

Leica SM2010 R

Sliding Microtome

Instructions for Use
English

Order No.: 14 0508 80101 - Revision I

Always keep this manual with the instrument.
Read carefully before working with the instrument.



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

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For the instrument serial number and year of manufacture, please refer to the nameplate on the back of the instrument.



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1. Important Information

1.1 Symbols and their meanings



Caution

Leica Biosystems GmbH assumes no liability for consequential loss or damage due to failure to observe the following instructions, particularly in relation to transportation and package handling, and failure to observe the instructions for handling the instrument carefully.

Symbol:



Title of the symbol:

Warning

Description:

If this danger is not avoided, then this may result in death or serious injury.

Symbol:



Title of the symbol:

Caution

Description:

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Symbol:



Title of the symbol:

Note

Description:

Indicates a situation with the potential for property damage which, if not avoided, could result in damage to the machine or something in its vicinity.

Symbol:

→ "Fig. 7 - 1"

Title of the symbol:

Item number

Description:

Item numbers for numbering illustrations. Numbers in red refer to item numbers in illustrations.

Symbol:

Start

Title of the symbol:

Function key

Description:

Software symbols that have to be pressed on the input screen are displayed as bold, gray and underlined text.

Symbol:



Title of the symbol:

Manufacturer

Description:

Indicates the manufacturer of the medical product.

Symbol:



Title of the symbol:

Manufacturing date

Description:

Indicates the date when the medical device was manufactured.

Symbol:



Title of the symbol:

CE Compliance

Description:

The CE marking is the manufacturer's declaration that the medical product meets the requirements of the applicable EC directives and regulations.

Symbol:



Title of the symbol:

In vitro diagnostics (IVD) medical device

Description:

Symbol:	Title of the symbol:	Observe the Instructions for Use
	Description:	Indicates the need for the user to consult the instructions for use.
Symbol:	Title of the symbol:	Country of Origin
	Description:	The Country of Origin box defines the Country where the final character transformation of the product has been performed.
Symbol:	Title of the symbol:	UKCA Label
	Description:	The UKCA (UK Conformity Assessed) marking is a new UK product marking that is used for goods being placed on the market in Great Britain (England, Wales and Scotland). It covers most goods which previously required the CE marking.
Symbol:	Title of the symbol:	Order No.
	Description:	Indicates the manufacturer's catalog number so that the medical device can be identified.
Symbol:	Title of the symbol:	Serial number
	Description:	Indicates the manufacturer's serial number so that a specific medical device can be identified.

1.2 Qualification of personnel

- The Leica SM2010 R may be operated by trained laboratory personnel only. The instrument is intended for professional use 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.

1.3 Intended purpose

The Leica SM2010 R is a manually operated sliding microtome specifically designed for creating thin sections of formalin fixed, paraffin embedded human tissue specimens of varying hardness used for histological medical diagnosis by a pathologist, e.g. for cancer diagnosis. It is intended for sectioning soft and hard human specimens, as long as they are suitable for being cut manually. The Leica SM2010 R is designed for in vitro diagnostic applications.

Any other use of the instrument is considered improper!

1.4 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.

2. Safety



Warning

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.

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



Note

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.



Note

For current information about applicable standards, please refer to the CE Declaration of Conformity and UKCA Certificates on our Internet site:
<http://www.LeicaBiosystems.com>



Warning

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



Warning

- 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



Warning

- 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 (→ Fig. 1-2)!
- 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



Warning

- 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



Warning

- 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!

2.3 Integrated safety devices

The instrument is equipped with the following safety devices:

- Knife guard (→ Fig. 1-1) on the blade/knife holder.
- Knife sledge locking knob (→ Fig. 1-2) for the knife sledge.

