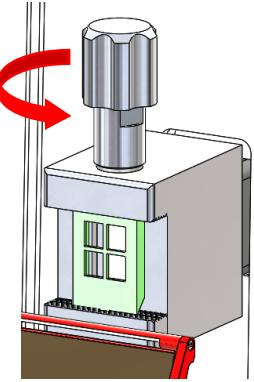
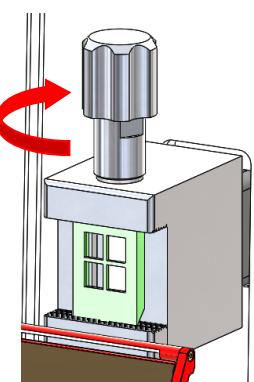
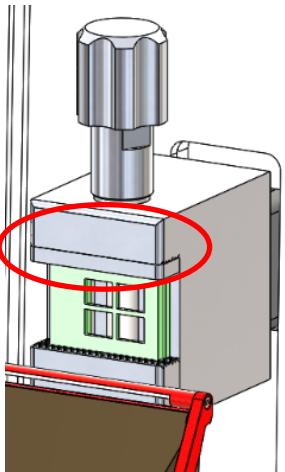
The unit should be positioned onto a plane, vibration-free surface.

Assure convenient and unobstructed access to the hand wheel.

Before use remove the transport security underneath the specimen head.

7 OPERATION OF TN6000

7.1 INSERTION OF SPECIMEN IN STANDARD SPECIMEN CLAMP

<p>Turn the handwheel to the highest position and activate the handwheel lock (see chapter 3.1) and the finger guard.</p> <p>Loosen the standard specimen clamp by turning the fixing screw counterclockwise.</p> <p>Remove the old specimen or insert a new one.</p>	 <p>Loosening of object fixation and insertion of new object</p>
<p>Close the specimen clamp and fix the specimen by turning the clamping screw (see fig.) clockwise.</p> <p>Loosen the finger guard and the handwheel lock (see chapter 3.1) to cut the specimen.</p>	 <p>Closing of specimen clamp and fastening of object fixation</p>
<p>If the cassette is clamped horizontally (rotated 90°), it is recommended to use the supplied clamping block (item no. 34123507) to re-center the cassette. If the cassette is normally clamped vertically, this additional clamping block is not used.</p> <p>In order to bring the specimens closer to the middle section, the clamping block must be clamped to the upper cheek.</p>	 <p>Clamping block</p>

Additional note:

In case you process exceptionally hard specimens, the required clamping force may not be achieved by simply tightening the clamping screw. For these exceptional cases, an attachment for an open-end wrench SW17 is provided in the middle area of the clamping screw. We would like to point out that very high clamping forces can occur when using tools and this can lead to increased wear on the corresponding components.

7.2 INSERTION OF SPECIMEN IN UNIVERSAL CASSETTE CLAMP

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

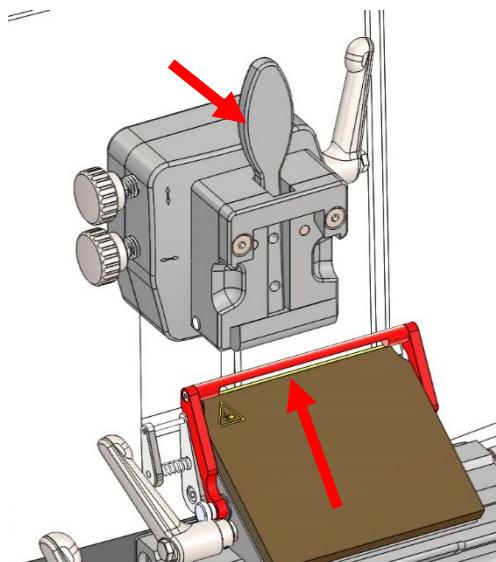
Activate finger protection guard.

Open cassette fixation by pulling the fixation lever.

Insert / remove cassette.

Object fixation will go back into fixation position automatically.

Release finger protection guard and hand wheel lock (see chapter 3.1) for cutting.



Opening of cassette fixation and insertion of new cassette

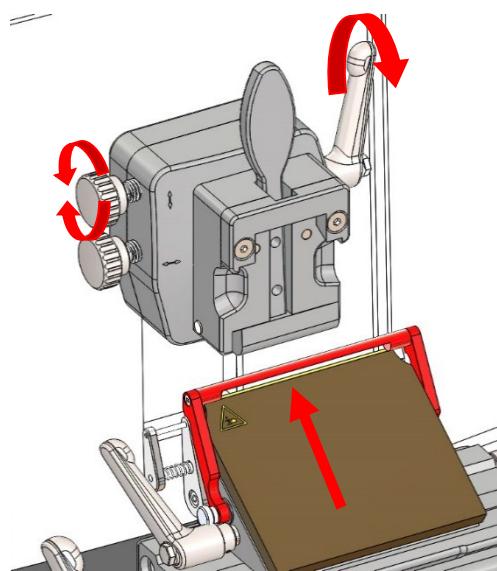
7.3 SPECIMEN ORIENTATION ADJUSTMENT

Turn hand wheel to its highest position and activate the hand wheel stop (see chapter 3.1).

For orientation of the specimen, open the fixing lever on the right side of the orientation.

For upward and downward orientation use the upper orientation wheel (see fig.).

For orientation to the left and right use the left orientation wheel (see fig.).

