

Instructions for Use

# Leica SM2010 R

Sliding Microtome



CE

## Instructions for Use

Leica SM2010 R, V 1.4 RevC – 09/2013, English

**Order No.:** 14 0508 80101 RevC

Always keep this manual with the instrument.

Read carefully before working with the instrument.



## NOTE

---

The information, numerical data, notes and value judgments contained in this manual represent the current state of scientific knowledge and state-of-the-art technology as we understand it following thorough investigation in this field.

We are under no obligation to update the present manual periodically and on an ongoing basis according to the latest technical developments, nor to provide our customers with additional copies, updates etc. of this manual.

To the extent permitted in accordance with the national legal system as applicable in each individual case, we shall not be held liable for erroneous statements, drawings, technical illustrations etc. contained in this manual. In particular, no liability whatsoever is accepted for any financial loss or consequential damage caused by or related to compliance with statements or other information in this manual.

Statements, drawings, illustrations and other information as regards contents or technical details of the present Instructions for Use are not to be considered as warranted characteristics of our products.

These are determined only by the contract provisions agreed between ourselves and our customers.

Leica reserves the right to change technical specifications as well as manufacturing processes without prior notice. Only in this way is it possible to continuously improve the technology and manufacturing techniques used in our products. This document is protected under copyright laws. All copyrights to this documentation are held by Leica Biosystems Nussloch GmbH.

Any reproduction of text and illustrations (or of any parts thereof) by means of print, photocopy, microfiche, web cam or other methods – including any electronic systems and media – requires express prior permission in writing by Leica Biosystems Nussloch GmbH.

For the instrument serial number and year of manufacture, please refer to the name plate at the rear of the instrument.

© Leica Biosystems Nussloch GmbH



Leica Biosystems Nussloch GmbH  
Heidelberger Str. 17 - 19  
D -69226 Nussloch  
Germany

Phone: +49 6224 143-0

Fax: +49 6224 143-268

Internet: <http://www.LeicaBiosystems.com>

Assembly contracted to Leica Microsystems Ltd. Shanghai

## Table of contents


---

<b>1.</b>	<b>Important Information</b> .....	<b>3</b>
<b>2.</b>	<b>Safety</b> .....	<b>4</b>
2.1	Safety notes .....	4
2.2	Warnings .....	4
<b>3.</b>	<b>Instrument Components and Specifications</b> .....	<b>7</b>
3.1	Overview - instrument components .....	7
3.2	Technical data .....	8
<b>4.</b>	<b>Instrument Setup</b> .....	<b>10</b>
4.1	Standard delivery .....	10
4.2	Site requirements .....	10
4.3	Unpacking.....	11
4.4	Setup .....	11
4.5	Assembling the knife holder SN .....	13
4.6	Assembling the blade holder SE.....	16
<b>5.</b>	<b>Operation</b> .....	<b>21</b>
5.1	Operating elements and their functions .....	21
5.1.1	Section thickness setting.....	21
5.1.2	Coarse driving wheel.....	21
5.1.3	Manual feed .....	22
5.1.4	Automatic feed .....	22
5.1.5	Directional fixture for specimen clamps .....	23
5.2	Clamping the specimen in the universal cassette clamp (UCC).....	24
5.3	Clamping a disposable blade .....	25
5.4	Replacing the pressure plate .....	26
5.5	Inserting the knife .....	27
5.6	Sectioning.....	28
5.7	Changing the specimen or interrupting sectioning .....	29
<b>6.</b>	<b>Cleaning and maintenance</b> .....	<b>30</b>
6.1	Cleaning the instrument .....	30
<b>7.</b>	<b>Optional accessories</b> .....	<b>32</b>
<b>8.</b>	<b>Troubleshooting</b> .....	<b>39</b>
8.1	Possible faults.....	39
8.2	Instrument malfunctions .....	39
<b>9.</b>	<b>Warranty and Service</b> .....	<b>40</b>
<b>10.</b>	<b>Notes</b> .....	<b>41</b>
<b>11.</b>	<b>Decontamination Certificate (Master)</b> .....	<b>42</b>



## Symbols in the text and their meanings



Warnings appear in a gray box and are marked by a warning triangle .



Notes, i.e. important user information appears in a gray box and is marked by an information symbol .

(5)

Numbers in parentheses refer to item numbers in illustrations.



Manufacturer



Date of Manufacture



This product fulfills the requirements of the Council's Directive 98/79/EC concerning in vitro diagnostics (IVD) medical devices.



In vitro diagnostics (IVD) medical device



Observe the Instructions for Use



Order No.



Serial number

## Qualification of personnel

- The Leica SM2010 R may be operated by trained laboratory personnel only.

- All laboratory personnel designated to operate the Leica instrument must read these Instructions for Use carefully and must be familiar with all technical features of the instrument before attempting to operate it.

## Intended use of instrument

The Leica SM2010 R is a manually operated sliding microtome for creating thin sections of specimens of varying hardness for use in routine and research laboratories in the fields of biology, medicine and industry.

It is designed for sectioning soft paraffin specimens as well as harder specimens, as long as they are suitable for being cut manually.

**Any other use of the instrument is considered improper!**

## Instrument type

All information provided in these Instructions for Use applies only to the instrument type indicated on the title page. A nameplate indicating the instrument serial number is attached to the rear side of the instrument. The figure below is provided as an example only and shows a valid nameplate for this instrument.

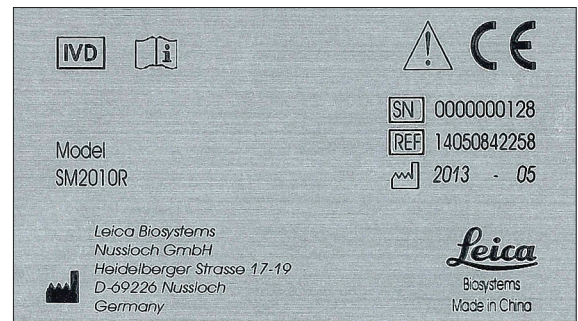


Fig. 1

## 2. Safety

---



**Be sure to comply with the safety instructions and warnings provided in this chapter. Be sure to read these instructions, even if you are already familiar with the operation and use of other Leica products.**

### 2.1 Safety notes

These Instructions for Use include important information related to the operating safety and maintenance of the instrument.

The instruction manual is an important part of the product, which must be read carefully prior to Instrument Setup and use and must always be kept near the instrument.

This instrument has been built and tested in accordance with the Machinery Directive 2006/42/EC, and the safety regulations governing laboratory apparatus.

To maintain this condition and ensure safe operation, the user must observe all notes and warnings contained in these Instructions for Use.



**These Instructions for Use must be appropriately supplemented as required by the existing regulations on accident prevention and environmental safety in the operator's country.**



**The current EC Declarations of Conformity can be found on the Internet:**

<http://www.LeicaBiosystems.com>



**The protective devices on both instrument and accessories may neither be removed nor modified. Only service personnel qualified by Leica may repair the instrument and access the instrument's internal components.**

### 2.2 Warnings

The safety devices installed in this instrument by the manufacturer only constitute the basis for accident prevention. Primarily responsible for accident-free operation is above all the owner of the instrument and, in addition, the designated personnel who operates, services or cleans the instrument.

To ensure trouble-free operation of the instrument, make sure to comply with the following instructions and warnings.

### Warnings - Safety instructions / warning labels attached to the instrument



- Safety notes on the instrument itself, which are marked with a warning triangle, indicate that the correct operating instructions (as defined in these Instructions for Use) must be followed when operating or replacing the item marked. Failure to adhere to these instructions may result in an accident, personal injury, damage to the instrument or accessory equipment.

### Warnings - Transport and installation



- Once unpacked, the instrument may be transported only in an upright position.
- Before transporting the instrument, the knife sledge must be locked with the locking knob (23, Fig. 2)!
- Do not transport the instrument by holding it by the knife sledge, coarse driving wheel or the knob for setting the section thickness.

### Warnings - Working at the instrument



- Be very careful when handling microtome knives or blades. The cutting edge is extremely sharp and can cause serious injuries!
- Always wear work safety shoes and safety gloves!
- Never place a knife anywhere with the cutting edge facing upwards and never try to catch a falling knife! Always put the knives back into the knife case when not in use!
- Always clamp the specimen block **BEFORE** clamping the knife.
- Lock the knife sledge and cover the knife edge with the knife guard prior to any manipulation of knife/blade or specimen, prior to changing the specimen block and during all work breaks.
- Always wear protective glasses and a mask when sectioning brittle specimens!
- Risk of splintering!

### Warnings - Cleaning and maintenance



- Before each cleaning, remove the knife or disposable blade!
- Do not use solvents that contain acetone or xylene!
- Ensure that liquids do not enter the interior of the instrument during cleaning!
- When using cleaners, please comply with the safety instructions of the manufacturer and the laboratory safety regulations!

## 2. Safety

### 2.3 Integrated safety devices

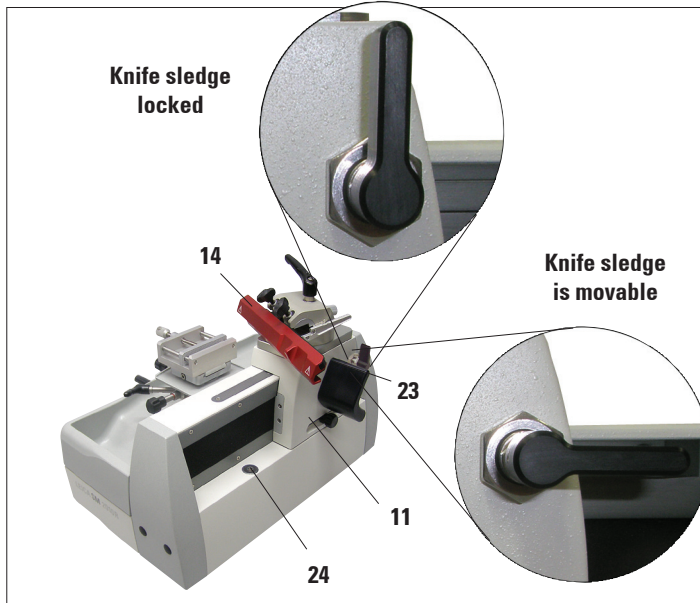


Fig. 2

#### Knife guard on the blade holder

The blade holder is equipped with a tightly mounted knife guard (14). This makes it possible to cover completely the cutting edge of the blade (Fig. 3).

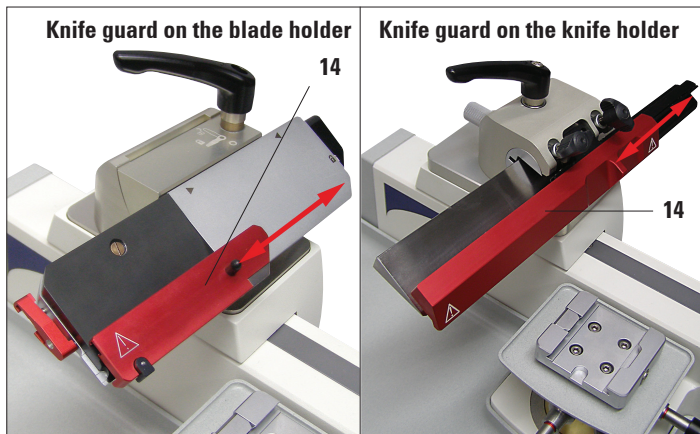


Fig. 3

The instrument is equipped with the following safety devices:

- Knife guard (14) on the blade/knife holder.
- Knife sledge locking knob (23) for the knife sledge.

#### Knife sledge locking knob

The knife sledge is locked in place using the locking knob (23) that engages in the notch points on the bar (24), thus holding the knife sledge securely. The bar has 11 notch points, with a distance of 10 mm between each.



