

# OPERATING INSTRUCTIONS

# Automatic Rotary Microtome TN8000



INS1000-30GB  
2021-07-008.00 TN



# CONTENTS

<b>1</b>	<b>INTENDED USE</b>	<b>5</b>
<b>2</b>	<b>SYMBOLS</b>	<b>5</b>
<b>3</b>	<b>SAFETY NOTES</b>	<b>5</b>
3.1	HAND WHEEL STOP	6
3.2	FINGER PROTECTION GUARD	8
3.3	ELECTRICAL CONNECTIONS	9
3.4	EMERGENCY SWITCH	10
3.5	MOTORIZED OPERATION	10
3.6	WORKING WITH KNIVES AND DISPOSABLE BLADES	10
<b>4</b>	<b>COMPONENTS</b>	<b>11</b>
4.1	MAGNIFIER WITH ILLUMINATION, DIMMABLE (OPTIONAL)	12
<b>5</b>	<b>SPECIFICATIONS</b>	<b>15</b>
<b>6</b>	<b>UNPACKING AND INSTALLATION</b>	<b>17</b>
6.1	UNPACKING THE DEVICE	17
6.2	INSTALLATION	17
<b>7</b>	<b>OPERATION OF TN8000</b>	<b>18</b>
7.1	INSERTION OF SPECIMEN IN STANDARD SPECIMEN CLAMP	18
7.2	INSERTION OF SPECIMEN IN UNIVERSAL CASSETTE CLAMP	19
7.3	SPECIMEN ORIENTATION ADJUSTMENT	20
7.4	EXCHANGING THE CLAMP TYPE	21
7.5	INSERTION AND ORIENTATION OF MICROTOME KNIVES	26
7.6	INSERTION AND ORIENTATION OF DISPOSABLE BLADES	27
7.7	APPROACH TO SPECIMEN	32
7.8	SPECIMEN FEED MEMORY	33
7.9	MOTORISED COARSE ADVANCE	33
7.10	MOTORISED FINE ADVANCE	33
7.11	MANUAL CUTTING	34
7.12	ADJUSTMENT OF TRIMMING	35
7.13	ADJUSTMENT OF CUTTING	35





7.14	ROCKING MODUS	35
7.15	ADJUSTMENT OF RETRACTION DURING THE UPWARD MOVEMENT	36
7.16	SECTION COUNTER / SECTION SUM / REMAINING TRAVEL INDICATION	37
7.17	DISPLAY CONTRAST SETTINGS	37
7.18	SETTING OF CUTTING SPEED	38
7.19	SETTING OF TRIMMING SPEED	39
7.20	SETTING OF CUTTING MODE	40
7.21	PROGRAMMING AUTOMATIC CUTTING	42
7.22	OVERVIEW KEY COMBINATIONS	43
<b>8</b>	<b>EXTERNAL CONTROL PANEL TN8000</b>	<b>45</b>
8.1	EXTERNAL CONTROL PANEL TN8000	45
8.2	FUNCTIONAL OVERVIEW OF USER INTERFACE	46
<b>9</b>	<b>CLEANING AND MAINTENANCE</b>	<b>47</b>
9.1	CLEANING	47
9.2	RECOMMENDED MAINTENANCE AND SERVICE SCHEDULE	47
<b>10</b>	<b>SERVICE</b>	<b>48</b>
<b>11</b>	<b>OPTIONAL ACCESSORIES</b>	<b>49</b>
<b>12</b>	<b>WARRANTY</b>	<b>50</b>
<b>13</b>	<b>DISPOSAL</b>	<b>50</b>

## 1 INTENDED USE

The rotary microtome TN8000 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 100 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:

	TN8000
Hand wheel stop	•
Collapsible hand wheel lever	•
Emergency stop switch	•
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)

	<b>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.</b>
	<b>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!</b> <b>Use the supplied cover!</b>

### 3.1 HAND WHEEL STOP

#### 3.1.1 HAND WHEEL STOP WITH BRAKE ON THE HANDLE

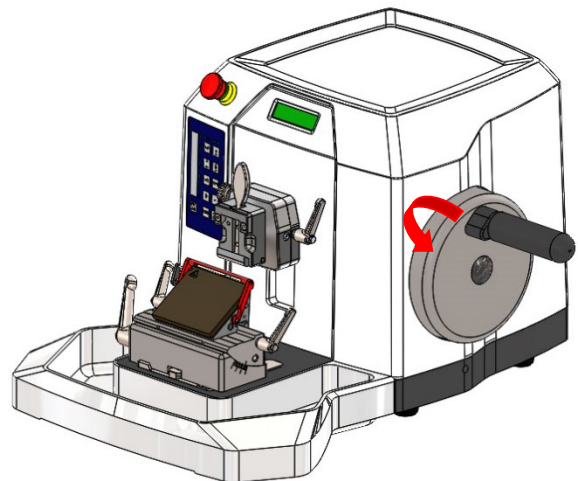
Always use the finger protection guard with the knife- / blade holder and put hand wheel in stop position

- 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 stop towards the center. To do this, turn the locking lever 90° counterclockwise.

To release the handwheel lock again, turn the lever 90° clockwise.

For motorized operation with TN8000 please always fold the hand wheel lever to the inside into the recess provided. To do this pull the handle to the outside and then fold it to the inside. Once you move it back again it will automatically latch on again.

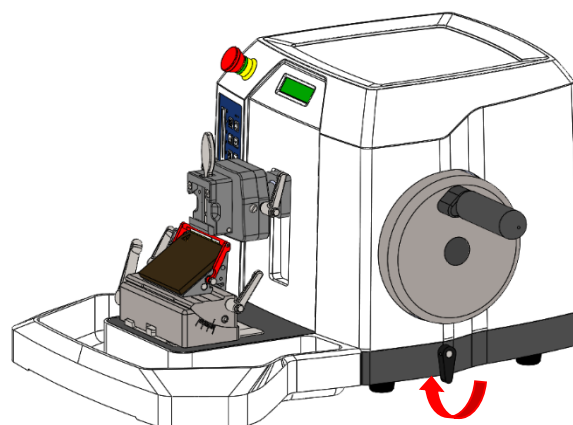


### 3.1.2 HANDWHEEL STOP WITH BRAKE ON THE BASE (OPTIONAL)

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

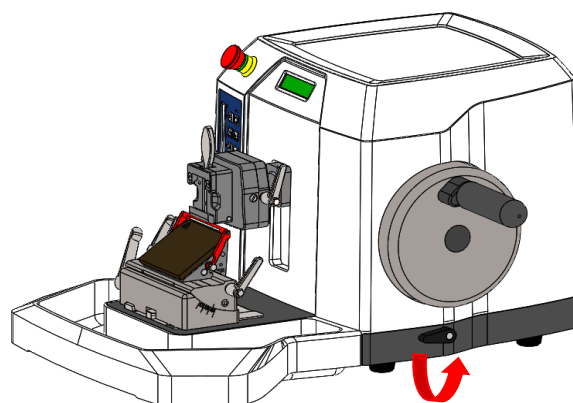
- before working with the knife or specimen,
- before changing the specimen,
- during break time.

The basic brake can be activated in every handwheel position. To close, turn the lever for 90° clockwise vertically (notch).



Basic brake open

To release the handwheel lock, turn the lever 90° counter-clockwise.

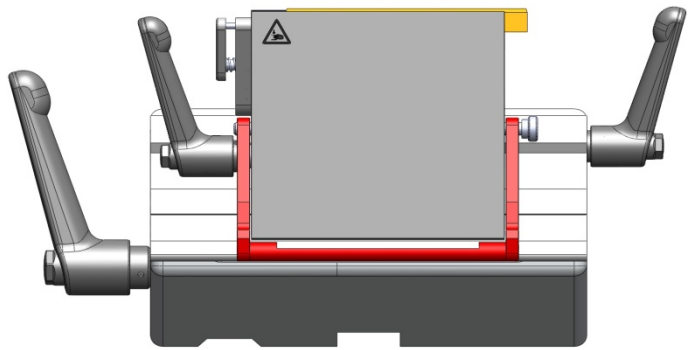


Basic brake closed

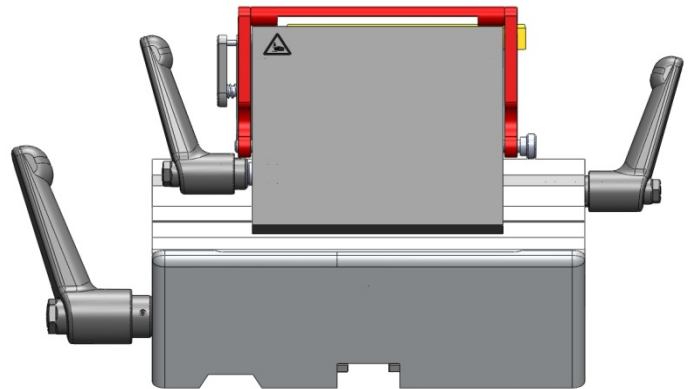
## 3.2 FINGER PROTECTION GUARD

Use the finger protection guard for the blade and knife holder as well as the handwheel stop always

- before you start any work with the knife or specimen,
- before changing the specimen,
- during work break.