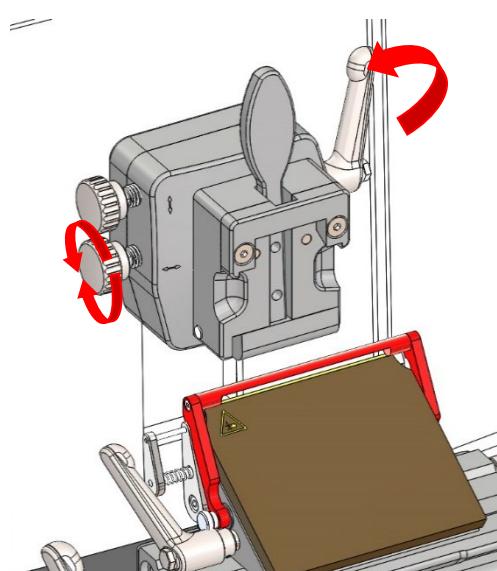


Opening of orientation fixation lever and orientation of specimen holder upwards and downwards

For orientation in the z-axis, turn the cassette clamp (see fig.).

Fix the specimen orientation by locking the clamping lever on the right side of the specimen holder.

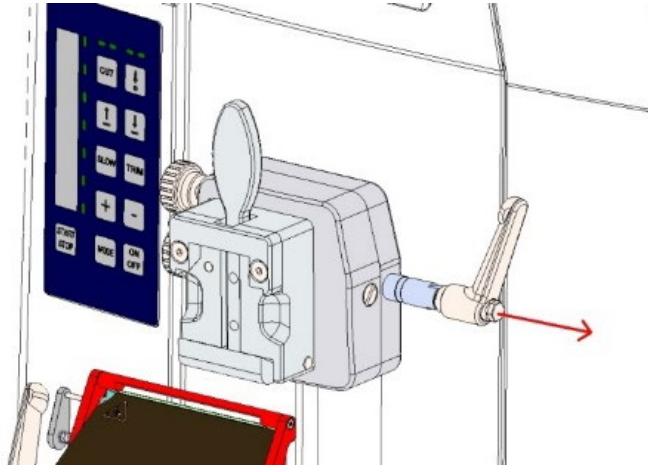
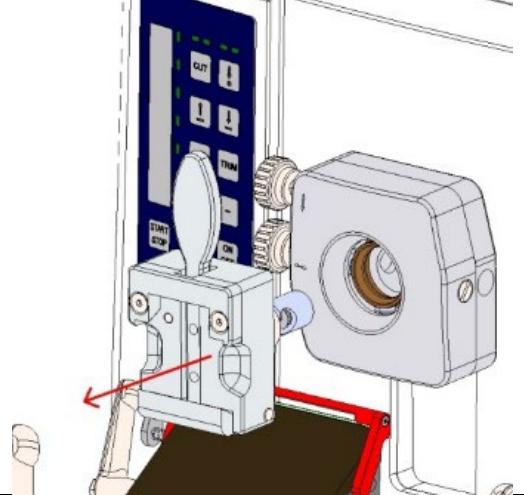
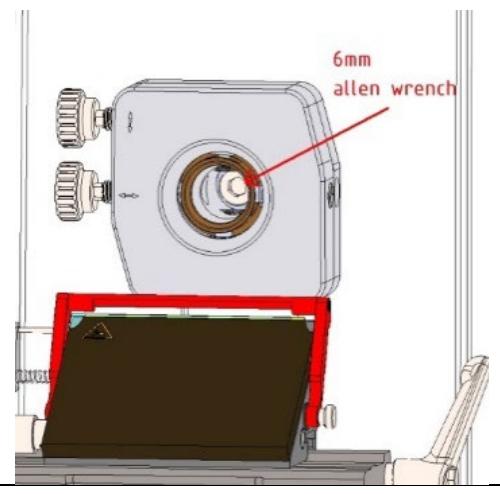
Loosen the finger guard and the handwheel lock (see chapter 3.1) for cutting the specimen.



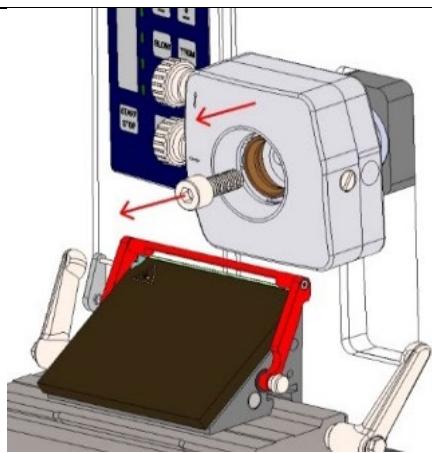
Change specimen orientation to right or left and sample orientation in z-axis

7.4 EXCHANGING THE CLAMP TYPE

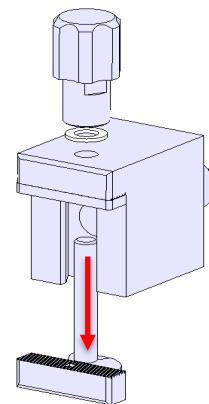
For exchanging the universal cassette clamp with specimen orientation with the standard specimen clamp (fixed), please proceed as follows:

<p>Move the universal cassette clamp to the upper position and fix the hand wheel by pressing the brake lever.</p>	
<p>Pull out the right handle of the specimen orientation to release the universal cassette clamp out of the system.</p>	
<p>Use a 6 mm Allen wrench to remove the screw out of the center of the specimen orientation.</p>	

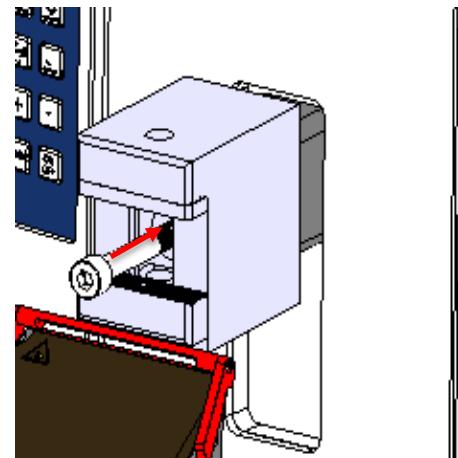
Disassemble the specimen orientation.