**Prior to changing the specimen or knife and before transporting the instrument, lock the knife sledge (11) using the locking knob (23).**



**Prior to any manipulation of the knife or specimen, and each change of specimen, and during breaks, always cover the cutting edge of the blade/knife with the knife guard (14)!**

**Caution!**

**When the knife guard is pushed over the blade, do not reach into the blade from below!**

### 3. Instrument Components and Specifications

#### 3.1 Overview - instrument components

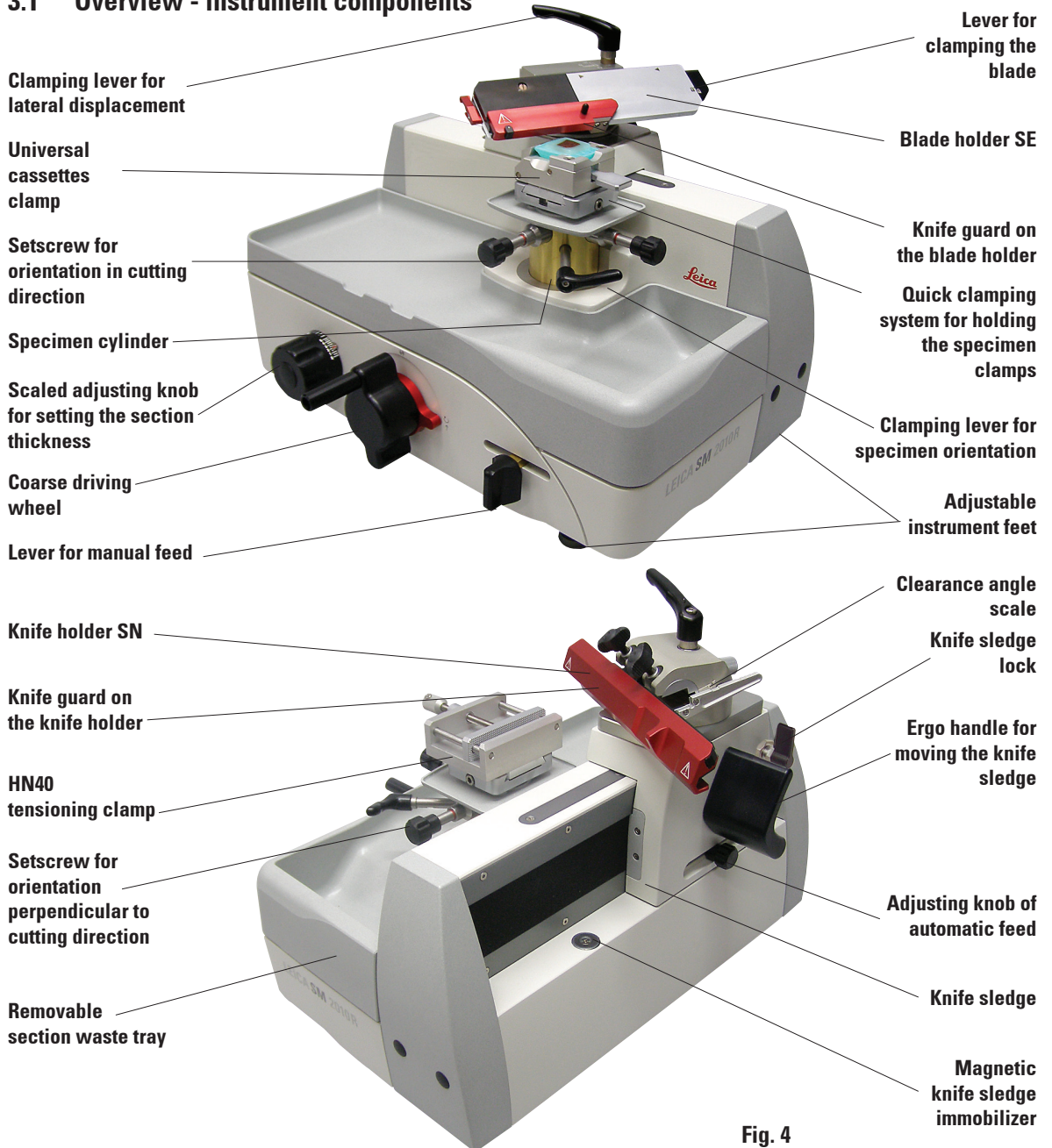


Fig. 4

### 3. Instrument components and specifications

---

#### 3.2 Technical data

##### General

Approvals:	The instrument-specific marks are located on the name plate.
Operating temperature range:	10 °C to +40 °C
Relative humidity:	max. 80% non-condensing
Operating temperature range during storage:	+ 5 °C to +55 °C
Storage humidity:	< 80 %

##### Microtome

Section thickness range:	0.5 - 60.0 µm
Section thickness settings:	from 0.5 - 5.0 µm in 0.5 µm increments from 5.0 - 10.0 µm in 1.0 µm increments from 10.0 - 20.0 µm in 2.0 µm increments from 20.0 - 60.0 µm in 5.0 µm increments
Automatic specimen feed:	from 0 to 30 µm
Total specimen stroke:	approx. 50 mm
Clearance angle adjustment:	-3° to 10°
Maximum specimen size:	50 x 60 x 40 mm
Specimen orientation in cutting direction:	± 8°
perpendicular to cutting direction:	± 8°
Declination:	0° - 45° in cutting direction

##### Dimensions and weight

Width (with coarse driving wheel and Ergo handle):	390 mm
Width (base plate):	256 mm
Depth:	430 mm
Height (total):	343 mm (with blade holder)
Working height (knife blade):	255 mm (measured from the table)
Weight (without accessories):	Approx. 20 kg

### 3.3 Instrument specifications

- The Leica SM2010 R is a manually operated sliding microtome, designed as a low-maintenance tabletop instrument with roller-guided knife sledges and automatic section thickness feed.
- Stable, torsion-free basic design with micrometer feed system in a closed housing, protected from ingress of paraffin waste.
- The vertical cross roller bearings have a cover which provides reliable protection from ingress of section waste.
- The instrument has an ergonomically optimized specimen head position; the smooth-running knife sledge can be securely locked in 10 mm increments.
- Precise 8° XY orientation with defined zero position.
- Individually adjustable Ergo handle for easily moving the sledge.
- The sectioning window can be adjusted to the specimen size.
- The cutting thickness can be adjusted within the range of 0.5 µm to 60 µm; the automatic feed functions in the range of 0.5 µm to 30 µm.
- Manual feed by pulling or pushing the feed lever.
- Depending on the version, the instrument is either fitted with a blade holder SE for disposable blades or a knife holder SN for conventional knives. The blade holder and knife holder each have an integrated knife guard. In the knife holder SN a blade rail can also be inserted for holding disposable blades.
- The knife or disposable blade holder does not need to be removed for the clearance angle adjustment.
- The smooth-turning, coarse driving wheel can be chosen with clockwise or counterclockwise rotation.
- Different specimen clamps can be inserted in the quick clamping system.
- The instrument has an antistatic waste tray for holding a large volume.



## 4. Instrument Setup

---

### 4.1 Standard delivery

The Leica SM2010 R standard delivery includes:

1 Leica SM2010 R basic instrument.....	14 0508 42258
1 section waste tray.....	14 0508 42328
1 tool set consisting of.....	14 0508 42983
1 Allen key size 6.....	14 0194 43634
1 Allen key with handle, size 4.....	14 0194 04782
1 Allen key T 25.....	14 0194 45250
1 open-end wrench, size 10.....	14 0330 04158
1 spare magnet.....	14 0508 44762
1 dust protection cover.....	14 0212 18961
1 pair of safety gloves, size S.....	14 0340 40859
1 Instructions for Use.....	14 0508 80101
1 language CD.....	14 0500 80200



**The accessories ordered are included in a separate box. Carefully check the delivery against the packing list and the delivery note. Should you find any discrepancies, please contact your Leica sales office without delay.**

### 4.2 Site requirements

- Stable, vibration-free laboratory table with horizontal, flat table top, as far as possible vibration-free ground.
- No other instruments nearby which might cause vibrations.
- Room temperature consistently between + 10 °C and + 40 °C.
- Free access to coarse driving wheel and knife sledge.
- The instrument is suitable for operation in enclosed rooms only.



### 4.3 Unpacking



First check the shipment for external damages upon arrival. If it is evident that the shipment was damaged during transport, please make a claim to the carrier immediately.

- Open the packaging.
- Remove all foam material.
- Take out all accessories and the instruction manual.

### 4.4 Setup

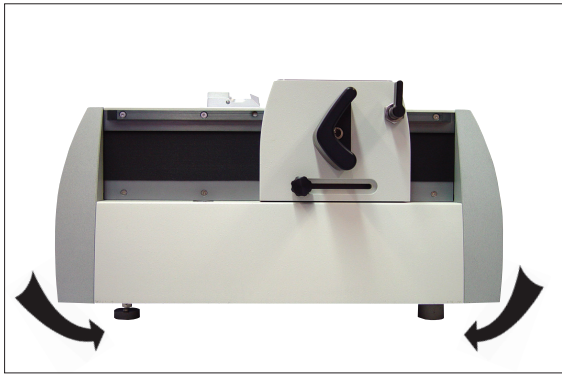


Fig. 5



Do not transport the instrument by holding it by moving parts, on the knife sledge, coarse driving wheel or the knob for setting the section thickness.

- To lift the instrument from the box, hold it on the left and right of the housing (Fig. 5), lift it out of the foam cushion of the package and place it on a stable lab table.
- Remove all adhesive tape used as transport anchors.

#### Loosening the transport locking screw of the knife sledge



The locking knob (23) secures the knife sledge during transport. In daily operation, it is also used to lock the knife sledge in place.

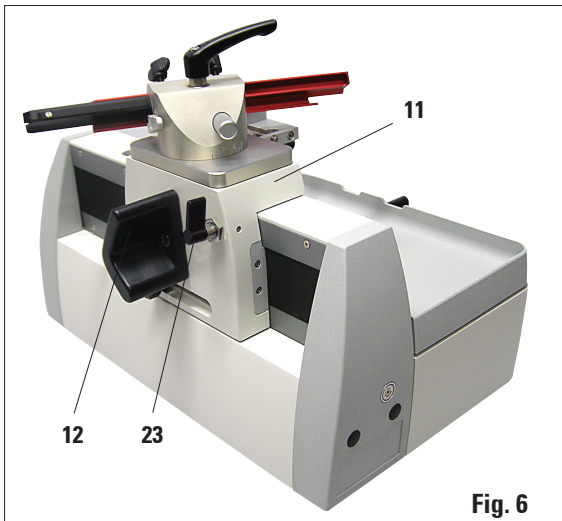


Fig. 6

## 4. Instrument Setup

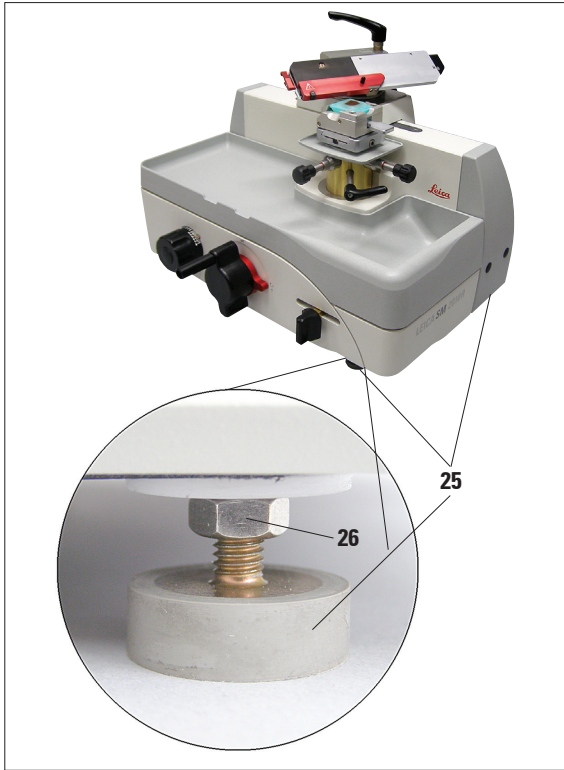


Fig. 7

### Horizontal alignment

For safe and accurate work, it is important that all instrument feet are in uniform contact with the installation surfaces.

The microtome is horizontally aligned at the factory. If a completely level or horizontal surface is not available at the installation site, the instrument must be realigned.