Finger protection guard released



Finger protection guard activated



Please note that the finger protection guard may be engaged throughout processing (exchange of blade, lateral displacement, trimming, cutting), thereby increasing operation safety!



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.



### 3.3 ELECTRICAL CONNECTIONS

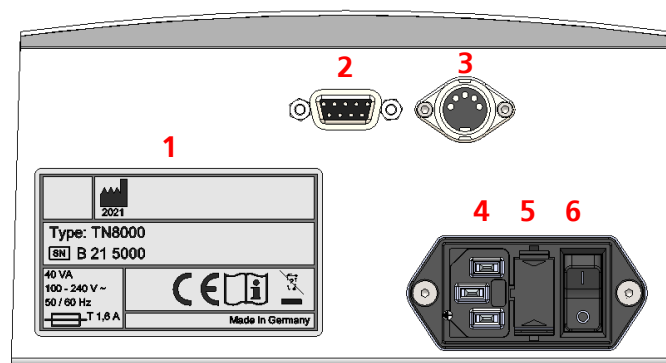


Before connecting any electrical units, the device must be switched off.

Electrical connections are attached at the backside of the microtome. Further on the name plate is located here (pos. 1).

Following connections are available depending on the microtome type:

- 2: External Control Panel
- 3: Footswitch
- 4: Mains cable
- 5: Fuse
- 6: ON- / OFF-Switch

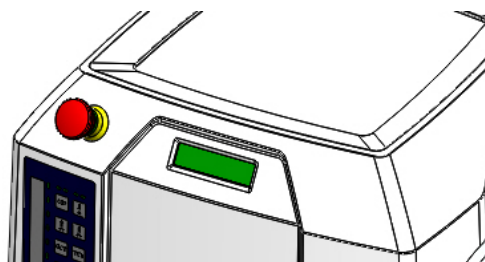


- Before installing the device, check that the electrical connection values correspond to the specifications on the type plate and that a constant power supply is guaranteed. This should be examined during installation of the unit by a competent person.
- Do not use any extension cable.
- For maintenance and service always unplug the mains cable.
- Only use a specified fuse for the unit.
- Do not connect another unit to the same power circuit.


### 3.4 EMERGENCY SWITCH

By pressing the red emergency switch an emergency stop is activated. The cutting motor stops immediately.

For deactivating the emergency stop it has to be turned, then it moves automatically back into the original position. The device switches on again automatically. The motor remains switched off for safety reasons and must be switched on and started again for operation.



### 3.5 MOTORIZED OPERATION

To switch the motor on and off, use the control button on the left side of the unit  or the installed foot switch.

### 3.6 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.

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.

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

In case of multiple use of the knife or blade, use the finger guard.

To increase the usage time of knives and blades, avoid increased wear and tear by cleaning the cutting edge and blade holder regularly.

## 4 COMPONENTS

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

	TN8000
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	•
Foot switch for motor drive	•
Mains cable	•
Manual	•

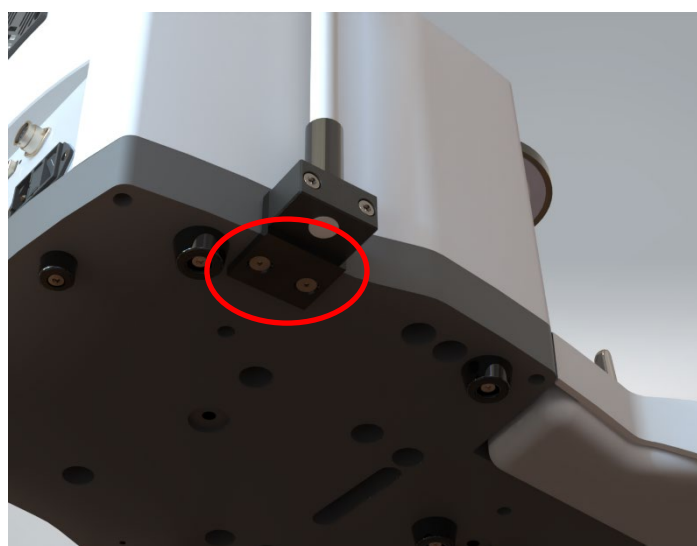
## 4.1 MAGNIFIER WITH ILLUMINATION, DIMMABLE (OPTIONAL)

### 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.



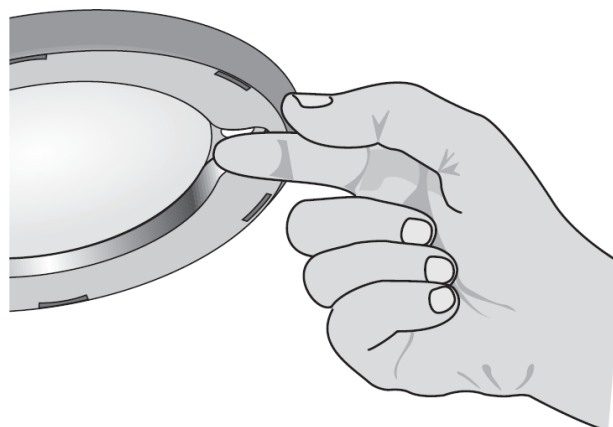
## Switching on / off:

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

Nominal supply voltage	100 - 240 V + / -10 %
Nominal frequency	50/60 Hz
Power draw	120 VA
Protective class (1)	I
Power fuses	2 x T 1,6 A
Pollution degree (1)	2
Overvoltage installation category	II
Maximum heat emission	120 J / s
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 - 100 µm
Section thickness settings	0.5 - 2 µm in 0.5-µm steps 2 - 20 µm in 1-µm steps 20 - 50 µm in 2-µm steps 50 - 100 µm in 5-µm steps
Trimming thickness settings	0 - 750 µm 0.5 - 2 µm in 0.5-µm steps 2 - 20 µm in 1-µm steps 20 - 50 µm in 2-µm steps 50 - 150 µm in 5-µm steps 150 - 750 µm in 10-µm steps
Horizontal advance	28 mm (step motor)
Specimen feed speed SLOW	75 / 150 / 300 / 600 µm / s
Specimen feed speed	normally 3.000 µm / s
Specimen feed memory	2 positions programmable
Vertical specimen stroke	72 mm
Maximum specimen size	50 x 50 mm
Sectioning speed	3 - 450 mm / s selectable via slider
Sectioning modes	Continuous, Single, Rocking, Window, Program
Sectioning window	4 sizes selectable
Knife holder basis - north-south axis	35 mm
Specimen retraction on return stroke	0 - 200 µm, selectable
Specimen orientation, horizontal	8°
Specimen orientation, vertical	8°

Specimen orientation, z-axis	360°
Section counter	Strokes / Distance
Dimensions [width x depth x height]	520 mm x 600 mm x 325 mm incl. handwheel and waste tray
Weight without accessories	34 kg

(1) According to IEC 1010, EN 61010



## 6 UNPACKING AND INSTALLATION

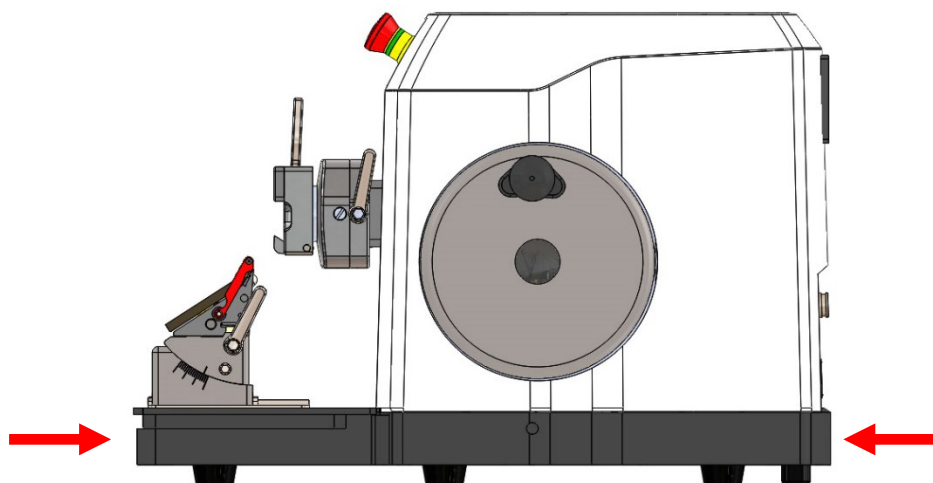
### 6.1 UNPACKING THE DEVICE

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.