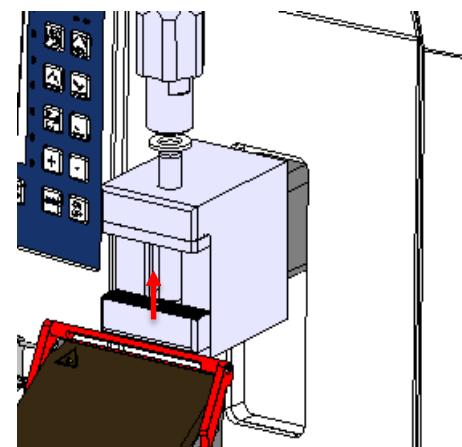
Disassemble the standard specimen clamp to get access to the center screw – M8 x 50 mm.



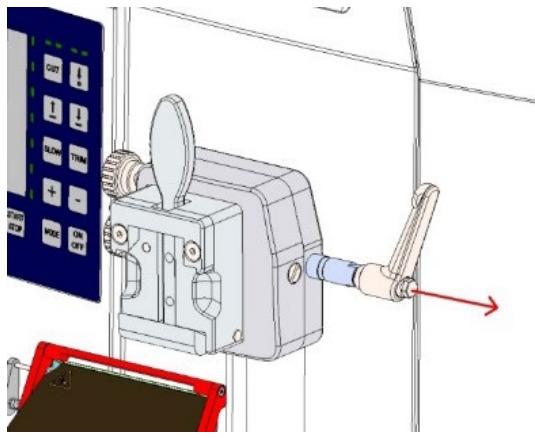
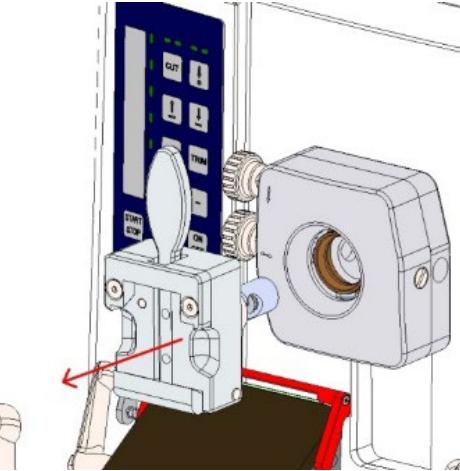
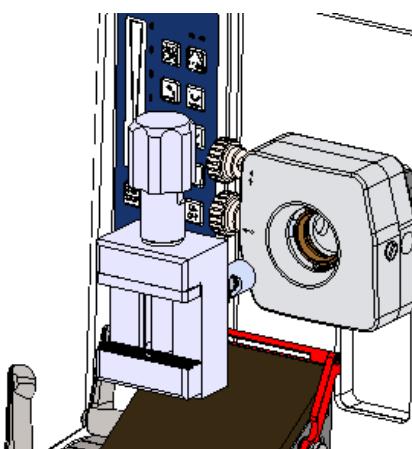
Install the basic part of the standard specimen clamp and fix it with the Allen screw.