To do so, the two instrument feet (25) on the right side of the instrument are height-adjustable.

- For alignment, loosen the locknuts (26) using a size 10 open-end wrench.
- Adjust the instrument feet (25) until the microtome is in a stable position at the installation location according to requirements.
- Retighten the locknuts.

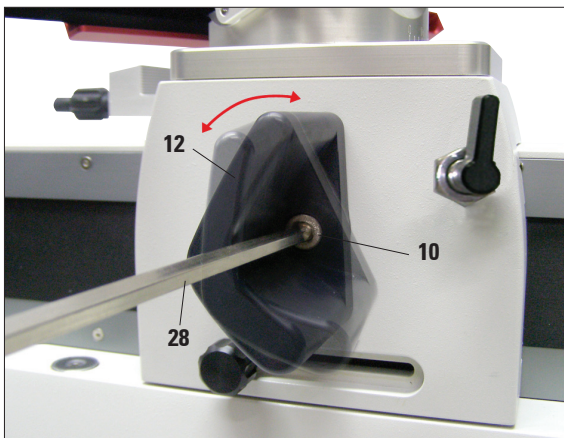


Fig. 8

### Setting the Ergo handle

The Ergo handle (12), which is used to move the knife sledge, can be set individually to an ergonomic gripping position.

- To do this, loosen the fastening screw (10) using a size 6 Allen key (28).
- Turn the handle (12) to the desired position and retighten the screw (10).

### 4.5 Assembling the knife holder SN

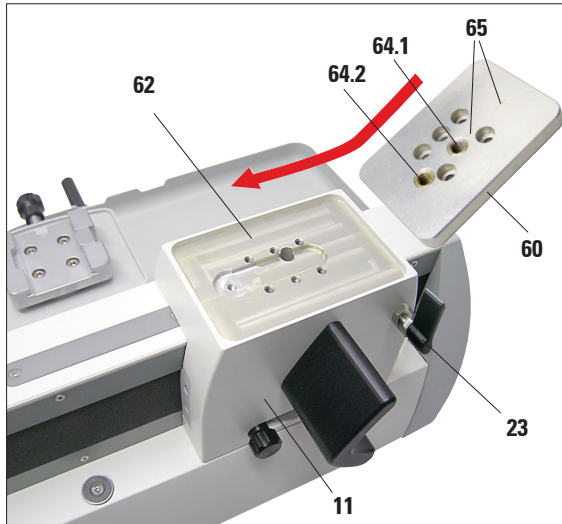


Fig. 9

#### Installing the intermediate plate

- Lock the knife sledge (11) in place using the locking knob (23) so that it cannot be moved.
- The intermediate plate (60) intended for the knife holder SN, is mounted on the mounting table (62) of the knife sledge (11).



#### Important!

The mounting table must be absolutely clean and dry. There must not be any foreign particles on it. Otherwise, sections could become contaminated.

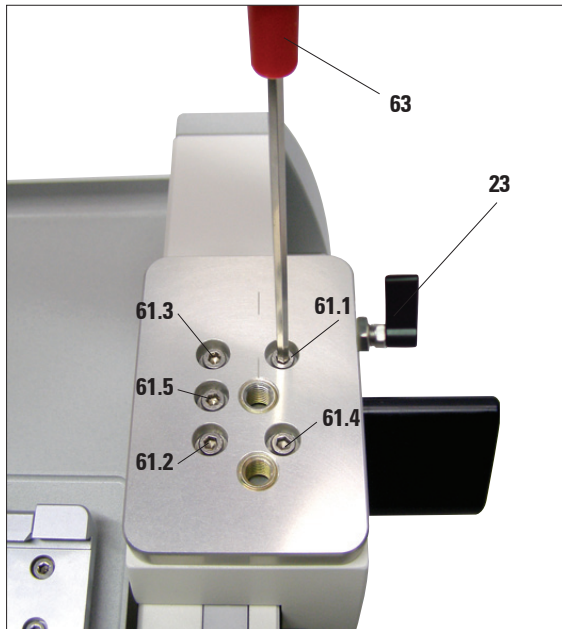


Fig. 10

- As shown in Fig. 9, place the intermediate plate on the mounting table. Make sure that the two index markings (65) are at the top and point towards the back.
- Insert the five countersunk screws (61.1–61.5) into the bores and tighten them crosswise (in the sequence shown in Fig. 10) using an Allen key T25 (63).

## 4. Instrument Setup

### Assembling the knife holder SN (continued)

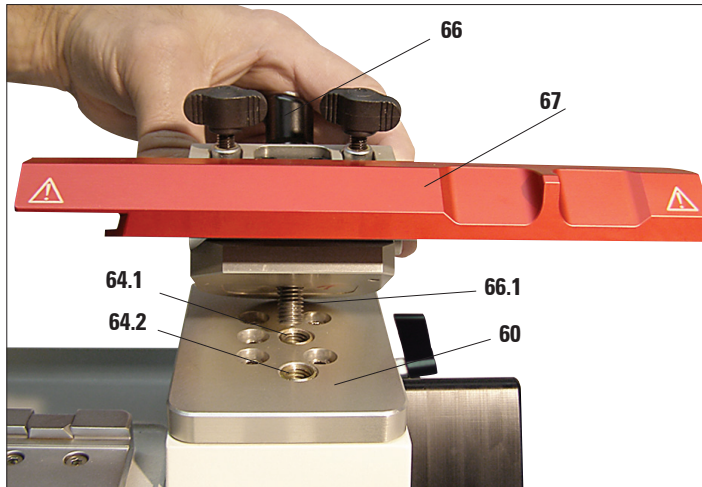


Fig. 11

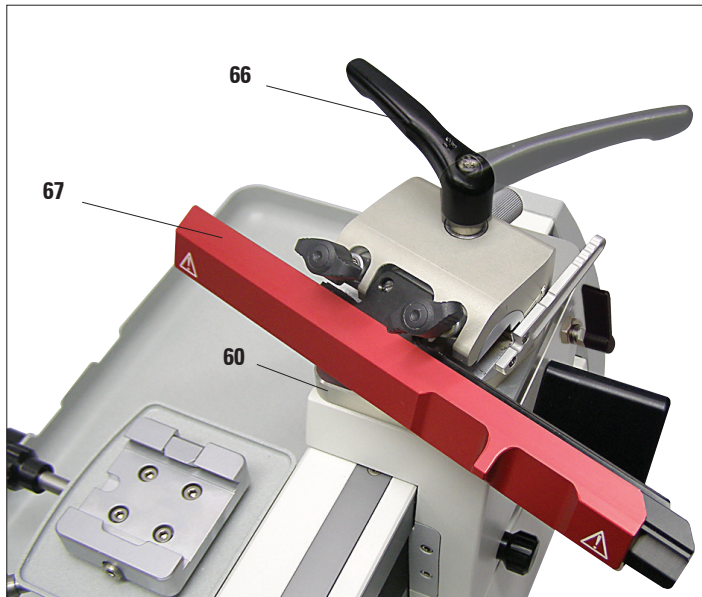


Fig. 12

### Fastening the knife holder



The knife holder SN (67) has two bores (64) and thus two different mounting positions for different sectioning requirements.

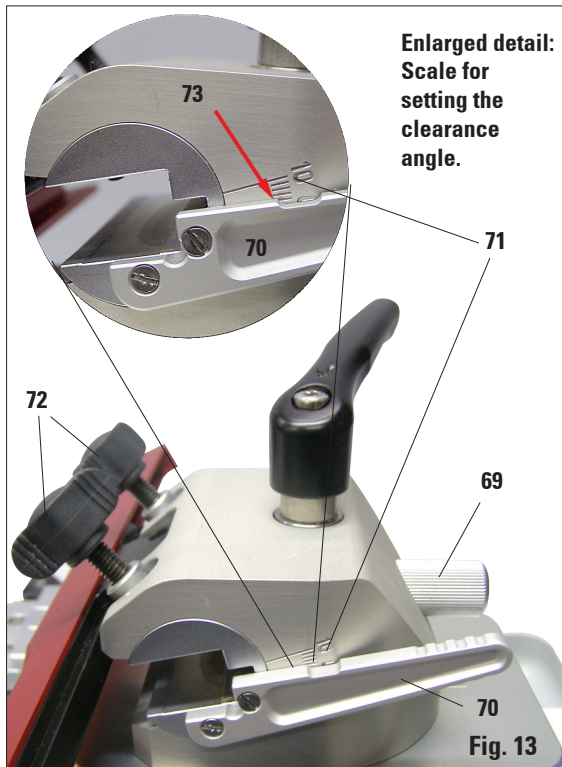
- Press the clamping lever (66) of the knife holder (67) downwards and screw the bottom of the thread (66.1) into one of the two bores (64.1) or (64.2, Fig. 11) of the intermediate plate (60).
- Continue turning the clamping lever (66) in a clockwise direction until the knife holder is firmly screwed on (Fig. 12).



The clamping lever (66) has a plastic handle that can be turned into whatever position is best. To do so, pull the handle upwards and turn it into the desired position (Fig. 12). It will then lock automatically when released.



### Assembling the knife holder SN (continued)

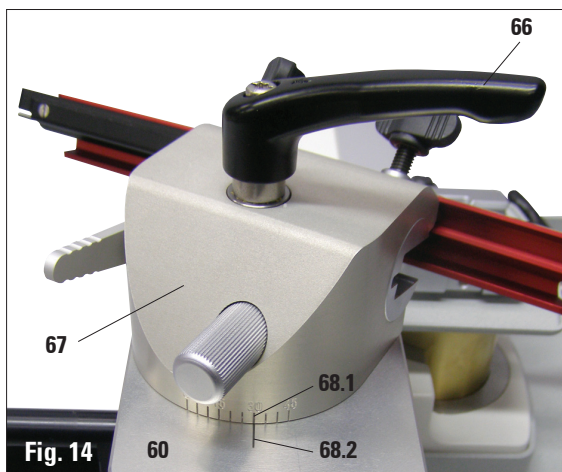


#### Setting the clearance angle (Fig. 13)

- Unscrew the knurled head screw (69).
- Set the required angle with the adjusting lever (70) using the scale for the clearance angle (71). The upper edge (73, red arrow in Fig. 13) of the lever (70) has to align with the index mark of the selected degree value.
- To fix the setting in place, retighten the knurled screw (69).

The clearance angle can also be adjusted if a knife is clamped.

- To do this, slightly unscrew the two clamping screws for the knife (72) and, if necessary, also the knurled head screw (69).
- Set the desired angle as described above.
- To fix the setting in place, retighten the knurled screw (69).



#### Inclination (declination) of the knife holder SN

- Loosen the clamping lever (66).
- Set the required declination (inclination of the knife holder from the cutting direction) on the scale (55.1) at the back of the knife holder (67).
- On the intermediate plate (60) there is an index mark (68.2) which serves as a point of reference for the scale division when adjusting the declination.
- For fixation, tighten the clamping lever (66) firmly in the required position.

## 4. Instrument Setup

### 4.6 Assembling the blade holder SE

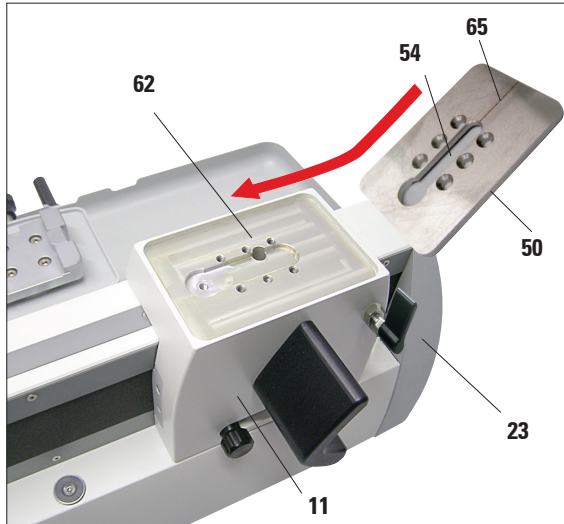


Fig. 15

The blade holder SE is designed for conventional disposable blades from all common manufacturers.