Before use remove the transport security underneath the specimen head.

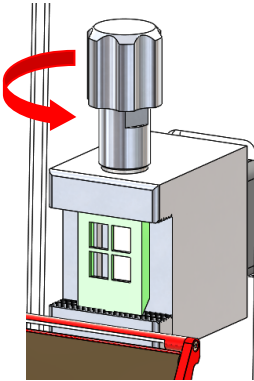
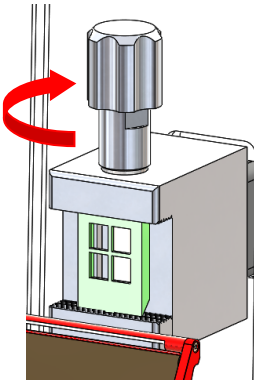
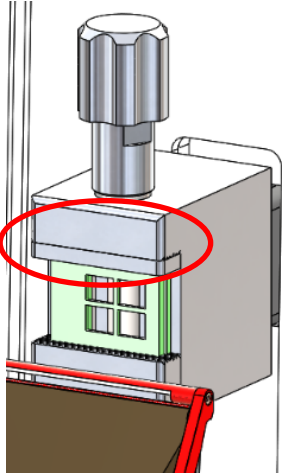
Assure convenient and unobstructed access to the hand wheel. Do not cover the ventilation outlet on the backside of the device and keep a minimum distance between wall and rear of the device of 5 - 10 cm.

Connect the foot switch for the cutting motor and the external control panel [optional] with the outlet on the back of the device. Connect the device to the power supply.

For connection of electric devices, please consider the guidance's listed in 3.3 ELECTRICAL CONNECTIONS.

## 7 OPERATION OF TN8000

### 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.

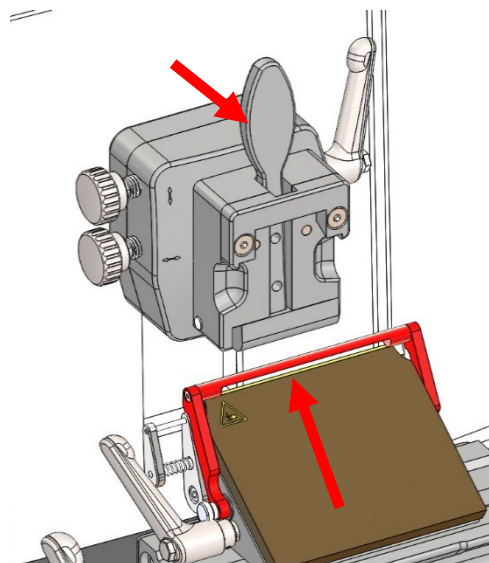
Activate finger protection guard.

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

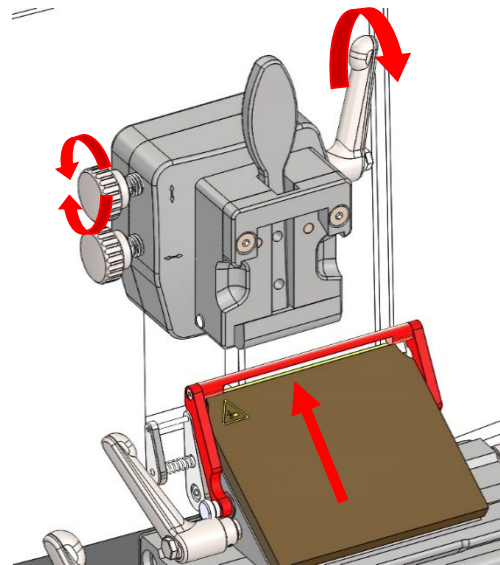
### 7.3 SPECIMEN ORIENTATION ADJUSTMENT

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.).

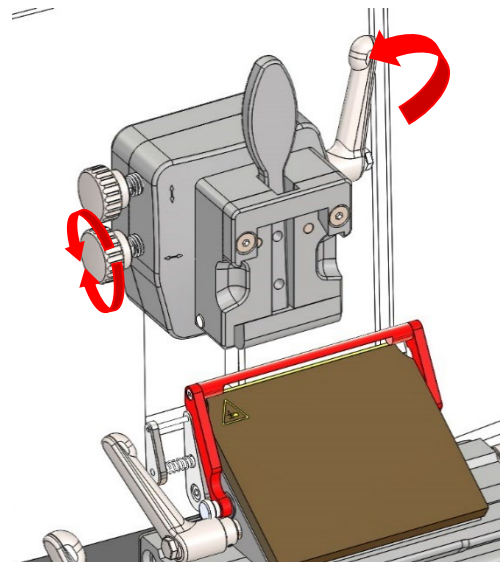


Opening of orientation fixation lever and orientation of specimen holder upwards and downwards

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.

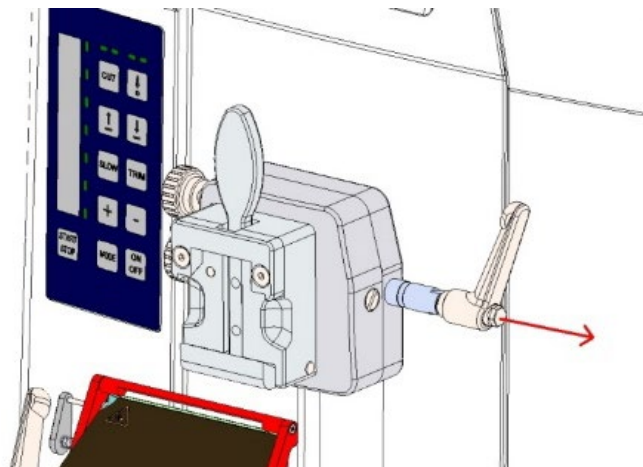


Change specimen orientation to right or left and sample orientation in z-axis

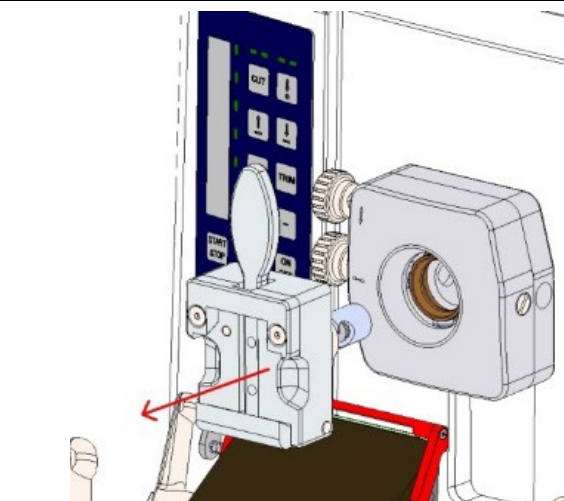
## 7.4 EXCHANGING THE CLAMP TYPE

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

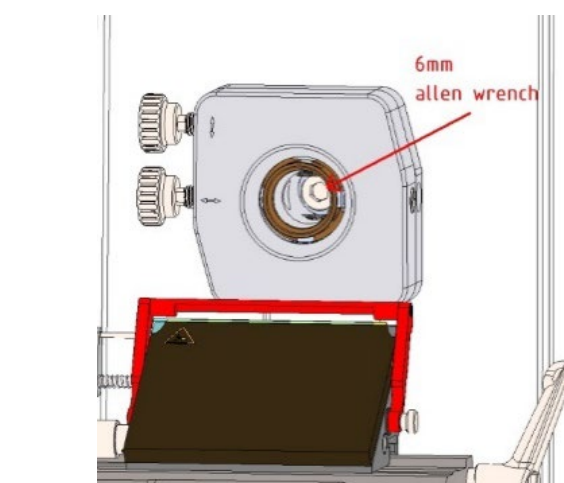
Move the universal cassette clamp to the upper position and fix the hand wheel by pressing the brake lever.