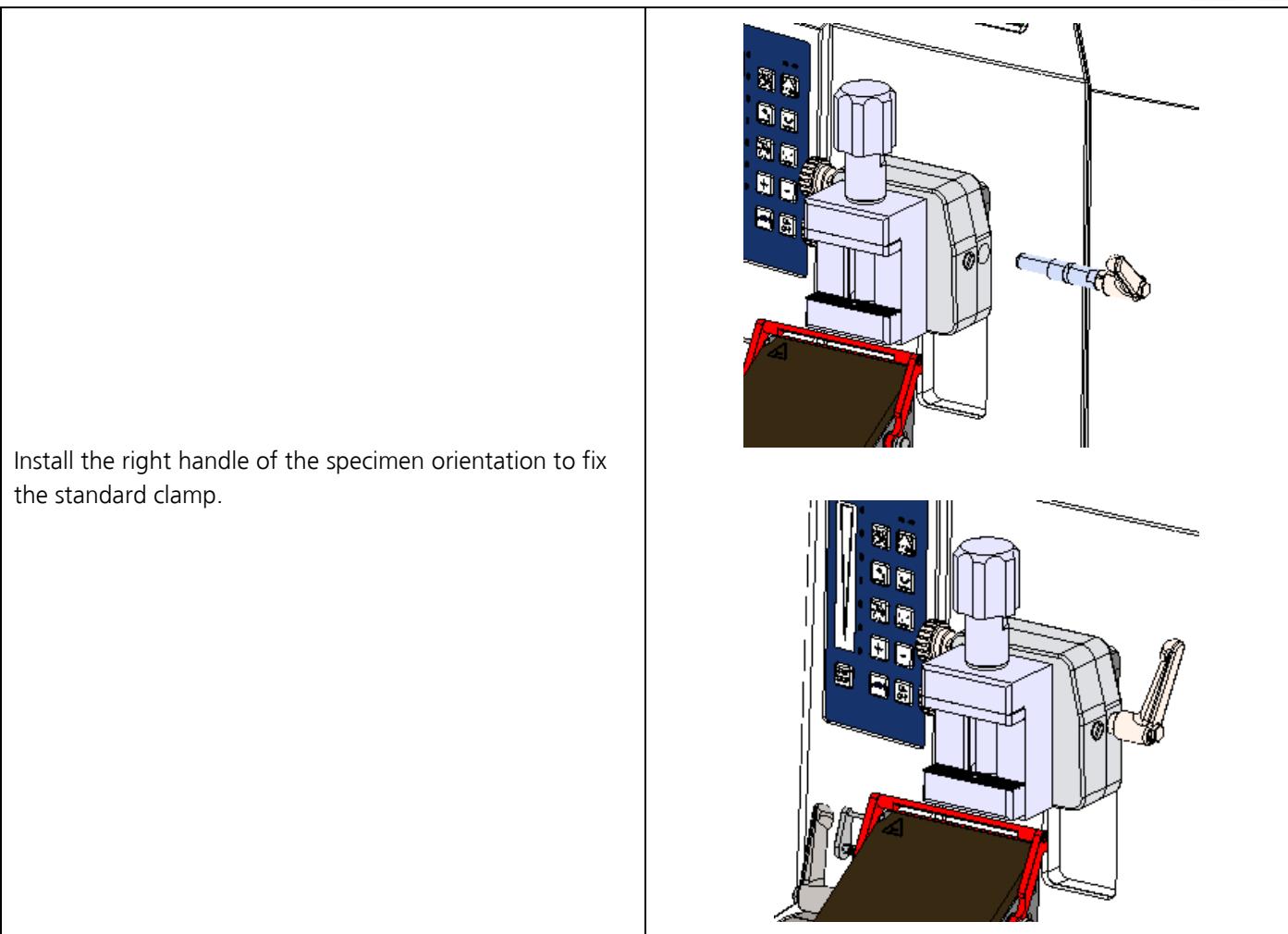


Install the spindle, the washer and the knob.



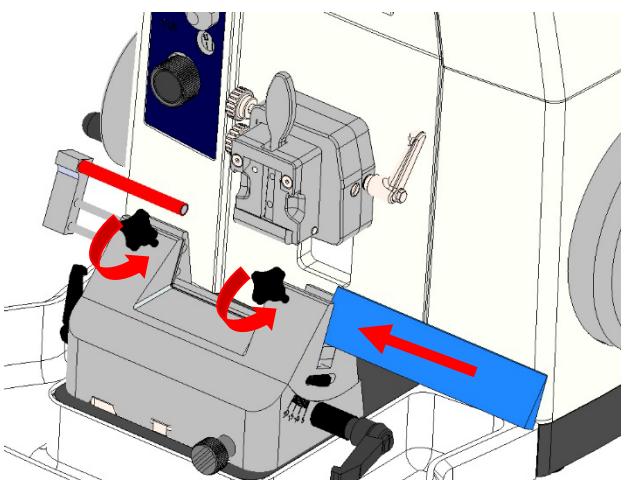
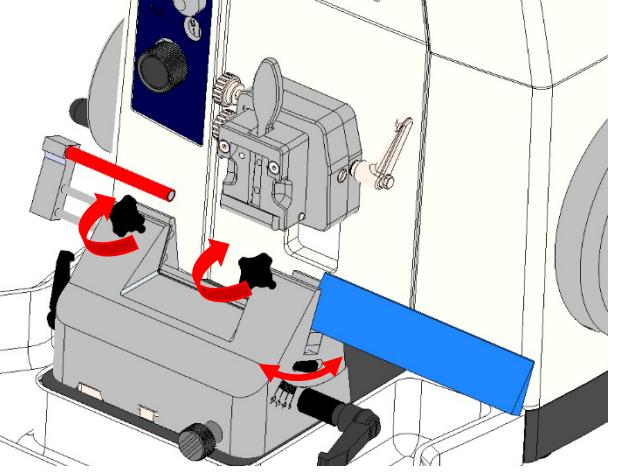
To replace the universal cassette clamp with specimen orientation with the standard specimen clamp with specimen orientation, please proceed as follows:

<p>Move the universal cassette clamp to the upper position and fix the hand wheel by pressing the brake lever. Pull out the right handle of the specimen orientation to release the universal cassette clamp out of the system.</p>	
<p>Remove the universal cassette clamp.</p>	
<p>Replace the universal cassette clamp with the standard specimen clamp.</p>	



Install the right handle of the specimen orientation to fix the standard clamp.

7.5 INSERTION AND ORIENTATION OF MICROTOME KNIVES

<p>Turn the handwheel to the highest position and activate the handwheel lock (see chapter 3.1).</p> <p>Remove finger protection guard on the right side of the knife holder.</p> <p>Loosen the knife fixation by turning the two black screws counter clockwise (see fig.).</p> <p>Remove the old knife or insert a new knife.</p>	 <p>Loosening of knife fixation and insertion of new knife</p>
<p>Tighten the knife fixation by turning the two black screws clockwise (see fig.).</p> <p>Adjust knife height by turning the wheels on the left and right side of the knife holder base.</p> <p>Install finger protection guard on the right side of the knife holder.</p> <p>Release hand wheel lock (see chapter 3.1) for cutting the specimen.</p>	 <p>Fixation and height adjustment of knife</p>

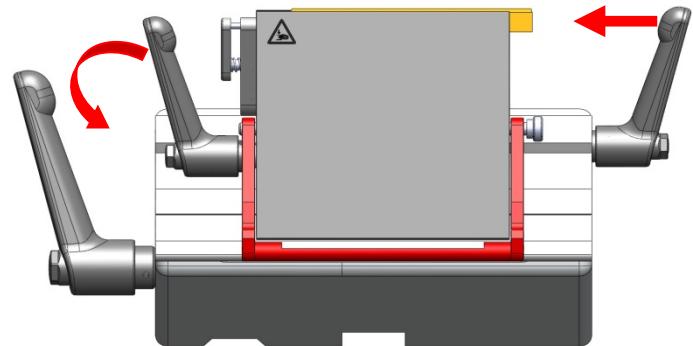
7.6 INSERTION AND ORIENTATION OF DISPOSABLE BLADES

Turn the handwheel to the highest position and activate the handwheel lock (see chapter 3.1).

Release the finger guard.