It is available in two models: one for low-profile blades and one for high-profile blades.

The blade holder SE has a lateral movement, so that the entire width of the blade can be used.

#### Mounting the grooved plate

- Lock the knife sledge (11) in place using the locking knob (23) so that it cannot be moved.
- The grooved plate (50), which is intended for the blade holder SE, is mounted on the mounting table (62) of the knife sledge (11).

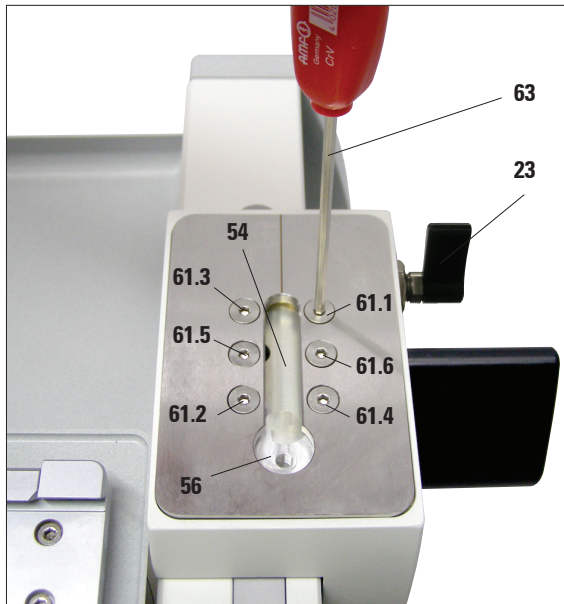


Fig. 16

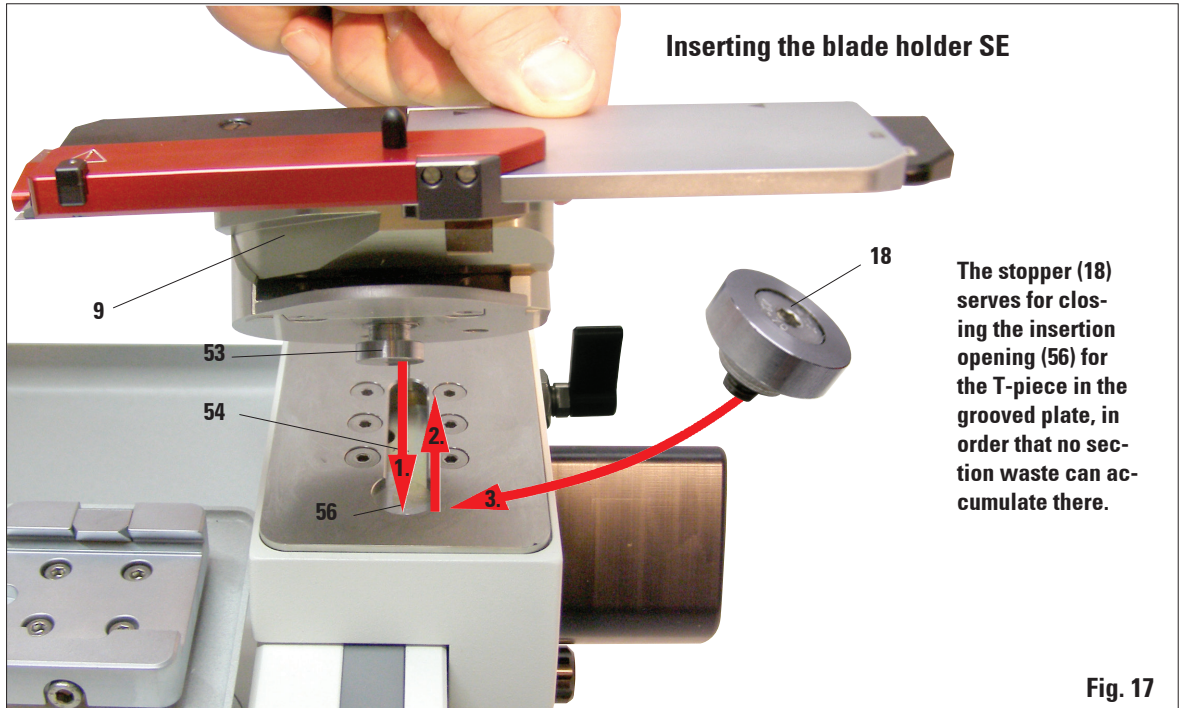


#### Important!

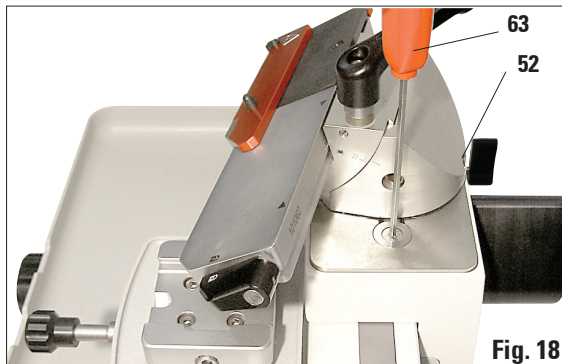
The mounting table must be absolutely clean and dry. There must not be any foreign particles on it. Otherwise, sections could become contaminated.

- As shown in Fig. 15, place the grooved plate on the mounting table. Make sure that the groove (54) for inserting the blade holder has the rounded opening (56) for the T-piece (Fig. 16) pointing forward.
- Insert the six countersunk screws (61.1–61.6) into the bores and tighten them crosswise (in the sequence shown in Fig. 16) using an Allen key T 25 (63).

### Assembling the blade holder SE (continued)



- Mount the blade holder (9) on the grooved plate (50) such that the T-piece (53) on the underside is inserted in the groove (54).
- Push the blade holder fully to the back such that the T-piece can be inserted in the round insertion opening (56).
- Then turn the blade holder (9) approx. 90° (Fig. 18), insert the stopper (18) that closes the insertion opening (56), and tighten it using the Allen key T25 (63).
- To clamp the blade holder on the grooved plate, tighten the screw (52) on the back of the blade holder base (17) using a size 6 Allen key (Fig. 19).



## 4. Instrument Setup

### Assembling the blade holder SE (continued)

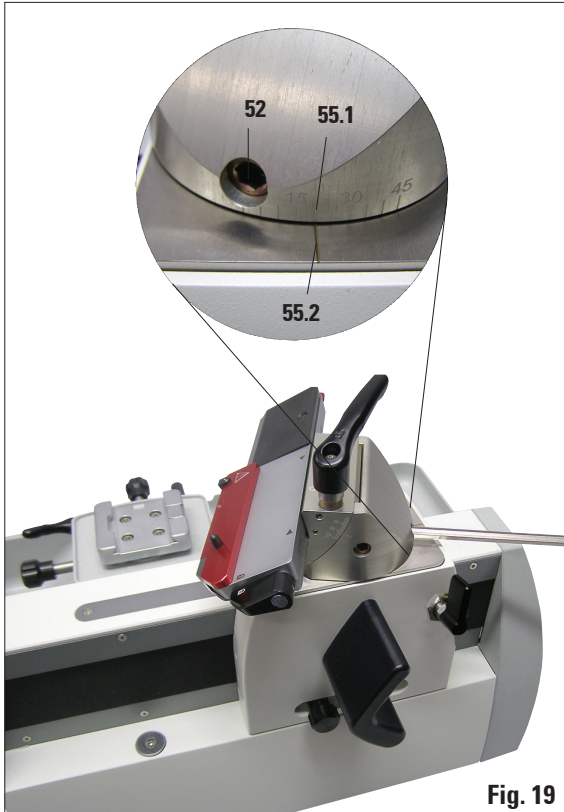


Fig. 19

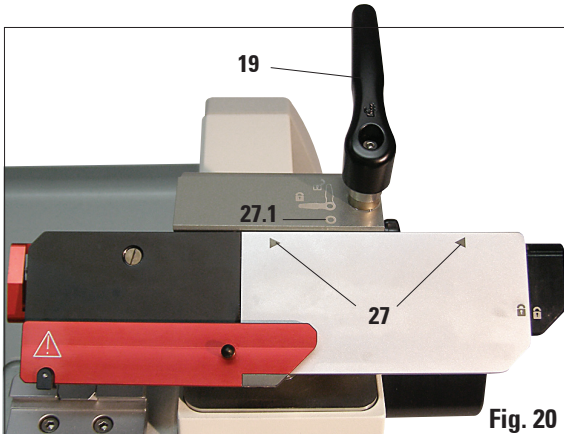


Fig. 20

### Inclination (declination) of the blade holder SE

- Unscrew the Allen screw (52) at the back of the blade-holder base using an Allen key SW 6.
- Turn the blade holder to the required position.
- Set the required declination (inclination of the blade holder to the cutting direction) on the scale (55.1) at the back of the blade holder (67).
- On the grooved plate (60) there is an index mark (55.2) which serves as a point of reference for the scale division when adjusting the declination.
- For fixation, tighten the screw (52) firmly in the required position.

### Lateral movement

The lateral displacement feature enables the entire cutting length of the blade to be used without having to readjust the blade holder.

- To move the blade rail, turn the clamping lever of the lateral displacement mechanism (19) on the segment arc to the right into the "open" position.
- Now the blade runner (20) can be moved laterally. To clamp, turn the lever (19) back to the left.

The two triangular marks (27) indicate the area in which the blade rail can be moved laterally, relative to the circular mark (27.1).



### Assembling the blade holder SE (continued)

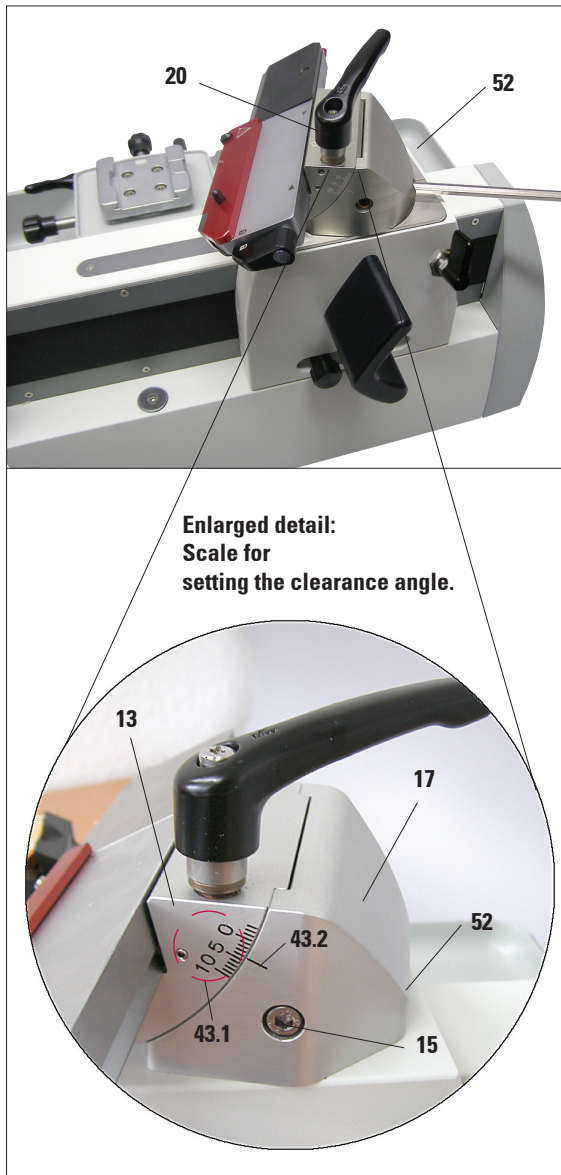


Fig. 21

### Adjusting the clearance angle and declination



#### Caution!

Always remove the blade before adjusting the clearance angle. The knife guard does not provide any protection if you reach into the blade from below (around the blade holder).

- The index marks (0° to 10°) for adjusting the clearance angle (43.1) are on the right side of the segment arc (13).
- There is also an index mark (17) on the right side of the knife holder basis (43.2) which serves as a reference point when adjusting the clearance angle.
- Loosen the screw (15) using a size 4 Allen key until the segment arc (13) can be moved.
- Using the blade holder, move the segment arc until the index mark coincides with that of the desired setting.