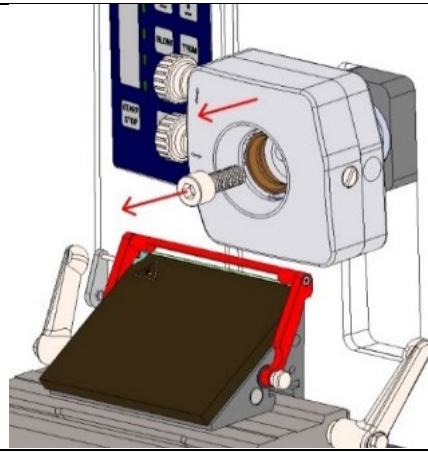
Pull out the right handle of the specimen orientation to release the universal cassette clamp out of the system.



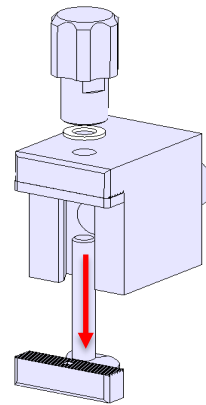
Use a 6 mm Allen wrench to remove the screw out of the center of the specimen orientation.



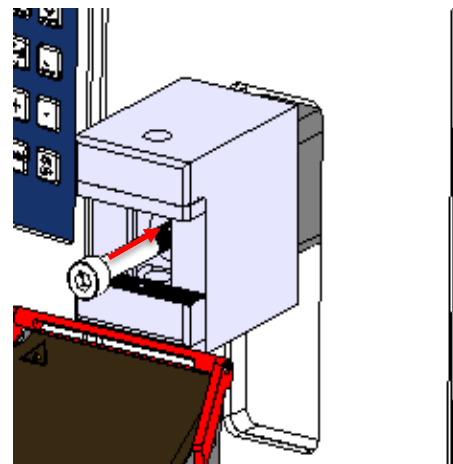
Disassemble the specimen orientation.



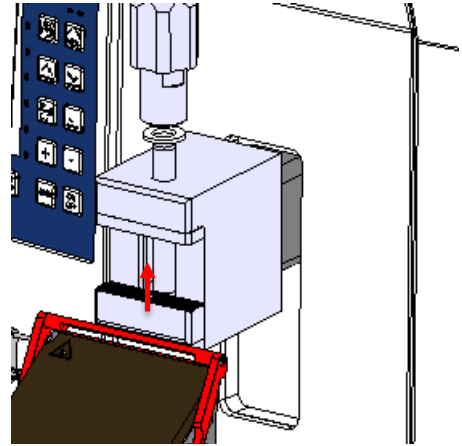
Disassemble the standard specimen clamp to get access to the center screw – M8 x 50 mm.



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

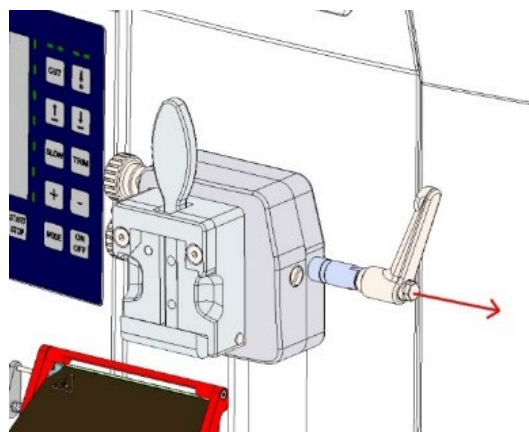


Install the spindle, the washer and the knob.

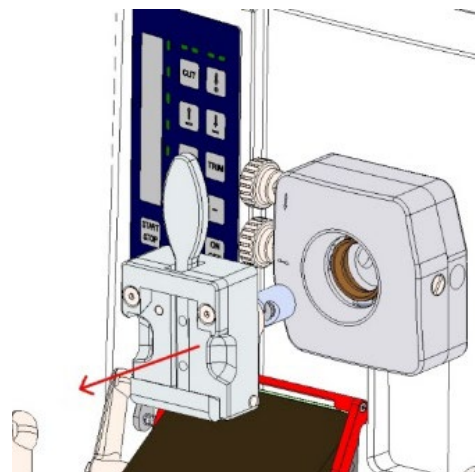


To replace the universal cassette clamp with specimen orientation with the standard specimen clamp with specimen orientation, please proceed as follows:

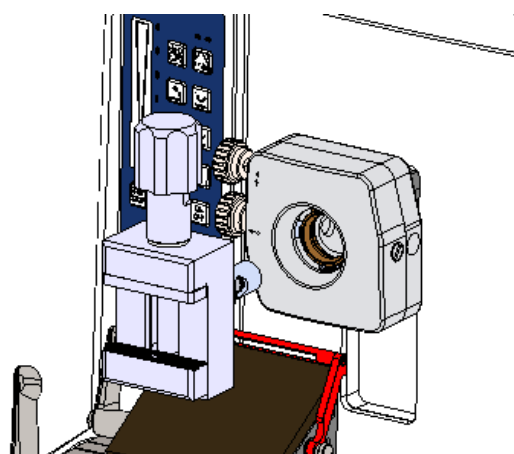
Move the universal cassette clamp to the upper position and fix the hand wheel by pressing the brake lever. Pull out the right handle of the specimen orientation to release the universal cassette clamp out of the system.



Remove the universal cassette clamp.

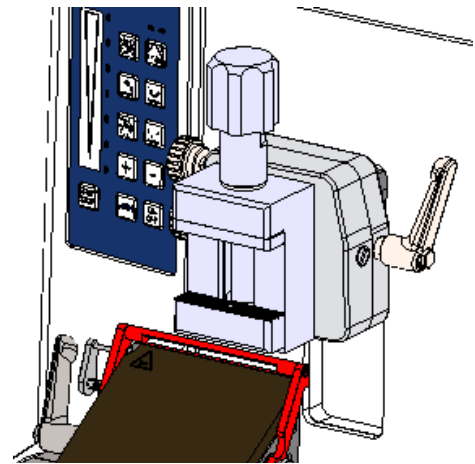
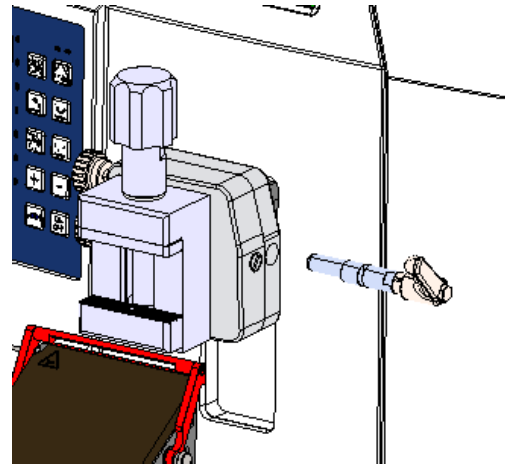


Replace the universal cassette clamp with the standard specimen clamp.





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



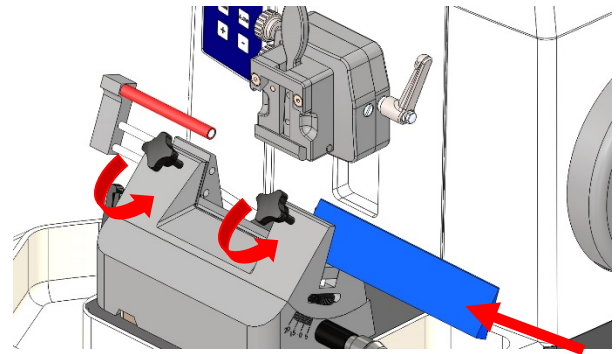
## 7.5 INSERTION AND ORIENTATION OF MICROTOME KNIVES

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

Remove finger protection guard on the right side of the knife holder.

Loosen the knife fixation by turning the two black screws counter clockwise (see fig.).

Remove the old knife or insert a new knife.