Release the blade clamping lever on the left side of the blade holder by turning it counterclockwise.

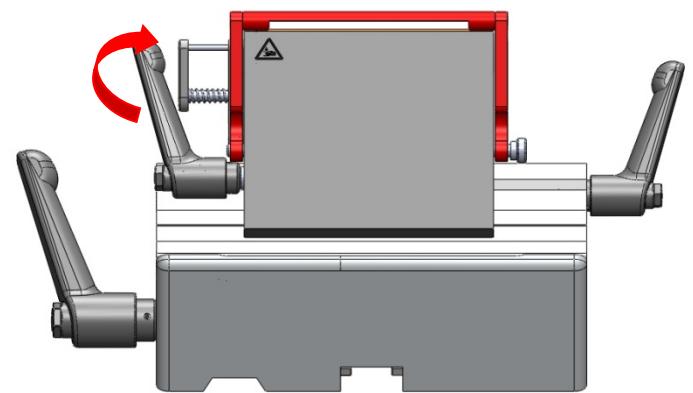
Remove the old blade or insert a new blade (see fig.).



Loosening of blade fixation and insertion of new blade

Fix the blade clamp by turning the lever on the left side of the blade holder clockwise.

Release hand wheel lock (see chapter 3.1) for cutting the specimen.



Fixation of blade

Horizontal orientation of the blade

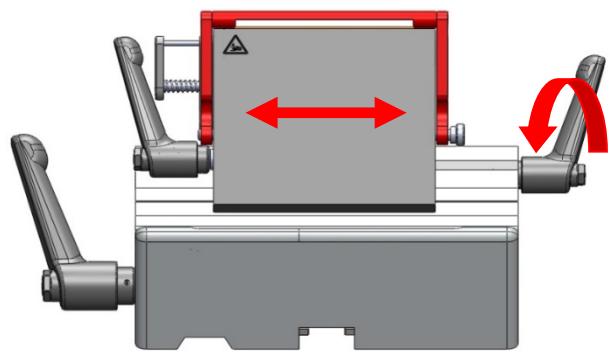
For adjustment of cutting area of the blade, the blade holder can be moved to the left or right.

To do so, release the lever on the lower right side of the swivel piece by turning it counterclockwise (see fig.).

Move the knife holder to the left or right.

Fix the new setting by turning the lever on the lower right side of the swivel piece clockwise.

Release hand wheel lock (see chapter 3.1) for cutting the specimen.



Loosening of blade holder fixation and horizontal orientation of blade holder

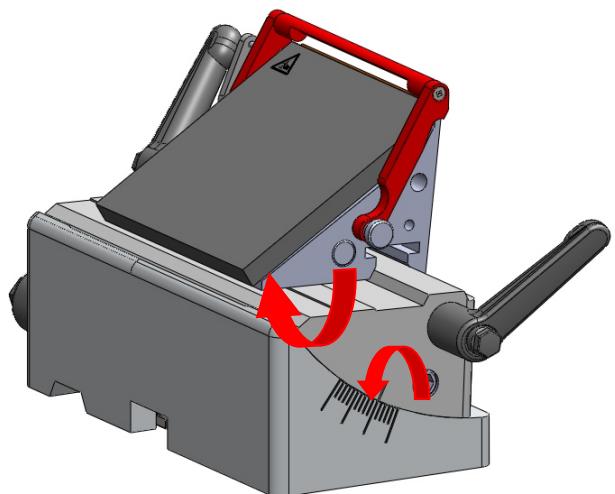
Cutting angle

To change the cutting angle, loosen the hexagon head screw on the swivel piece by turning it counterclockwise (see fig.).

Set new angle for cutting by manually tilting the blade holder. A tilt towards the specimen holder increases the cutting angle (clockwise rotation), a tilt away from the specimen holder decreases the cutting angle (counterclockwise rotation, see fig.).

Tighten the blade holder fixation by turning the indicated hexagon screw with an Allen key (size 6) clockwise.

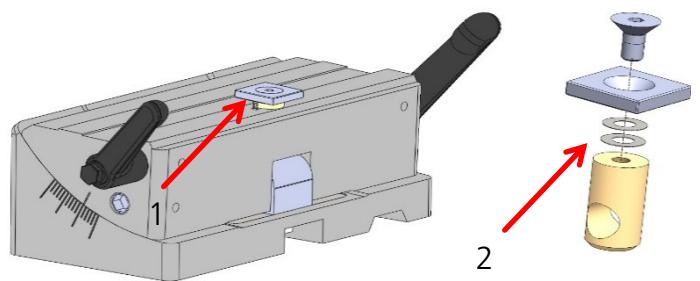
Release hand wheel lock (see chapter 3.1) for cutting the specimen.



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

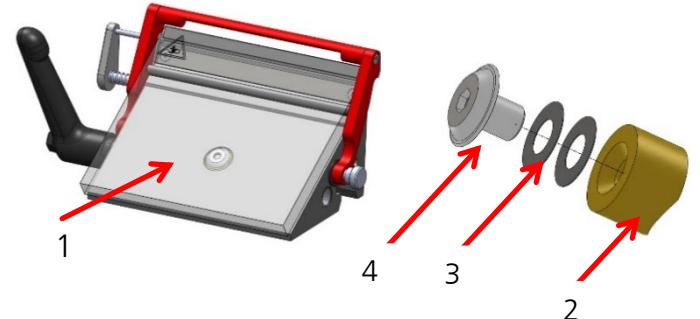
Adjusting the sledge clamping

1. Remove the screw with Allen key size 2,5 (pos. 1).
2. Removing washers makes clamping tighter. Adding washers loosens clamping.
3. Tighten the screw (pos. 1) and test the clamping by assembling the blade holder.