Example:

Enlarged detail showing a clearance angle setting of 4°.

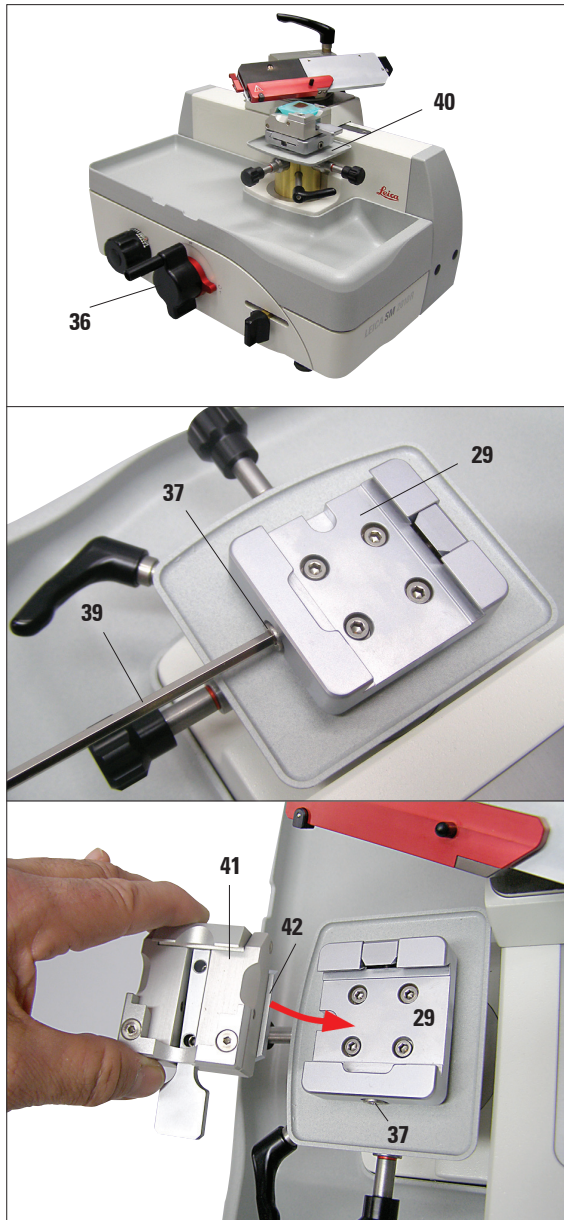


The recommended clearance angle setting for the blade holder is approx. 4°.

- Hold down the blade holder in this position and retighten the screw (15) for clamping.

## 4. Instrument Setup

### 4.6 Inserting the universal cassette clamp



The object orientation allows for simple position correction of the specimen surface when the specimen is clamped into place.

You can use the quick clamping system (29) to hold all the available accessory specimen clamps (for more information, see [Chapter 7 "Optional Accessories"](#)).

To do so, proceed as follows:

- Move the object head (40) to the lower end position by turning the coarse driving wheel (36).
- To loosen the clamping system, turn the screw (37) of the quick clamping system (29) counterclockwise using a size 4 Allen key (39).
- Push the guide (42) of the universal cassette clamp (41) from the left into the quick clamping system (29) as far as it will go.
- To clamp the cassette clamp, turn the screw (37) clockwise as far as it will go using the size 4 Allen key.



Since all stage clamps available as accessories are equipped with the same kind of guide on the back, they are inserted in the same way as described here using the example of the universal cassette clamp.

Fig. 22

## 5.1 Operating elements and their functions

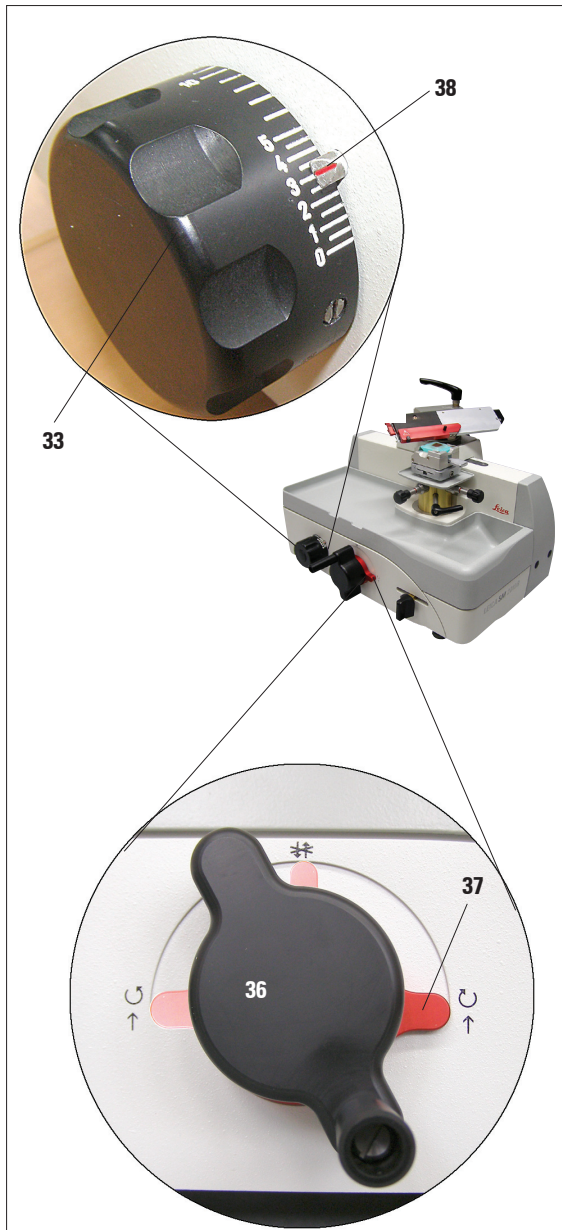


Fig. 23

### 5.1.1 Section thickness setting

The section thickness is set by turning the adjusting knob (33) on the left side of the microtome. The scaled knob has a notch for each value that can be set.

Setting range: 0.5 - 60  $\mu\text{m}$

from 0.5 - 5.0  $\mu\text{m}$  in 0.5  $\mu\text{m}$  increments

from 5.0 - 10.0  $\mu\text{m}$  in 1.0  $\mu\text{m}$  increments

from 10.0 - 20.0  $\mu\text{m}$  in 2.0  $\mu\text{m}$  increments

from 20.0 - 60.0  $\mu\text{m}$  in 5.0  $\mu\text{m}$  increments


The selected section thickness (on the scale) must agree with the red pointer (38).


### 5.1.2 Coarse driving wheel


The coarse feed serves for fast vertical upward movement of the object (towards the knife) and downward movement (away from the knife).

The coarse driving wheel (36) has a direction selection lever (37) with which you can select the direction of rotation "upwards" (feed movement of the specimen towards the knife).

Position of the direction selection lever for feed motion:

 Turning in a clockwise direction moves the specimen towards the knife.

 Turning in a counter clockwise direction moves the specimen towards the knife.

 Neutral:  
Turning the coarse driving wheel does not result in a feed motion. The coarse driving wheel does not turn as well during sectioning.

## 5. Operation

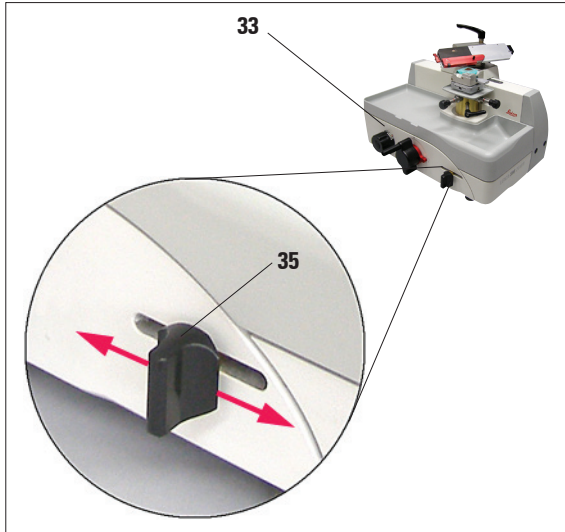


Fig. 24

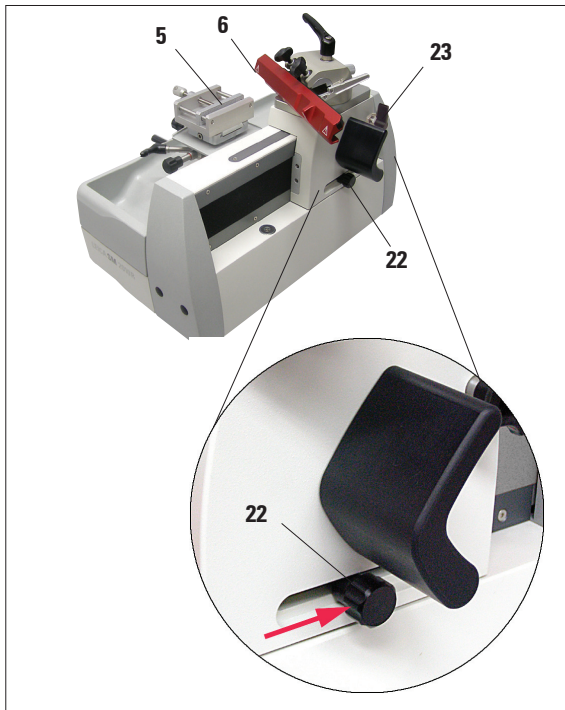


Fig. 25

### 5.1.3 Manual feed

The lever (35) for the manual feed is at the front right of the instrument.

- Each time the lever is pushed or pulled, this causes a feed motion for trimming or sectioning by the value set on the scaled adjusting knob (33).

### 5.1.4 Automatic feed

The position of the adjusting knob (22) determines the point of the knife sledge movement where the automatic feed takes place.

It should take place immediately in front of the specimen.



**The automatic feed is only effective up to a section thickness of 30 µm. All values set beyond that are not defined.**

- To adjust the automatic feed, move the blade/knife (6) until it is just in front of the specimen (5) (Fig. 25) and lock it in this position using the locking knob (23).
- Loosen the adjusting button (22) and push it back until you can feel resistance. Retighten it in this position.
- For exact work with the automatic feed, the knife sledge must be moved past the position of the adjusting knob.



**If the adjusting button (22) is locked in the frontmost (left) position (Fig. 25), there is no feed motion.**



## 5.1.5 Directional fixture for specimen clamps



All object clamps available as optional accessories can be inserted into the quick clamping device (29) of the directional specimen holder fixture, all object clamps available as optional accessories can be used.

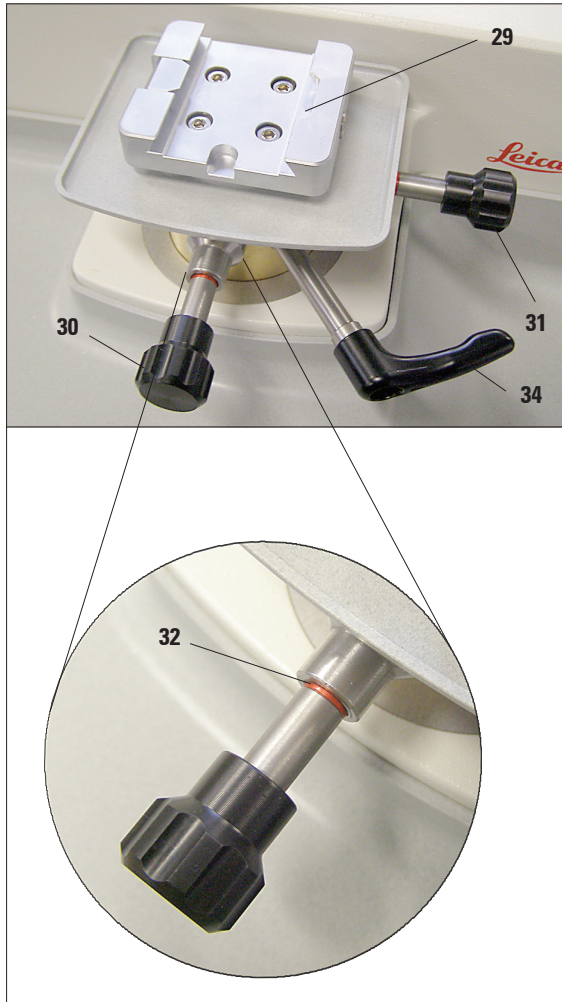


Fig. 26

The object orientation allows for simple position correction of the specimen surface when the specimen is clamped into place.