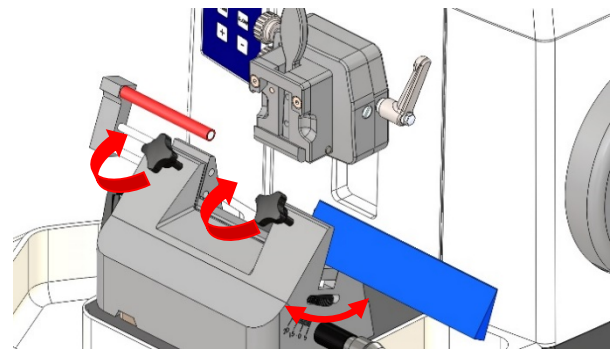
Loosening of knife fixation and insertion of new knife

Tighten the knife fixation by turning the two black screws clockwise (see fig.).

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

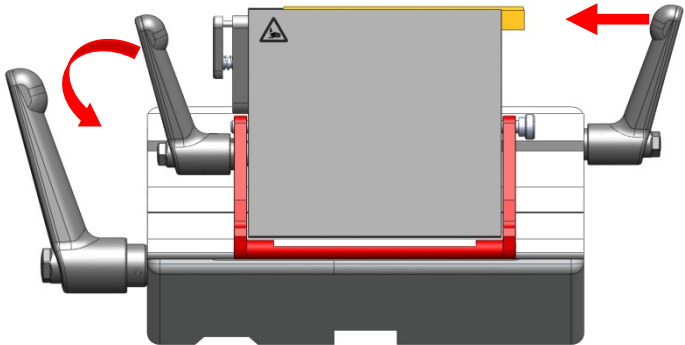
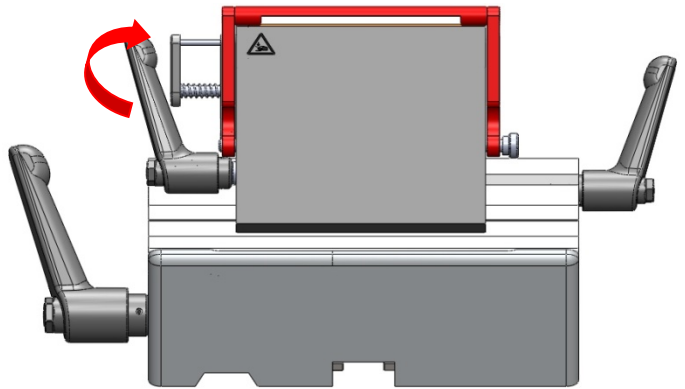
Install finger protection guard on the right side of the knife holder.

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



Fixation and height adjustment of knife

## 7.6 INSERTION AND ORIENTATION OF DISPOSABLE BLADES

<p>Turn the handwheel to the highest position and activate the handwheel lock (see chapter 3.1).</p> <p>Release the finger guard.</p> <p>Release the blade clamping lever on the left side of the blade holder by turning it counterclockwise.</p> <p>Remove the old blade or insert a new blade (see fig.).</p>	 <p>Loosening of blade fixation and insertion of new blade</p>
<p>Fix the blade clamp by turning the lever on the left side of the blade holder clockwise.</p> <p>Release hand wheel lock (see chapter 3.1) for cutting the specimen.</p>	 <p>Fixation of blade</p>

## Horizontal orientation of the blade

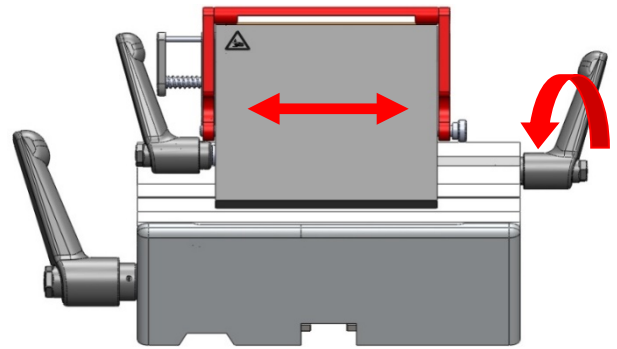
For adjustment of cutting area of the blade, the blade holder can be moved to the left or right.

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

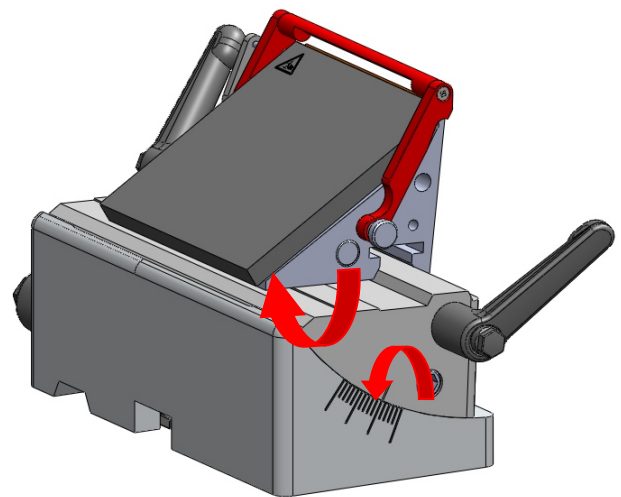
## Cutting angle

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.

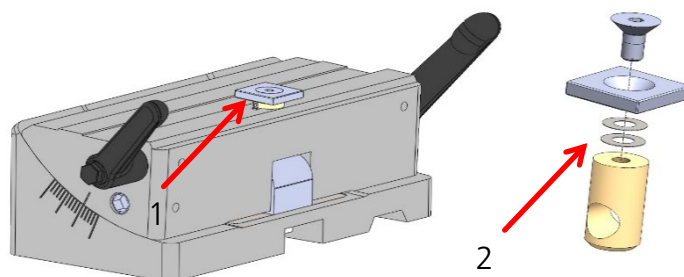
Release hand wheel lock (see chapter 3.1) for cutting the specimen.



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

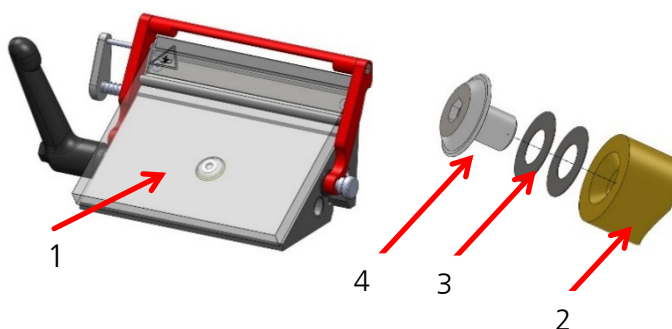
## Adjusting the sledge clamping

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.

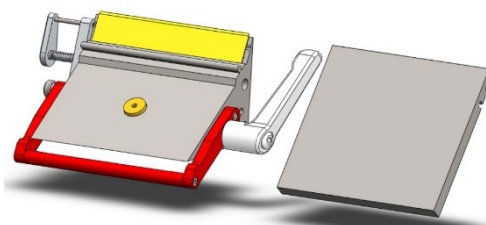
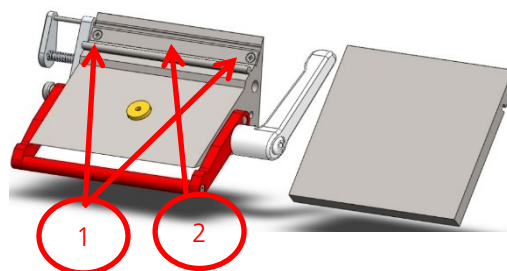
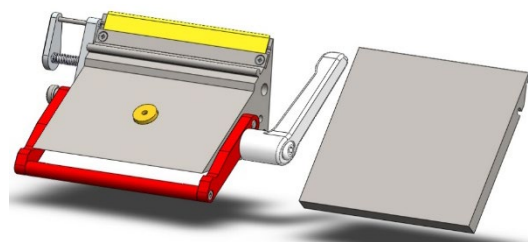


## Modification from low to high blades

Before any manipulation of the blade holder remove the blade!