Adjusting the blade clamping

1. Remove away the blade clamping plate (pos. 1).
2. Take the brass plunger (pos. 2) and add / remove one of the supplied adjustment washers (pos. 3). Add washers = clamping tighter. Remove washers = loosens clamping.
3. Tighten the screw (pos. 4) and test the clamping by assembling the blade holder.

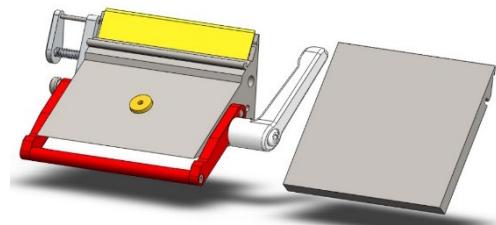
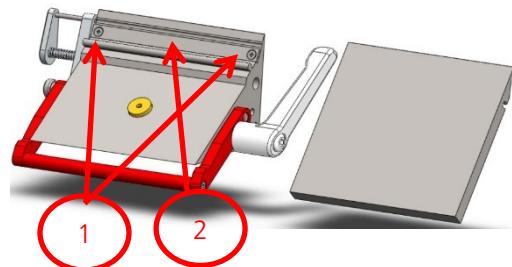
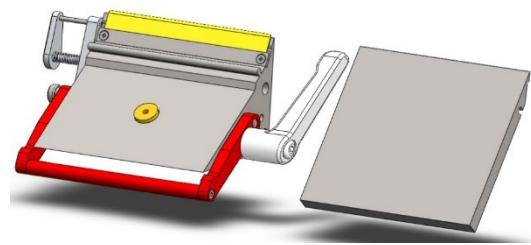


Modification from low to high blades

Before any manipulation of the blade holder remove the blade!

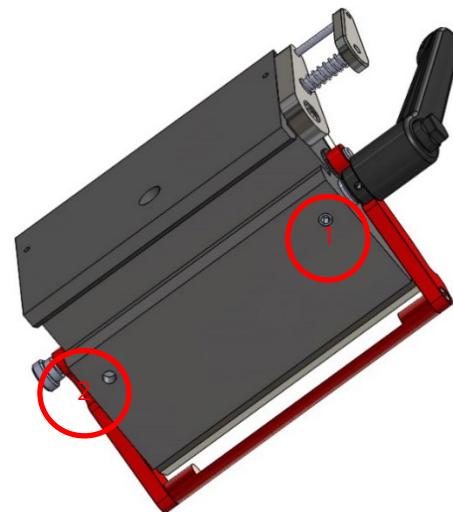
The first picture shows the low-profile configuration, underneath the low-profile configuration without the blade and the third picture shows the high-profile configuration.

To change from low profile to high profile configuration the two screws (pos. 1) have to be unscrewed with a PH0 screwdriver and the adapter strip (pos. 2) needs to be removed.



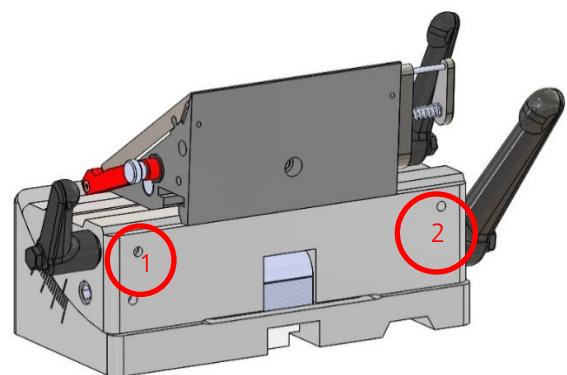
Changing the lever to the other side - blade clamp

1. Loosen the screw (located on bottom side of lateral sledge) with Allen key (see fig., marked with red circle no. 1).
2. Take the lever out of the sledge and put it into the hole from the other side.
3. Tighten the screw at the other side (marked with red circle no. 2).



Changing the lever to the other side – sledge clamp

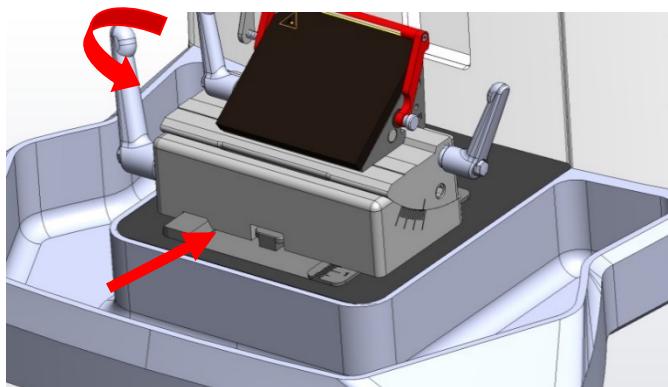
1. Loosen the screws (2x, located on bottom side of middle part) with Allen key (see fig., marked with red circle no. 1).
2. Take the lever out of the sledge and put it into the hole from the other side.
3. Tighten the screws at the other side (marked with red circle no. 2).



7.7 APPROACH TO SPECIMEN

Turn the handwheel to the highest position and activate the handwheel lock (see chapter 3.1).

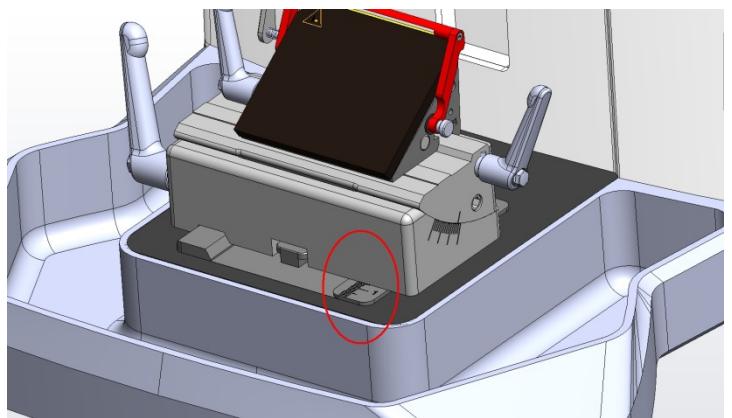
Loosen the knife or blade holder base by turning the left lever counter clockwise (see fig.).