**Orienting the specimen**

- To loosen the clamp, rotate the eccentric lever (34) upwards (until you feel it click into position).

**Caution! Turning it further to the left re-clamps the orientation!**

- Turn setscrew (30) to orient the specimen in the cutting direction. Turn setscrew (31) to orient the specimen transverse to the cutting direction.

Each complete turn of the screw inclines the specimen by 2°. A total of 4 complete turns = 8° are possible in every direction.

The accuracy is approximately  $\pm 0.5^\circ$ .

For better orientation, there is a noticeable notch point after each complete turn of the setscrew.

- To lock the current orientation, turn the eccentric lever (34) backwards.

**Display of the zero position**

For better display of the zero position, each setscrew (30, 31) has a red mark (32).

When both marks are visible and both setscrews are in zero position at the same time (notch point!), the specimen orientation is in zero position (0°).

## 5. Operation

### 5.2 Clamping the specimen in the universal cassette clamp (UCC)

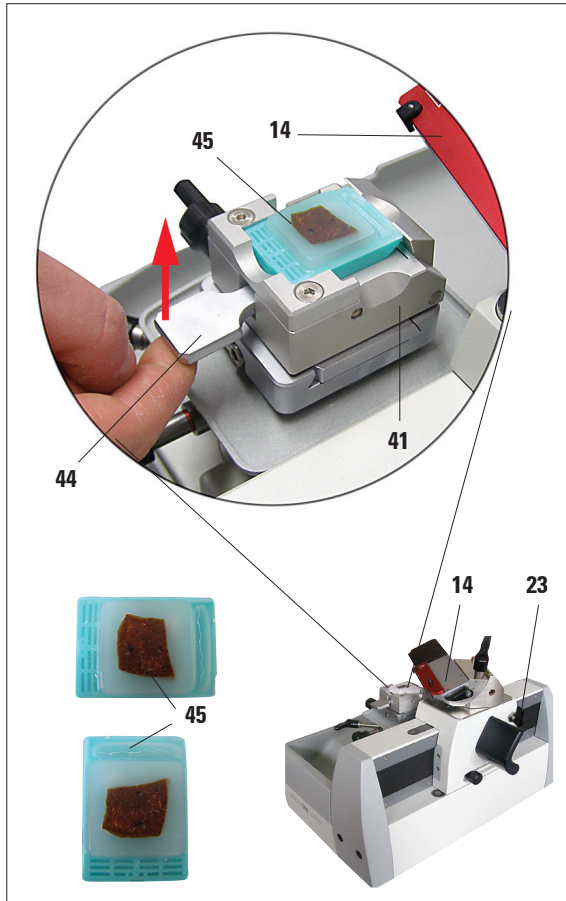


Fig. 27



#### Caution!

Always clamp the specimen block **BEFORE** clamping the knife. Lock the knife sledge and cover the knife edge / blade edge with the knife guard prior to any manipulation of knife/ blade or specimen, prior to changing the specimen block and during all work breaks!

- Move the cassette clamp (41) to the very bottom position by turning the coarse driving wheel.
- Lock the knife sledge in place using the locking knob (23).
- Cover the blade edge with the knife guard (14) toward the right.
- Push the clamping lever (44) upwards to open the clamp.
- Insert the cassette (45) into the cassette clamp.
- To clamp the cassette, release the lever (44).



The universal cassette clamp (UCC) is designed to clamp standard cassettes longitudinally or transversely to the cutting direction.

## 5.3 Clamping a disposable blade

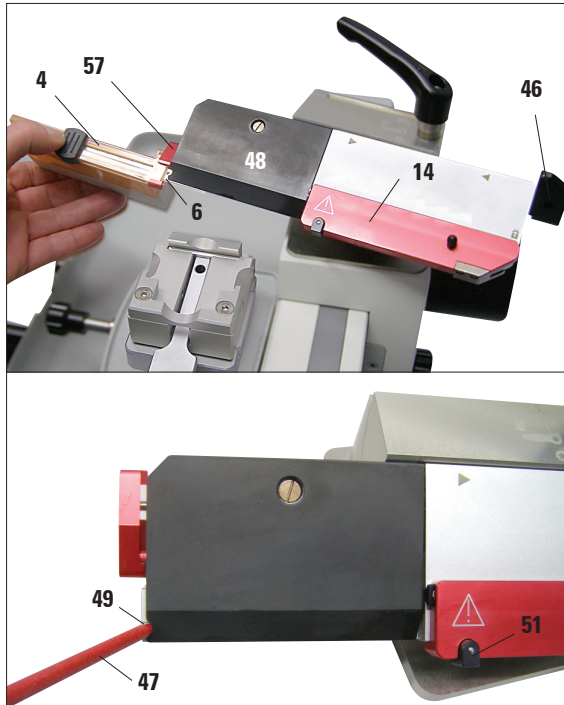


Fig. 28

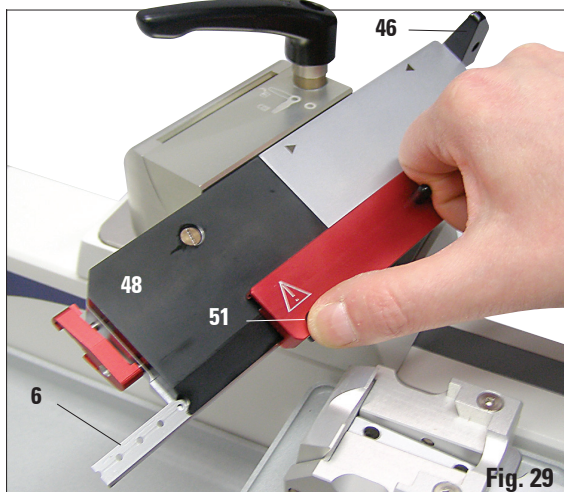


Fig. 29



Be very careful when handling microtome knives or blades. The cutting edge is extremely sharp and can cause serious injuries!

The blade holder has to be installed in the instrument before a blade is inserted!

## Insert the blade (Fig. 28)

- Push the knife guard (14) towards the right and push the lever (46) upwards to release the clamp of the pressure plate (48).
- Flap the insertion aid (57) downwards.
- Position the dispenser (4) with the disposable blades sideways (see Fig.) and push the blade (6) into the blade holder.
- Using a brush stick (47), carefully push the blade into its final position. The notch (49) makes it easier to push the blade all the way underneath the pressure plate.
- Push the clamping lever (46) downwards to clamp the blade.
- Make sure that the blade is clamped parallel to the front edge of the pressure plate.

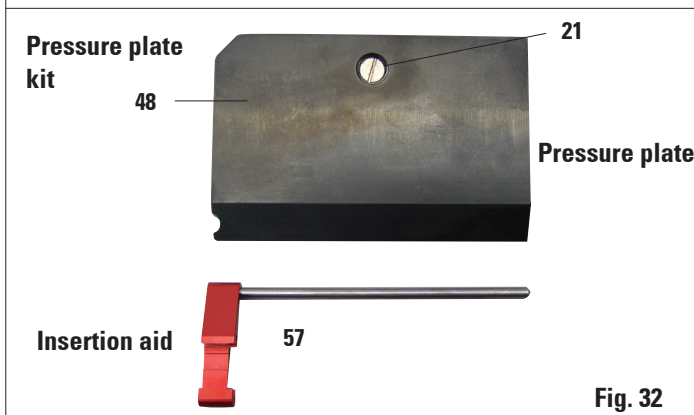
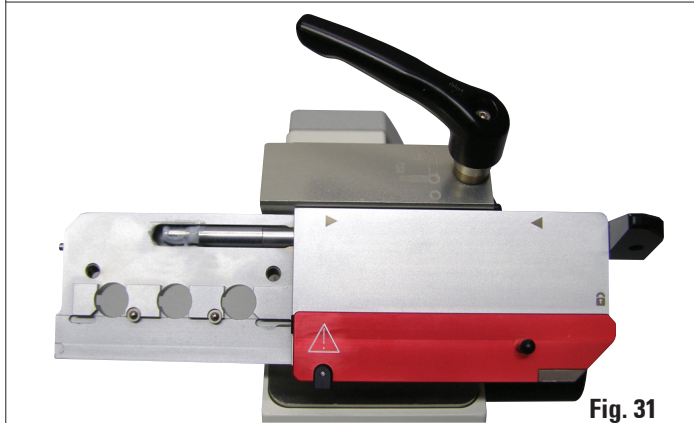
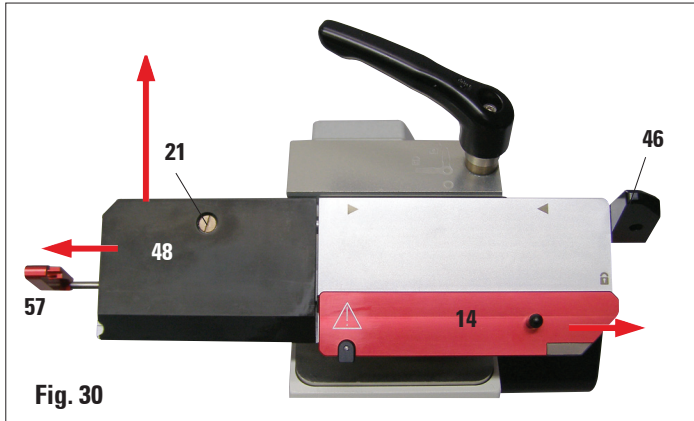
## Removal aid (Fig. 29)

A removal aid is provided for removing used blades (6).

- Loosen the clamping lever (46) of the pressure plate (48).
- Push the knife guard (14) towards the left while holding down the black push button (51). This pushes out the blade far enough sideways that it can be removed easily.

## 5. Operation

### 5.4 Replacing the pressure plate



The blade holder SE can be converted from use of narrow blades to use of wide blades, and vice versa.

To do this, both the pressure plate (48) and the matching insertion aid (57) have to be replaced.

To replace them, proceed as follows:

- Push the knife guard (14) towards the right and push the lever (46) upwards to release the clamp of the pressure plate (48).
- Now carefully pull the insertion aid (57) out to the left (Fig. 30). The pressure plate (48) can now be taken off (Fig. 31).
- To mount another pressure plate, please proceed in the reverse sequence. Only use the pressure plate together with the matching insertion aid.



The slotted screw (21) in the pressure plate is adjusted at the factory and glued in. It must not be altered.