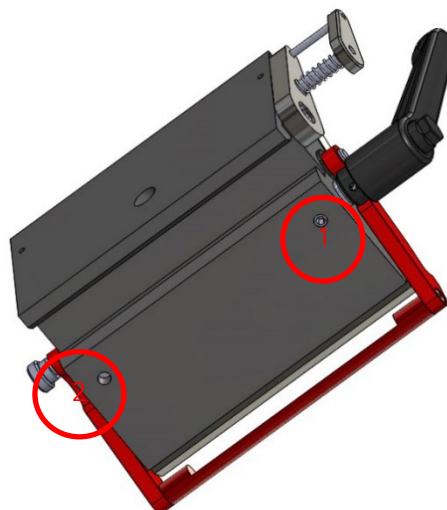
The first picture shows the low-profile configuration, underneath the low-profile configuration without the blade and the third picture shows the high-profile configuration.

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.



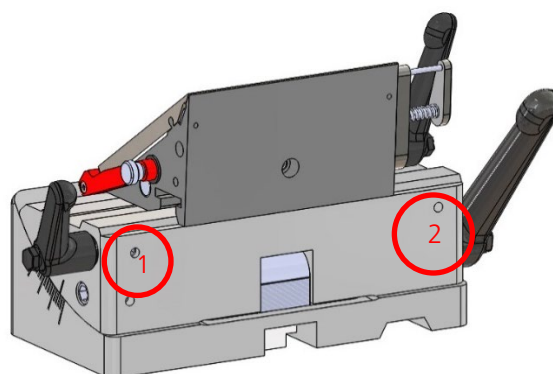
### Changing the lever to the other side - blade clamp

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

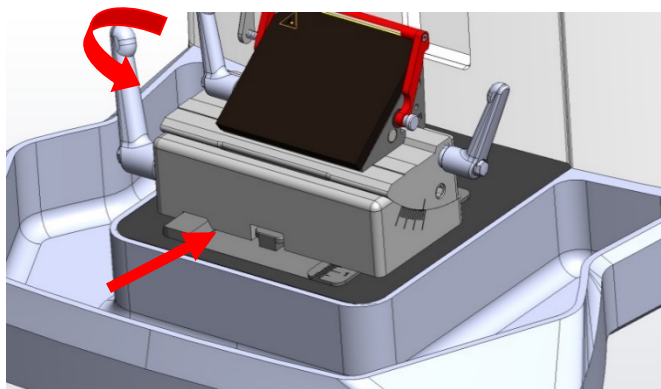
1. Loosen the screws (2x, located on bottom side of middle part) with Allen key (see fig., marked with red circle no. 1).
2. Take the lever out of the sledge and put it into the hole from the other side.
3. Tighten the screws at the other side (marked with red circle no. 2).



## 7.7 APPROACH TO SPECIMEN

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

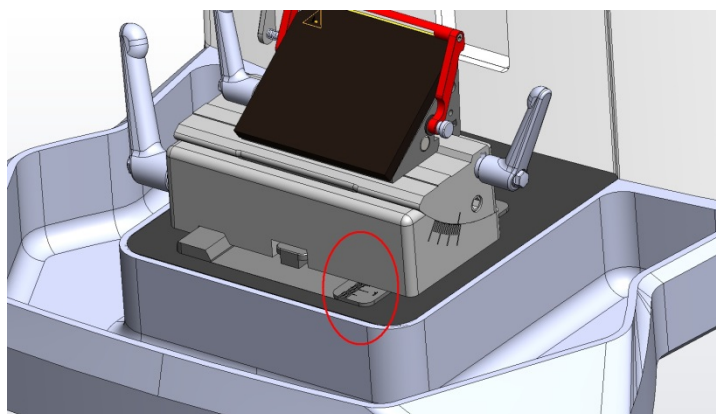
Loosen the knife or blade holder base by turning the left lever counter clockwise (see fig.).



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

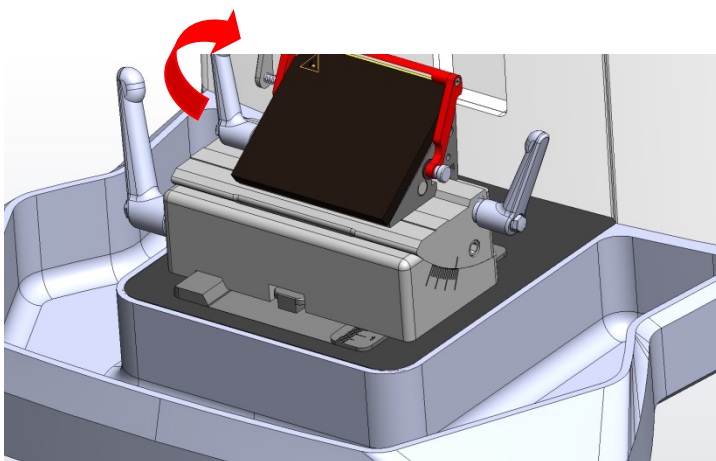
Move the blade holder base inside the guiding rail towards or away from the specimen (see fig.).

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




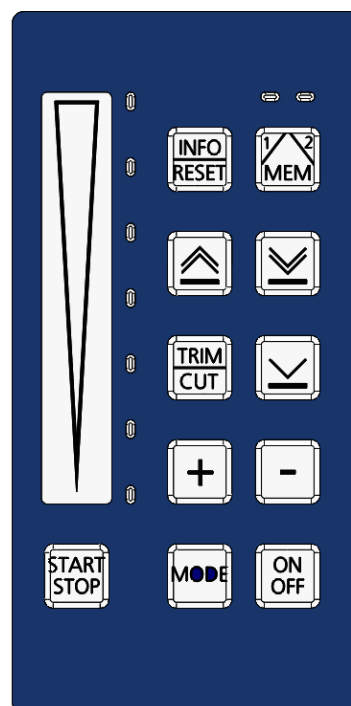
## 7.8 SPECIMEN FEED MEMORY

TN8000 is equipped with a specimen feed memory that stores two independent positions of the specimen. The LED on the upper right of the control panel will indicate which memory position is currently active.

To select the other memory position press  twice quickly.

Press  once to move to the designated memory position.

Press  for two seconds to store the current specimen position to the active memory.



## 7.9 MOTORISED COARSE ADVANCE

Press  to move the specimen towards the knife or blade.

Press  to move the specimen away from the knife or blade.

## 7.10 MOTORISED FINE ADVANCE

Press  to move the specimen slowly towards the knife or blade.

There are four speed settings available, which can be selected by holding the  key while switching on the device:


Mode 1: 75  $\mu\text{m}$  / s

Mode 2: 150  $\mu\text{m}$  / s

Mode 3: 300  $\mu\text{m}$  / s

Mode 4: 600  $\mu\text{m}$  / s

Select the desired mode using the keys  resp. .

Pressing  again will guide you to normal operating mode.

7.11 MANUAL CUTTING

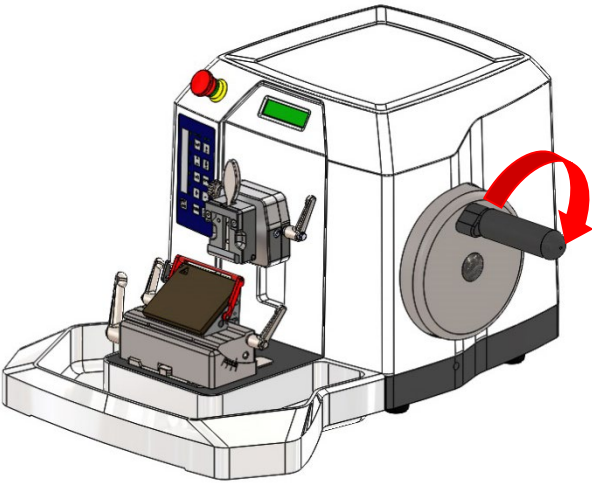
Release hand wheel stop (see chapter 3.1).

Remove the finger guard if necessary.

Turn the handwheel on the right side of the device evenly 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 7.6).






Manual cutting of specimen with TN8000

For trimming of specimen, select the thickness as described in section 7.12 (THICKNESS ADJUSTMENT FOR TRIMMING).

If Trim latching mode is activated, trimming function is activated and deactivated by pressing  once. Activation of the trimming function is displayed as illustrated.

To activate trim latching mode, continuously press  while switching on the device.

If Trim latching mode is deactivated, trimming function is activated by continuously pressing . Activation of trimming function is displayed as illustrated (see fig. on the right). Turn the handwheel evenly clockwise.

To activate rocking mode press  and  simultaneously. For cutting in rocking mode, move the handwheel a short distance back and forth. The cutting window in rocking mode is 30 mm.