Loosening of knife or blade holder base fixation and movement towards specimen

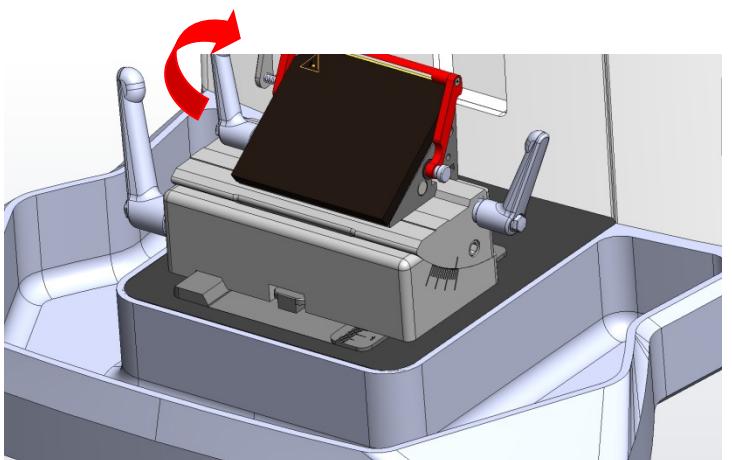
Move the blade holder base inside the guiding rail towards or away from the specimen (see fig.).

There is a scale on the right side of the microtome base plate. This enables faster and better positioning of the knife holder base if various combinations of standard specimens and specimen holders are used.



Fix the new setting by turning the lever on the left side of the knife holder base clockwise (see fig.).

Release hand wheel lock (see chapter 3.1) for cutting the specimen.

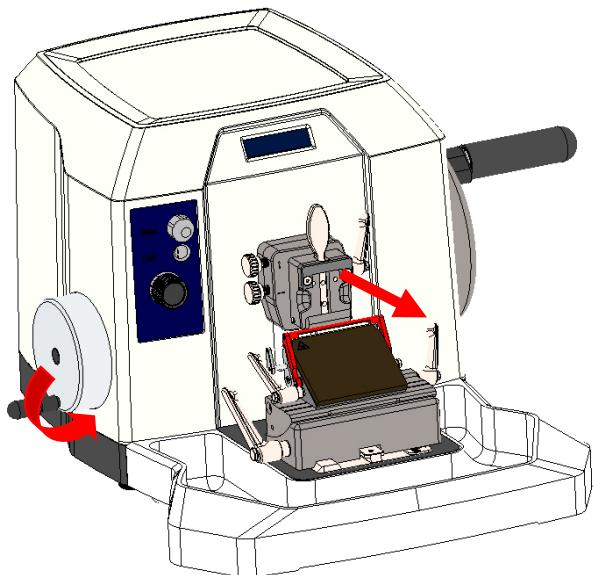


Fixation of knife holder base

7.8 COARSE ADVANCE

Turn hand wheel on the left-hand side of the device to move the specimen towards the knife or blade.

An acoustic signal is emitted at the mechanical end positions. In this case, do not continue to turn in the same direction, as this may cause damage to the device.

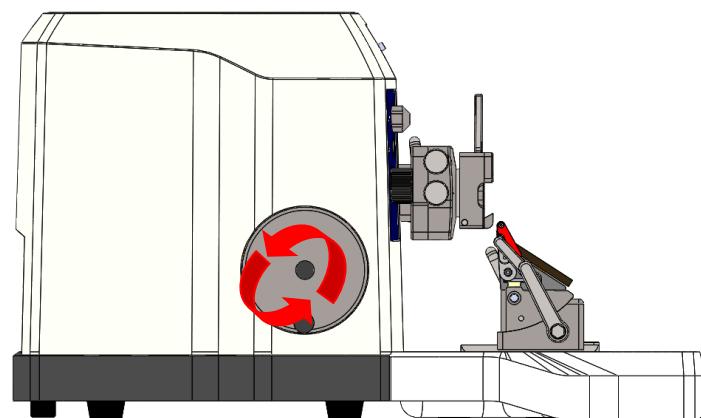


Coarse advance of specimen



Standard: When turning counter clockwise, the sledge moves out.

Optional: The opposite direction of rotation can be selected (the decision of the rotation direction must be made with purchase order).



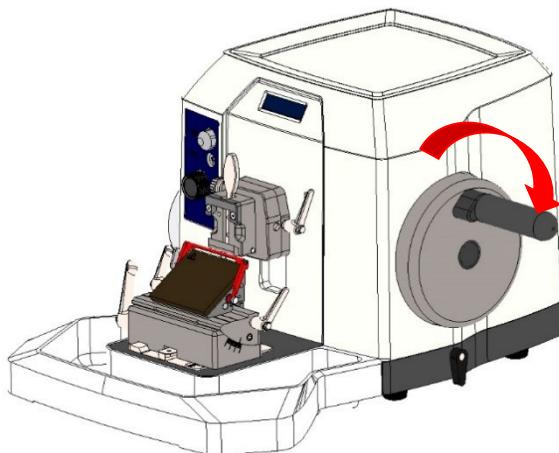
7.9 MANUAL CUTTING

Release hand wheel stop (see chapter 3.1).