### 5.5 Inserting the knife

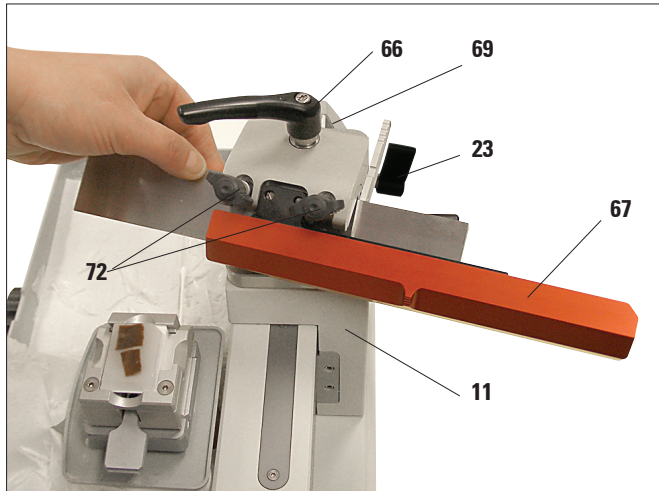


Fig. 33

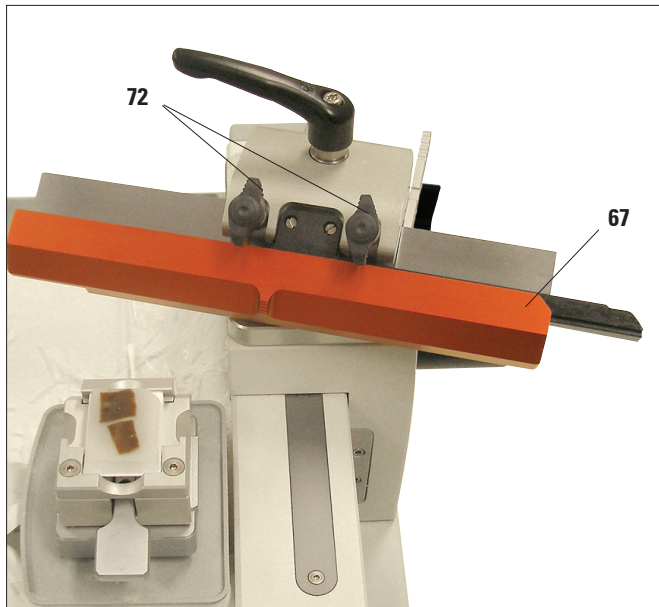


Fig. 34



Be very careful when handling microtome knives or blades. The cutting edge is extremely sharp and can cause serious injuries! The blade holder has to be installed in the instrument before a blade is inserted!

- Lock the knife sledge (11) in place using the locking knob (23).
- Please make sure that the knife holder is firmly clamped using the clamping lever (66) and that the knurled head screw (69) is tightened.
- Push the knife guard (67) to the right and loosen the clamping screws (70) sufficiently to allow the knife to be inserted.
- Take the knife out of the knife case and insert it carefully.
- Tighten the two clamping screws (72) in alternation until **both** are secure and cover the knife with the knife guard.



Proceed the same way to clamp a blade rail.

## 5. Operation

### 5.6 Sectioning

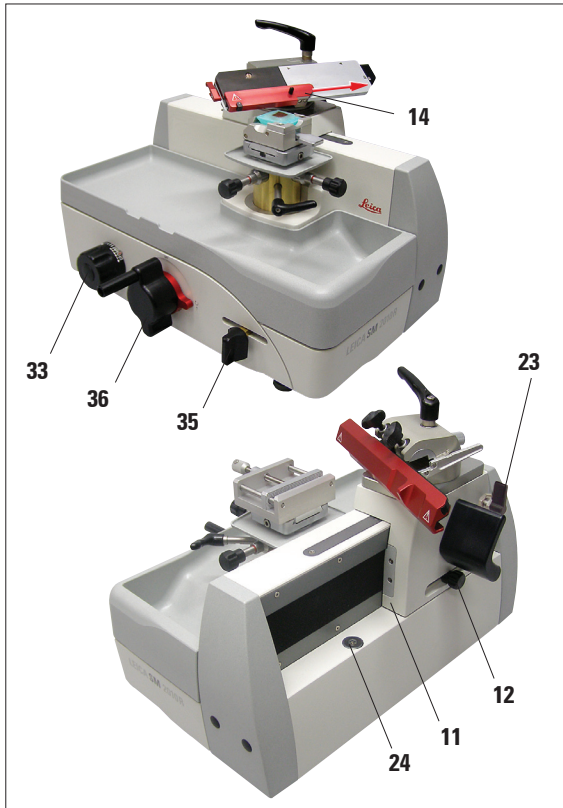


Fig. 35



The coarse driving wheel must not become locked! Otherwise there will be no correct feed motion of the section thickness.



When using the automatic advance feature, make sure to move the knife sledge against the limit stop position to disengage an automatic feed after each section.

#### Cutting into the specimen (trimming)

For trimming, the specimen feed can be disengaged either by turning the coarse driving wheel (36) or by operating the manual feed lever (35).

- Hold the knife sledge (11) at the grip (12) and place the sledge behind the specimen.
- Pull the knife guard (14) of the blade/knife holder to the right.
- To feed the specimen towards the knife, turn the coarse driving wheel (36);

**or**

select the required section thickness with the section thickness adjusting knob (33) and move the manual feed lever (35). Each lever movement causes a specimen feed by the selected value.

- Move the knife sledge forth and back until the specimen surface is trimmed as required.

#### Remove the sections

Always use different areas of the cutting edge for trimming and sectioning.

- Select the required section thickness with the section thickness adjusting knob (33).
- To produce the section, pull the knife sledge over the specimen at a constant speed.
- Carefully remove sections using a small brush and prepare them.

### 5.7 Changing the specimen or interrupting sectioning



**Lock the knife sledge and cover the knife edge with the knife guard prior to any manipulation of knife or specimen head, as well as prior to changing the specimen block and during all work breaks!**

- Lock the knife sledge and move the specimen clamp far enough downward that the new specimen fits below the knife/blade.
- Cover the cutting edge with the knife guard.
- Remove the specimen from the specimen clamp and mount a new sample to continue.
- Move the specimen clamps upwards using the coarse driving wheel until the new specimen can start being cut.

### 5.8 Finishing daily routine

- Raise the specimen to the lower end position by turning the coarse driving wheel and lock the knife sledge.



**Always remove the knife / blade before detaching the knife holder from the instrument.**

**Always put the knives back into the knife case when not in use!**

**Never place a knife anywhere with the cutting edge facing upwards and never try to catch a falling knife!**

- Remove the blade from the blade holder and insert it in the receptacle at the bottom of the dispenser, or remove the knife from the knife holder and put it back in the knife case.
- Remove the specimen from the specimen clamp.
- Push all section debris into the section waste tray and empty the tray.
- Clean the instrument (see [Chapter 8.1](#)).

## 6. Cleaning and maintenance

---

### 6.1 Cleaning the instrument



- **Always remove the knife or blade before detaching the knife/blade holder from the instrument!**
- **Always put the knives back into the knife case when not in use!**
- **Never place a knife anywhere with the cutting edge facing upwards and never try to catch a falling knife!**
- **When using cleaning agents, observe the manufacturer's safety instructions and the laboratory regulations valid in the country of use.**
- **When cleaning the outer surfaces, do not use xylene, scouring powders or solvents containing acetone or xylene. Xylene or acetone will damage the finished surfaces!**
- **Ensure that liquids do not enter the interior of the instrument during cleaning!**

#### **Before each cleaning carry out the following preparatory steps:**

- Move the specimen clamp to the lower end position and activate the handwheel lock.
- Remove the blade from the blade holder and insert it in the receptacle at the bottom of the dispenser, or remove the knife from the knife holder and put it back in the knife case.
- Remove knife holder base and knife holder for cleaning.
- Remove the specimen from the specimen clamp.
- Take out the waste tray and remove the section waste with a dry brush.
- Remove specimen clamp and clean separately.

### Clean the instrument and outer surfaces

- If necessary, the varnished outside surfaces can be cleaned with a mild, commercial household cleaner or soapy water and then wiped with a moist cloth.
- To remove paraffin residue, xylene substitutes, e.g. Roth Histol (Roth, Karlsruhe), Tissue Clear (Medite), Histo Solve (Shandon), paraffin oil or paraffin removers, e.g. Paragard (Polysciences) can be used.
- For treating varnished surfaces, a commercially available varnish cleanser is recommended.
- The instrument must be completely dry before it can be used again.
- Anodized parts (e.g. the specimen clamps) can also be cleaned with solvents.

### 6.2 Maintenance instructions



**Only authorized, qualified Leica service personnel may access the internal components of the instrument for service and repair!**

The instrument is basically maintenance-free.

To ensure trouble-free operation of the instrument over a long period of time, the following is recommended by Leica:

- Thoroughly clean the instrument on a daily basis.
- From time to time, oil the object cylinder (see [Fig. 4, Page 9](#)), blade/knife holder and the specimen clamps (e.g. after cleaning in the heating oven or with solvents) using oil no. 405.
- Have the instrument checked at least **1 x year** by a qualified service technician authorized by Leica.  
The intervals depend on how heavily the instrument is used.
- Enter into a service contract at the latest at the end of the warranty period.  
For more information, please contact your local Leica technical service center.

## 7. Optional accessories

---

### 7.1 Ordering information

Supernova cassette clamp with adapter, silver.....	14 0508 42634
Universal cassette clamp with adapter, silver .....	14 0508 42635
HN40 clamp with adapter, silver .....	14 0508 42637
Standard specimen clamp with adapter, silver .....	14 0508 42632
Dry ice tub with adapter, silver.....	14 0508 42641
Knife holder SN, assembly .....	14 0508 44670
Blade holder SE/SB, assembly .....	14 0508 43196
Blade holder SE/BB, assembly .....	14 0508 42775
Pressure plate kit SB, assembly.....	14 0508 43693
Pressure plate kit BB, assembly.....	14 0508 43694
Low-profile blade rail EC 240 L.....	14 0368 33013
Low-profile blade rail set, assembly.....	14 0368 38111
Plastic knife guard for blade rails .....	14 0368 33772
Knife 16 cm profile C, steel .....	14 0216 07100
Knife 16 cm profile D, steel.....	14 0216 07132
Knife 22 cm profile C, steel.....	14 0216 07116
Low-profile disposable blades, Type 819 1x50.....	14 0358 38925
High-profile disposable blades, Type 818 1x50.....	14 0358 38926
Ball handle, assembly .....	14 0508 42565



Fig. 36

**Supermega cassette clamp,**  
with adapter, silver  
for mounting in the quick change system for  
specimen imaging  
Maximum specimen size: 75x52x35 mm (LxWxH)

**Order No. .... 14 0508 42634**

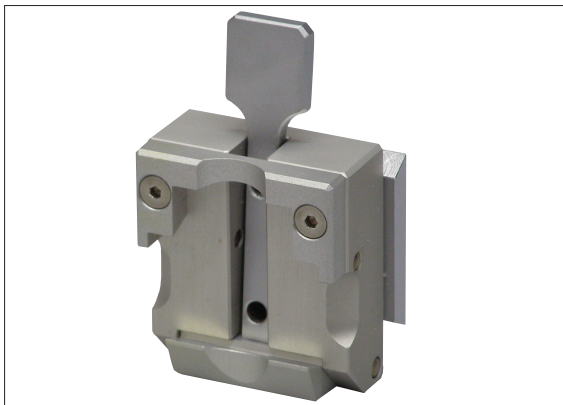


Fig. 37

**Universal cassette clamp (UCC),**  
with adapter, silver  
for mounting in the quick change system for  
specimen imaging  
Maximum specimen size: 40x29 mm (LxW)

**Order No. .... 14 0508 42635**



Fig. 38

**HN40 tensioning clamp,**  
with adapter, silver  
for mounting in the quick change system for  
specimen imaging  
Maximum specimen size: 59x45 mm (LxW)

**Order No. .... 14 0508 42637**

## 7. Optional accessories

---



Fig. 39

### **Standard specimen clamp,**

with adapter, silver

for mounting in the quick change system for specimen imaging

Maximum specimen size: 79x60 mm (LxW)

**Order No. .... 14 0508 42632**

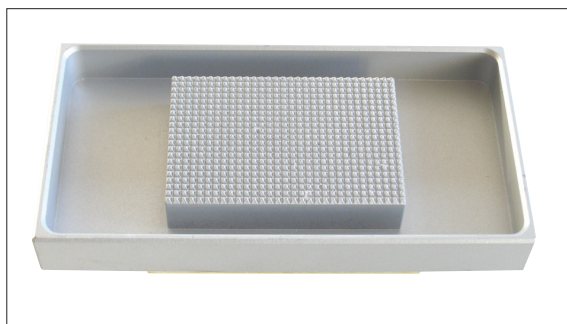


Fig. 40

### **Dry ice tub**

with adapter, silver

**Order No. .... 14 0508 42641**

1 pair of cold protection gloves, size 8

**Order No. .... 14 0340 45631**



Fig. 41

### **Dust cover**

**Order No. .... 14 0216 07100**





Fig. 42

Standard delivery:

- 1 blade holder base ..... 14 0508 44719
- 1 grooved plate ..... 14 0508 43643
- 1 stopper ..... 14 0508 44664
- 6 countersunk screws, Torx ..... 14 3000 00227



Fig. 43

### Blade holder SE, assembly

Easily converted from a low-profile to high-profile blade holder by switching the pressure plate.