30  $\mu$ m      TRIM      R 5  $\mu$

0000 n

Display with activated trimming function




7  $\mu$ m      CUT      R 5  $\mu$

0000 n

Display with deactivated trimming function (Cut mode)

## 7.12 ADJUSTMENT OF TRIMMING

The display indicates the current setting for the trimming mode (e. g. 30 µm in this example).

To change the trimming settings, press  continuously and press  or  to increase or decrease the value. To return to the cutting mode, please press the key again.

30 µm	TRIM	R 5 µ
0000 n		



Default setting for trimming thickness is 20 µm. For trimming a thickness range of 10 to 40 µm is recommended.

## 7.13 ADJUSTMENT OF CUTTING

The display indicates the current setting for the cutting thickness (e. g. 7 µm in this example).


To change the cutting thickness, press  or  to increase or decrease the value.

7 µm	CUT	R 5 µ
0000 n		

## 7.14 ROCKING MODUS






In this mode, the cutting is performed by moving the handwheel up and down from the central position (without doing a 360° turn) for at least approx. 15 mm.


This mode can also be used for trimming the sample.

The mode will be activated and deactivated in the manual mode (motor is off) by pressing . ROCK will be shown in the display.



30 µm	CUT	R 5 µ
0000 n	ROCK	

7.15 ADJUSTMENT OF RETRACTION DURING THE UPWARD MOVEMENT

<p>The display indicates the current setting for the retraction of the specimen upon upward movement (e. g. 5 µm in this example).</p> <p>To change the retraction setting, press  and  at the same time and  or , to increase or decrease the value. The retraction is usually preset to doubled cutting thickness and minimum of 1 µm. This preset can be abandoned by holding  while switching on the device.</p>	<div><div>7 µm                      CUT                      R 5 µ</div><div>0000 n</div></div>
--	---

	<p>Default setting for retraction is 5 µm.</p>
---	--


## 7.16 SECTION COUNTER / SECTION SUM / REMAINING TRAVEL INDICATION

The model TN8000 allows optional display of different parameters in the lower left display area. These are the number of the performed sections, the section sum or the remaining travel.	7 $\mu$ m      CUT      R 5 $\mu$ 0015 n
To change from counting strokes to cuts to the remaining travel or vice versa, simply press  once.	7 $\mu$ m      CUT      R 5 $\mu$ 0105 $\Sigma$
To reset the cutting counter, press  for 2 seconds.	7 $\mu$ m      CUT      R 5 $\mu$ 0000 n
The remaining travel is displayed on the lower left display area. Remaining travel > 1 mm displayed in mm:	7 $\mu$ m      CUT      R 5 $\mu$ R15.1
Remaining travel < 1 mm displayed in $\mu$ m (number flashes):	7 $\mu$ m      CUT      R 5 $\mu$ R.456
When the device is switched on, the object carriage automatically retracts (initialization) until it reaches the rear light barriers. When the rear-end position is reached, "REAR END POS." is displayed in line 2.	7 $\mu$ m      CUT      R 5 $\mu$ REAR END POS.
When the front-end position is reached, "FRONT END POS." is displayed in line 2.	7 $\mu$ m      CUT      R 5 $\mu$ FRONT END POS.

Info: If the remaining travel is < 1 mm, the displayed value starts to flash. If the number of the performed sections or the section sum was previously displayed, the display flashes alternately with the respective value.

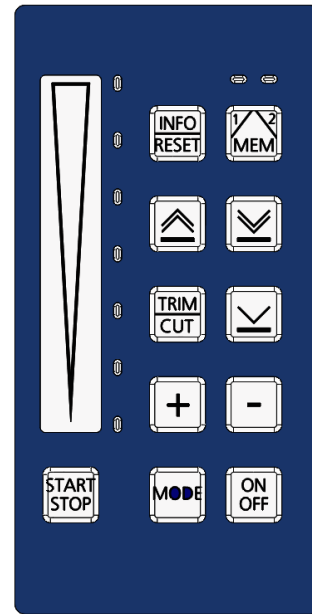
## 7.17 DISPLAY CONTRAST SETTINGS

TN8000 has a digital display. For optimized readability the contrast of the display is adjustable to fit the surrounding circumstances.


Hold  while pressing  once and change the contrast setting with  or .

## 7.18 SETTING OF CUTTING SPEED

The control of the cutting motor is by means of a slider on the left-hand side control panel. LED lights will display the current speed settings. The speed indicated is always the cutting speed (downward stroke), whereas the upward stroke is automatically calculated by the system software. The table below lists the programmable cutting speeds and the related upward speeds.

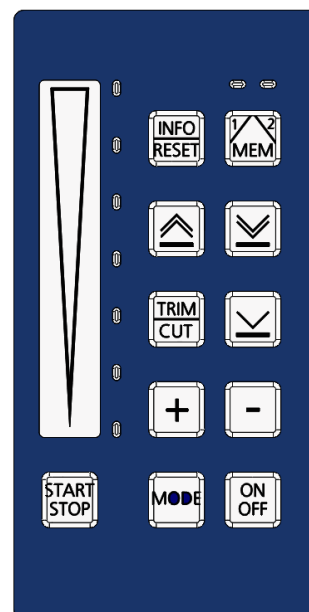






Cutting Speed [mm / s]	Upward Speed [mm / s]	Cutting Speed [mm / s]	Upward Speed [mm / s]
3	75	50	150
5	75	60	180
7	75	80	220
9	75	100	240
12	75	140	280
15	75	180	320
20	75	230	370
25	75	300	400
30	90	400	400
40	120		

For setting of vertical motor speeds, press  to activate the motor.	7 $\mu$ m      CUT      R 5 $\mu$ m 0000 n
The display will indicate the cutting mode and the cutting speed.	7 $\mu$ m      CUT      R 5 $\mu$ m 0000 n      SING      50 mm/s
By movement of the finger on the slider, the cutting speed can be increased (upward) or decreased (downward).	7 $\mu$ m      CUT      R 5 $\mu$ m 0000 n      SING      70 mm/s



## 7.19 SETTING OF TRIMMING SPEED

The control of the cutting motor is by means of a slider on the left-hand side control panel. If the TRIM mode is activated, LED lights will display the current speed settings for this mode. The speed indicated is always the cutting speed (downward stroke), whereas the upward stroke is automatically calculated by the system software. The table in section 7.18 lists the programmable cutting speeds and the related upward speeds.





For setting of vertical motor speeds, press  to activate the motor.	<div> <div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n</div> </div>
The display will indicate the cutting mode and the cutting speed.	<div> <div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      SING      50 mm/s</div> </div>
<p>Activate the TRIM mode by pressing  either continuously or once. The display will show the preset trimming thickness and trimming speed.</p> <p>If trim latching mode is activated, trimming function is activated and deactivated by pressing  once. Activation of the trimming function is displayed as illustrated.</p> <p>To activate trim latching mode, continuously press  while switching on the device.</p>	<div> <div>30 <math>\mu</math>m      TRIM      R 5 <math>\mu</math></div> <div>0000 n      SING      50 mm/s</div> </div>
By movement of the finger on the slider, the trimming speed can be increased (upward) or decreased (downward).	<div> <div>30 <math>\mu</math>m      TRIM      R 5 <math>\mu</math></div> <div>0000 n      SING      140 mm/s</div> </div>

## 7.20 SETTING OF CUTTING MODE

For setting of cutting modes, press  to activate the motor.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n</div>
The display will indicate the cutting mode and the cutting speed.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      SING      50 mm/s</div>
Press  to select the different cutting modes.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      SING      70 mm/s</div>



### Continuous Mode – CONT

In this mode, the cutting motor will be activated by pressing  or use of the foot pedal and will continuously operate until the user presses  again or utilizes the foot pedal. The specimen head will stop at the upper position when stopped.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      CONT      70 mm/s</div>
---	--

### STEP Mode


In this mode, the cutting motor will be activated as long as the foot pedal is activated. After release of the foot pedal the specimen head will stop at the upper position when stopped.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      STEP      70 mm/s</div>
---	--

### Rocking Mode







<p>In this mode, over a quarter of a handwheel be cut and delivered. From the middle position of the handle, the handwheel is like usually turned down. This is cut and delivered. It does not 360° but a joint-friendly and fatigue-free 90° handwheel rotation carried out.</p> <p>This mode can be used to cut and trim the sample. To activate rocking mode, the cutting motor must be inactivated via the ON / OFF button. This can be recognized by the LEDs turning off / on when the power is turned ON / OFF.</p> <p>The button  activates rocking mode and ROCK appears in the display.</p> <p>Use the button  to exit the rocking mode again.</p>	<div>30 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      ROCK</div>
--	--