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

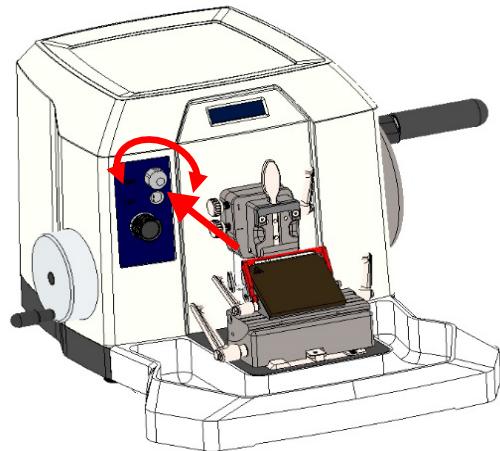
A counter clockwise movement of the hand wheel will also result in cutting and the specimen is gradually brought closer to the blade.

The cutting angle can be changed as required (see chapter 7.5; OPERATION OF TN6000).



Cutting of specimen

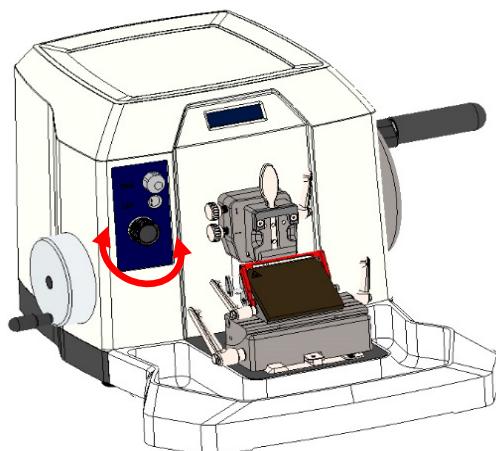
For trimming of specimen, select the thickness with the upper knob on the left front side of the device. Trim thicknesses of 10, 20, 30 or 40 μm can be selected. Now press the control knob and simultaneously turn the right handwheel to trim the specimen (see fig.).



Selection of trimming thickness and trimming

Select cutting thickness by turning the lower knob on the left front side of the device (see fig.).

The selected cutting thickness is displayed above the knob.



Selection of cutting thickness

8 CLEANING AND MAINTENANCE

8.1 CLEANING

The recommended frequency of cleaning the microtome depends on how intensely the device is used.

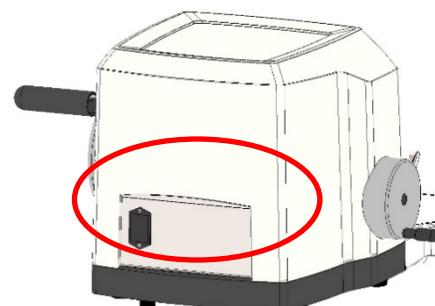
	<p>Wear protective clothing and disposable gloves according to Good Laboratory Practices.</p> <p>Please take note of the safety aspects of the device.</p> <p>To clean the microtome mild domestic cleaning agents can be used. Do not use aggressive cleaning agents or solvents such as acetone or xylene, as the plastic or metal components of the device can be affected or corrode.</p> <p>The hood should be cleaned with commercially available plastic cleaning agents. Do not use alcoholic or organic solvents to clean the hood.</p> <p>Never spray or use cleaning agents directly on the touch panels or the display.</p>
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8.2 BATTERY REPLACEMENT

The battery generates an acoustic signal when the horizontal slide is moved to the front or rear end position so that the small handwheel is not turned any further when the acoustic signal is sounding.

The battery must be replaced regularly once a year (there is no report for empty batteries), otherwise driving over the end position can cause mechanical damage.

To change the battery, please pull the inner part of the cover outwards, to give you access to the 9V-block battery.



8.3 RECOMMENDED MAINTENANCE AND SERVICE SCHEDULE

Daily	<p>Remove section waste from the waste tray.</p> <p>Please use supplied dust cover when device is not in use.</p>
Weekly	Cleaning of blade holder.
Yearly	<p>Annual inspection (performed by authorized Tanner Scientific service technician)</p> <ul style="list-style-type: none">• Check of all functions• Lubricating of movable parts• Check of driving system• Complete cleaning• Change of battery

9 SERVICE

Internal components may only be serviced by authorized technicians.

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

- complete contact details,
- type of device and serial number,
- location of device and name of user,
- purpose of service call,
- delivery date of the unit.

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

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

10 OPTIONAL ACCESSORIES

aquatec system	#10090056
MTR Bench top quick-freezing unit	#10110000
Magnifier with illumination	#10090060
Disposable blade holder TC65 (for tungsten carbide blades)	#10090041
Tungsten carbide blade (1 pc.)	#28406000
Glass knife holder (for triangle glass knives)	#10090014
Segment arc incl. universal sample holder (for glass knife holder application)	#10090015
Super Mega cassette clamp, orientable	#10090027
Super Mega cassette clamp, fixed	#10090021
Standard specimen clamp, fixed	#10090026
Foil clamp	#10090025
Prism (set)	#10090017
Round specimen holders (different diameters)	on demand
Disposable blades (low profile; 50 pcs.)	#28407000
Disposable blades (high profile; 50 pcs.)	#28408000
Disposable blades (low profile; 50 pcs.), Plasma LPH, for hard specimen	#28407004
Disposable blades (low profile; 50 pcs.), Plasma LPS, for soft specimen	#28407005
Disposable blades (high profile; 50 pcs.), Plasma HPS, for hard specimen	#28407006
Tungsten carbide blade (1 pcs.)	#28406000
Microtome knife profile: C or D, length: 10 to 40 cm	on demand
2nd handwheel lock	#10090024
More on request	

11 WARRANTY

Tanner Scientific 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.

Tanner Scientific guarantees that the device is manufactured under an ISO 9001:2015 and ISO 13485:2016 quality management system.

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

Only original Tanner Scientific spare parts must be used.

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

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

12 DISPOSAL

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

Notes

Notes

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