Adjusting the clearance angle using an Allen key. Blade holder declination with scale for reproducible adjustment up to 45°. Safe insertion of the disposable blade using a magnet and insertion aid on the blade holder.

Central disposable blade clamp. Precise and safe, lateral displacement of the blade for using the entire blade length. Safe removal of a used disposable blade by using the removal aid integrated into the knife guard. Space-saving knife guard with integrated blade removal tool in signal color.

Blade holder for SB ..... **Order No. 14 0508 43196**

Blade holder for BB ..... **Order No. 14 0508 42775**

- 1 knife guard ..... 14 0368 33772
- 1 blade holder SE, assembly
  - Segment arc SB ..... 14 0508 44853
  - Segment arc BB ..... 14 0508 44854

### Pressure plate kit SB, assembly

consisting of:

- 1 pressure plate SB ..... 14 0508 43692
- 1 blade insertion aid SB ..... 14 0508 43686

**Order No. .... 14 0508 43693**

### Pressure plate kit BB, assembly

consisting of:

- 1 pressure plate BB ..... 14 0508 43691
- 1 blade insertion aid BB ..... 14 0508 43687

**Order No. .... 14 0508 43694**

## 7. Optional accessories



Order No.14 0508 44670

Fig. 44

### Knife holder SN, assembly

for resharpenable knives or blade rails. Blade holder declination with scale for reproducible adjustment up to 45°. 2 clamping screws for quickly and securely clamping the cutting tool.

Safe lateral displacement of the cutting tool for using the entire blade edge. Space-saving, integrated knife guard in signal color.

Standard delivery:

- 1 intermediate plate ..... 14 0508 44671
- 5 cheese-head screws..... 14 0508 44670
- 1 knife holder attachment SN ... 14 0508 44857

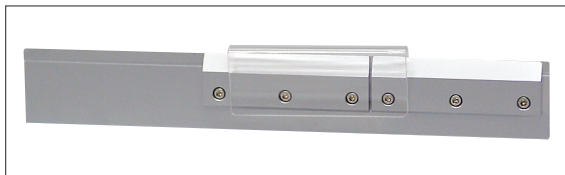


Fig. 45

### Low-profile blade rail EC 240 L

for low-profile disposable blades, shipment in a plastic case with two pressure plates and all required tools and accessories (see Fig. 45).

Order No. .... 14 0368 33013

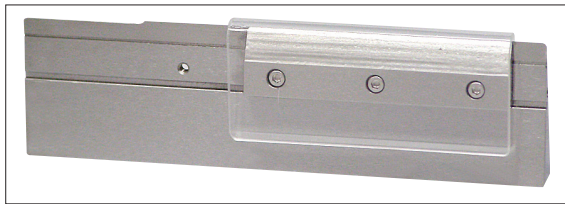


Fig. 46

### Low-profile blade rail set, assembly

Shipment in a plastic case with one pressure plate and all required tools and accessories (see Fig. 46).

Order No. .... 14 0368 38111

## 7. Optional Accessories

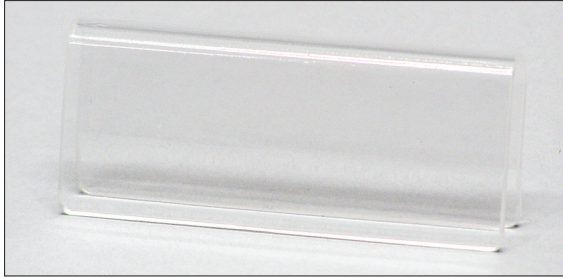


Fig. 47

**Plastic knife guard,**  
for blade rails

**Order No.** ..... 14 0368 33772

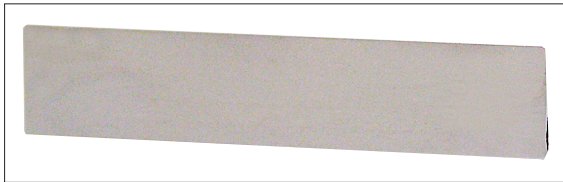


Fig. 48

**Knife, 16 cm**

Profile C, steel

flat on both sides, for wax and frozen sections.

Note: including knife case 14 0213 11140

**Order No.** ..... 14 0216 07100

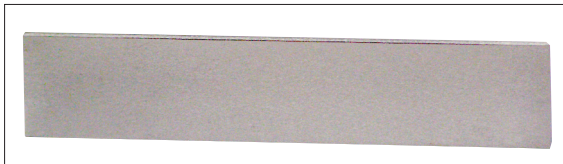


Fig. 49

**Knife, 16 cm**

Profile D, steel

Note: including knife case 14 0213 11140

**Order No.** ..... 14 0216 07132

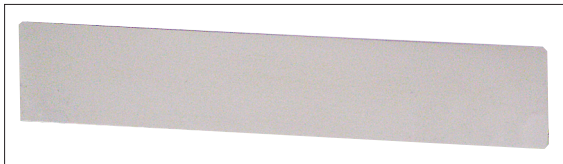


Fig. 50

**Knife, 22 cm**

Profile C, steel

for paraffin and cryosections;

Note: including knife case 14 0213 11141

**Order No.** ..... 14 0216 07116



Fig. 51

**Ball handle, assembly**

**Order No.** ..... 14 0508 42565

## 7. Optional accessories

---



Fig. 52

### **Leica low-profile disposable blades - Type 819**

Length 80 mm, height 8 mm

1 package of 50 pieces

**Order No. .... 14 0358 38925**



Fig. 53

### **Leica high-profile disposable blades - Type 818**

Length 80 mm, height 14 mm

1 package of 50 pieces

**Order No. .... 14 0358 38926**



In the following table there is a list of the most common problems which can arise while working with the instrument, along with possible causes and troubleshooting procedures.

Problem	Possible cause	Corrective action
<b>8.1 Possible faults</b>		
<b>1. Thick/thin sections</b> The sections alternate between being thick and thin. In extreme cases, there are no sections whatsoever.	<ul style="list-style-type: none"> <li>• The blade is not clamped properly.</li> <li>• Blunt blade/knife.</li> <li>• Angle of inclination of the knife/blade and therefore also clearance angle too small.</li> </ul>	<ul style="list-style-type: none"> <li>• Reclamp the blade.</li> <li>• Laterally displace the blade/knife holder or insert a new blade/knife.</li> <li>• Methodically experiment with larger clearance angle settings until you have found the optimum angle.</li> </ul>
<b>2. Section compression</b> The sections are very compressed, show folds or are squeezed together.	<ul style="list-style-type: none"> <li>• The blade/knife is blunt.</li> <li>• The specimen is too warm.</li> <li>• The clearance angle is too wide.</li> </ul>	<ul style="list-style-type: none"> <li>• Use another area of the blade/knife, or use a new blade/knife.</li> <li>• Cool the specimen before sectioning.</li> <li>• Methodically reduce the clearance angle setting until you have found the optimum angle.</li> </ul>
<b>3. The sections have scratches and chatter marks</b>	<ul style="list-style-type: none"> <li>• The clearance angle is too wide.</li> <li>• Unsuitable knife profile</li> <li>• Insufficient clamping to the object holder system and/or the blade/knife holder</li> </ul>	<ul style="list-style-type: none"> <li>• Methodically reduce the clearance angle setting until you have found the optimum angle.</li> <li>• Use a knife with another profile.</li> <li>• Check all screw and clamp connections on the object holder system and the knife holder. If necessary, tighten the levers and screws.</li> </ul>
<b>8.2 Instrument malfunctions</b>		
<b>1 There is no further feed motion and thus no sectioning.</b>	<ul style="list-style-type: none"> <li>• The front end position has been reached.</li> </ul>	<ul style="list-style-type: none"> <li>• Run the specimen downwards by turning the coarse driving wheel.</li> </ul>
<b>2. High blade consumption</b>	<ul style="list-style-type: none"> <li>• Too great of a sectioning force was applied.</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the sectioning speed and/or section thickness when trimming. Select a smaller section thickness, move knife sledge more slowly.</li> </ul>

## **9. Warranty and Service**

---

### **Warranty**

Leica Biosystems Nussloch GmbH guarantees that the contractual product delivered has been subjected to a comprehensive quality control procedure based on the Leica in-house testing standards, and that the product is faultless and complies with all technical specifications and/or characteristics warranted.

The scope of the warranty is based on the content of the concluded agreement. The warranty terms of your Leica sales organization or the organization from which you have purchased the contractual product shall apply exclusively.

### **Service information**

If you are in need of technical customer service or spare parts, please contact your Leica representative or the Leica dealer where you purchased the unit.

Please provide the following information:

- Model name and serial number of the instrument.
- Location of the instrument and name of the person to contact.
- Reason for the service call.
- Delivery date

### **Decommissioning and disposal**

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





# 11. Decontamination Certificate (Master)

Dear Customer,

Any product that is to be returned to Leica Biosystems or serviced on site, must be cleaned and decontaminated in the appropriate manner. Since it is not possible to decontaminate for prion diseases, such as CJD, BSE, CWD etc., equipment exposed to specimens containing prion diseases cannot be returned to Leica Biosystems for repair. On-site repair of prion contaminated equipment will only be conducted after the Field Service Engineer has been educated in the risks, instructed in the policies and procedures of the institution, and provided with personal protective equipment. Please fill out this confirmation carefully and enclose a copy with the instrument. Attach the confirmation to the outside of the flight case or hand it directly to the service technician.

Packages will not be opened, nor servicing commenced until the Company or service engineer have received a satisfactory certificate. Should returned goods be considered a hazard by the Company, they will be returned immediately to the customer at his/her expense. **Note:** Microtome knives must be in boxes.

**Mandatory information:** Fields marked with \* are mandatory. Depending on whether the instrument is contaminated, please also complete either section A or section B.

Nameplate information

Model (see nameplate)\*

SN (see nameplate)\*



REF (see nameplate)\*

**Tick Box A if applicable. Otherwise please complete all parts of B, providing further information as requested or appropriate.**

## A

Yes

This equipment has not been in contact with unfixed biological samples.

## B

Yes

No

**1** This equipment has been exposed internally or externally to hazardous materials as indicated below:

Blood, body fluids, pathological samples

**Please provide further detail here:**



Other biohazards



Chemicals/substances hazardous to health



Other hazards



Radioactivity

Yes

No

**2** This equipment has been cleaned and decontaminated:

If yes, give details of the method:

**Please provide further detail here:**



If no\*\*, please indicate why not:

\*\* Such equipment must not be returned without the written agreement of Leica Biosystems.

Yes

No

**3** The equipment has been prepared to ensure safe handling/transportation. Whenever possible, please use the original transportation case/box.

## 11. Decontamination Certificate (Master)

**Important - to avoid refusal of shipment:**

Place one copy in the unit prior to packaging, or hand it over to the service engineer. Customer assumes all responsibility for the immediate return shipment of articles sent to Leica without proper decontamination documentation.

If you have any further questions, please call your local Leica organization.

**Leica Internal Use:** If applicable, note corresponding Job and RAN-/RGA-Number:

Job Sheet No.: \_\_\_\_\_ BU Return Authorization Number: \_\_\_\_\_ SU Return Goods Authorization: \_\_\_\_\_

**Signature/Date\***

**Name\***

**Position\***

**eMail**

**Institute\***

**Department\***

**Address\***

**Phone\***

**Fax**

Leica Biosystems Nussloch GmbH  
Heidelberger Str. 17-19  
69226 Nussloch, Germany

Phone: ++49 (0) 6224 143 0  
Fax: ++49 (0) 6224 143 268  
www.LeicaBiosystems.com



[www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)



Leica Biosystems Nussloch GmbH  
Heidelberger Straße 17–19  
D– 69226 Nussloch  
Phone: +49 - (0) 6224 - 143 0  
Fax: +49 - (0) 6224 - 143 268  
Web: [www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)