## Single cut – SING

In this mode, the cutting motor is started by pressing  or by pressing the foot switch and will perform a cutting motion. The sample is stopped in the upper position.	<div>7 <math>\mu</math>m      CUT      R 5 <math>\mu</math></div> <div>0000 n      SING      70 mm/s</div>
---	--



## Window Mode – WIND

In this mode, the cutting motor will be activated by pressing  or activation of the foot switch and will continuously operate until the user presses  or activates the foot switch again. In window mode, the system will cut with the selected cutting speed solely in a predefined section of the downward stroke (see list of window sizes below). This enhances the overall speed of the system, especially when cutting with low speed. To switch from one window size to the other, simultaneously press  and  , then press  and  .	<div>7 <math>\mu</math>m      CUT      W 2</div> <div>0000 n      WIND      70 mm/s</div>
---	---

Window size	Applicable to sample sizes (vertical size)
W1	< 10 mm
W2	< 20 mm
W3	< 30 mm
W4	< 40 mm




	<p>For sample sizes (vertical size) &gt; 40 mm, please use the continuous mode.</p> <p>As long as the motor is activated a manual cutting is not possible.</p>
	<p>Never start the motor with activated handwheel brake as this can lead to damage of the microtome.</p>



## 7.21 PROGRAMMING AUTOMATIC CUTTING



It is possible to preset the number of strokes which should be performed in the modes CONT and WIND. If one of those 2 modes are activated, this presetting will be activated by simultaneously pressing the buttons  and .

7 $\mu\text{m}$	CUT	R 5 $\mu$
P 005		

The preset number of cuts will be shown in the display.

To change the setting, please press and hold  and then press  and .

A preselection can now be made using the keys  and . After activation the motor will perform as much strokes as preselected. The counter counts down to zero. Then the cutting motor will stop automatically and the preselected figure is shown again.

In order to return to the normal cutting mode, simultaneously press  and .

## 7.22 OVERVIEW KEY COMBINATIONS

### 7.22.1 Operation via keyboard(s)

Keyboard shortcuts at power-on (for configuration)	
TRIM/CUT	TRIM/CUT switchover latching / momentary
SLOW	Setting feed rate for SLOW
REV	Retraction limitation on / off
INFO/RESET+MEM	Set all settings to factory defaults

### 7.22.2 Key combinations during operation

TRIM/CUT+SLOW+PLUS	Display service cut counter
MODE+TRIM/CUT+PLUS/MINUS	Window size setting (only in WINDOW mode)
MODE+ON/OFF	Switch Preset / continuous
MODE+PLUS/MINUS	Change Preset count (only if PRESET active)
TRIM/CUT+REV+PLUS/MINUS	Set retraction
TRIM/CUT+FWD+PLUS/MINUS	Set contrast
TRIM/CUT+SLOW	Display version and serial number

### 7.22.3 Short keystrokes

INFO/RESET	Switching between section counter / section sum / remaining travel indication
MEM (1x)	Move to selected memory position (if position still unknown: backwards to stop)
MEM (2x)	Change between memory position 1 and 2 (see LEDs)
TRIM/CUT	TRIM / CUT switchover (if TRIM is momentary)
TRIM/CUT	TRIM is activated, as long as pressed (if latching)
SLOW from V3.15:	Feed by set CUT / TRIM distance
PLUS, MINUS	Change the current cutting value
START/STOP	Start and stop of the drive motor, stop takes place at OT (with CONT / WIND the slider LEDs are switched off after stop actuation, with STEP the drive runs as long as the key is pressed)
MODE	Change CONT / SING / WIND / STEP (motor) or normal / ROCK (manual)
ON/OFF	Switch motor operation / manual operation

### 7.22.4 Long keystrokes

INFO/RESET (2 s)	Reset cut counter
MEM (2 s)	Save current position in active position memory (confirmation: both position LEDs go off)
REV, FWD, SLOW	Direct movement of specimen holder (as long as key is pressed), while SLOW key is pressed fast "typing" can be done with FWD From V3.13: REV first slow, after 2 s fast From V3.15: SLOW only after 300 ms continuous (before jog mode)

### 7.22.5 Display

Line 1:	Cut thickness, CUT / TRIM, retraction (with WIND instead of retraction window size)
Line 2:	Cut counter / total, mode, speed. In line 2 also all error messages are displayed, these replace the normal line content
„--- SERVICE ---“	Service due (2 million strokes) - stops approx. 10 s after switching on
„EMERGENCY STOP“	Emergency stop operated (only TN8000)
„-- H&V Error --“	Failure / error of both pairs of light barriers
„--- H Error ---“	Failure / error of horizontal light barriers
„--- V Error ---“	Failure / error of vertical light barriers
„- Motor Error -“	Error at motor / encoder (no pulses during control) (error is displayed for approx. 10 s, manual operation still possible)
„--- Overload ---“	Drive motor was switched off after overload (10 s display)
„- End Position -“	Specimen grips are in front end position

## 8 EXTERNAL CONTROL PANEL TN8000



Before connecting any electrical units, the device must be switched off.

### 8.1 EXTERNAL CONTROL PANEL TN8000

To provide a more comfortable usage of the microtome the optional external control panels can be used for TN8000. The control panel is equipped with a connection cable to the microtome with a length of 1.80 m so the placement of the control panel can be arranged individually. To connect the control element to the microtome please refer to 3.3 ELECTRICAL CONNECTION. The LED's will light up for approx. 2 seconds after the microtome has been switched on.

Symbols and functions are identical to the control panel located in the housing of the microtome.



External control panel TN8000

## 8.2 FUNCTIONAL OVERVIEW OF USER INTERFACE

Quick Guide – User Interface

### TN8000



Button		Function
	<b>press once</b> = change display from counting strokes to cuts to the remaining travel	INFO / RESET
	<b>hold for 2 seconds</b> = reset the cutting counter to 0	INFO / RESET
	<b>press once</b> = move to selected memory position <b>press twice</b> = change between memory position 1 and 2 <b>hold for 2 seconds</b> = save current position	MEM
	<b>hold</b> = direct movement of specimen towards blade / knife	FWD
	<b>press once</b> = feed by set distance (jog mode) <b>hold</b> = after 300 ms continuous movement	SLOW
	<b>press once</b> = retraction (5 $\mu$ standard setting) <b>hold</b> = fast retraction after 2 s	REV
	<b>press once</b> = switch between TRIM / CUT mode	TRIM / CUT
	<b>press once</b> = change the current cutting value - 0.5 - 100 $\mu$ m (CUT mode) - 0.5 - 300 $\mu$ m (TRIM mode)	PLUS / MINUS

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Quick Guide – User Interface

### TN8000



Button		Function
<b>hold</b> <b>press once</b> <b>set retraction</b> from 0 - 200 $\mu$ m		TRIM / CUT + REV + PLUS / MINUS
<b>hold</b> <b>press once</b> <b>set contrast</b> (display)		TRIM / CUT + FWD + PLUS / MINUS
<b>press once</b> = activation / deactivation of the drive motor		ON / OFF
<b>press once</b> = start and stop of the drive motor		START / STOP
<b>press once</b> = change cutting mode between CONT (continuous) / SING (single) / WIND (window) / STEP (motor) resp. normal / ROCK (manual)		MODE
<b>hold</b> <b>press once</b> <b>window size setting</b> (4 sizes, only in WIND mode)		MODE + TRIM / CUT + PLUS / MINUS
	Setting the cutting speed	SLIDER

Please note:

This is a Quick Guide to have the most important commands at hand. For detailed information on how to operate the microtome, please read the user manual.


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## 9 CLEANING AND MAINTENANCE

### 9.1 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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### 9.2 RECOMMENDED MAINTENANCE AND SERVICE SCHEDULE

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

## 10 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.



## 11 OPTIONAL ACCESSORIES

aquatec system	#10090056
MTR Bench top quick-freezing unit	#10110000
Magnifier with illumination	#10090060
External control panel TN8000	#10090051
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	

## **12 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 warrant-ed.

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.

## **13 DISPOSAL**

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

Notes

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