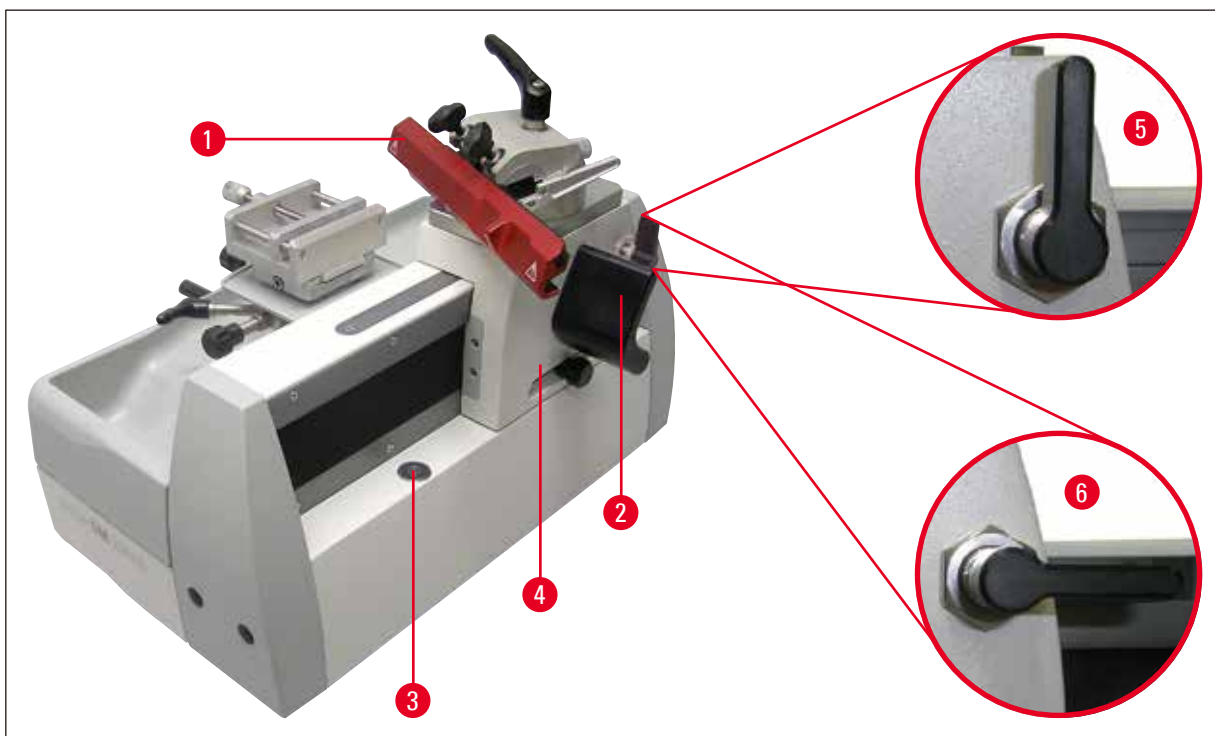


Fig. 1

Knife sledge locking knob

The knife sledge is locked in place using the locking knob (→ Fig. 1-2) that engages in the notch points on the bar (→ Fig. 1-3), thus holding the knife sledge securely. The bar has 11 notch points, with a distance of 10 mm between each.

- » Knife sledge locked (→ Fig. 1-5)
- » Knife sledge is movable (→ Fig. 1-6)



Warning

Prior to changing the specimen or knife and before transporting the instrument, lock the knife sledge (→ Fig. 1-4) using the locking knob (→ Fig. 1-2).

Knife guard on the blade holder

The blade holder is equipped with a tightly mounted knife guard (→ Fig. 2-1). This makes it possible to cover completely the cutting edge of the blade (→ Fig. 2).

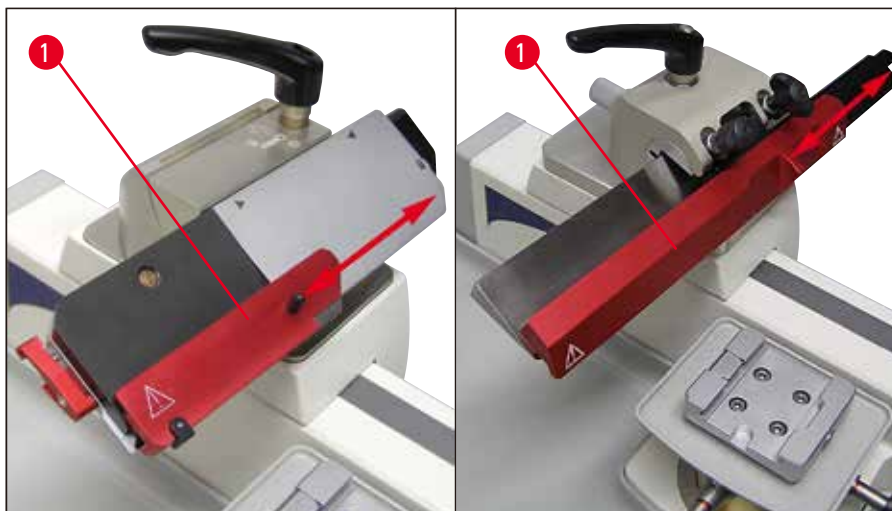


Fig. 2



Warning

Prior to any manipulation of the knife or specimen, or each change of specimen, and during breaks, always cover the cutting edge of the blade/knife with the knife guard (→ Fig. 2-1)!



Caution

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

3 Instrument Components and Specifications

3. Instrument Components and Specifications

3.1 Overview - instrument components



Fig. 3

1	Clamping lever for lateral displacement	8	Lever for clamping the blade
2	Universal cassettes clamp	9	Blade holder SE
3	Setscrew for orientation in cutting direction	10	Knife guard on the blade holder
4	Specimen cylinder	11	Quick clamping system for holding the specimen clamps
5	Scaled adjusting knob for setting the section thickness	12	Clamping lever for specimen orientation
6	Coarse driving wheel	13	Adjustable instrument feet
7	Lever for manual feed		

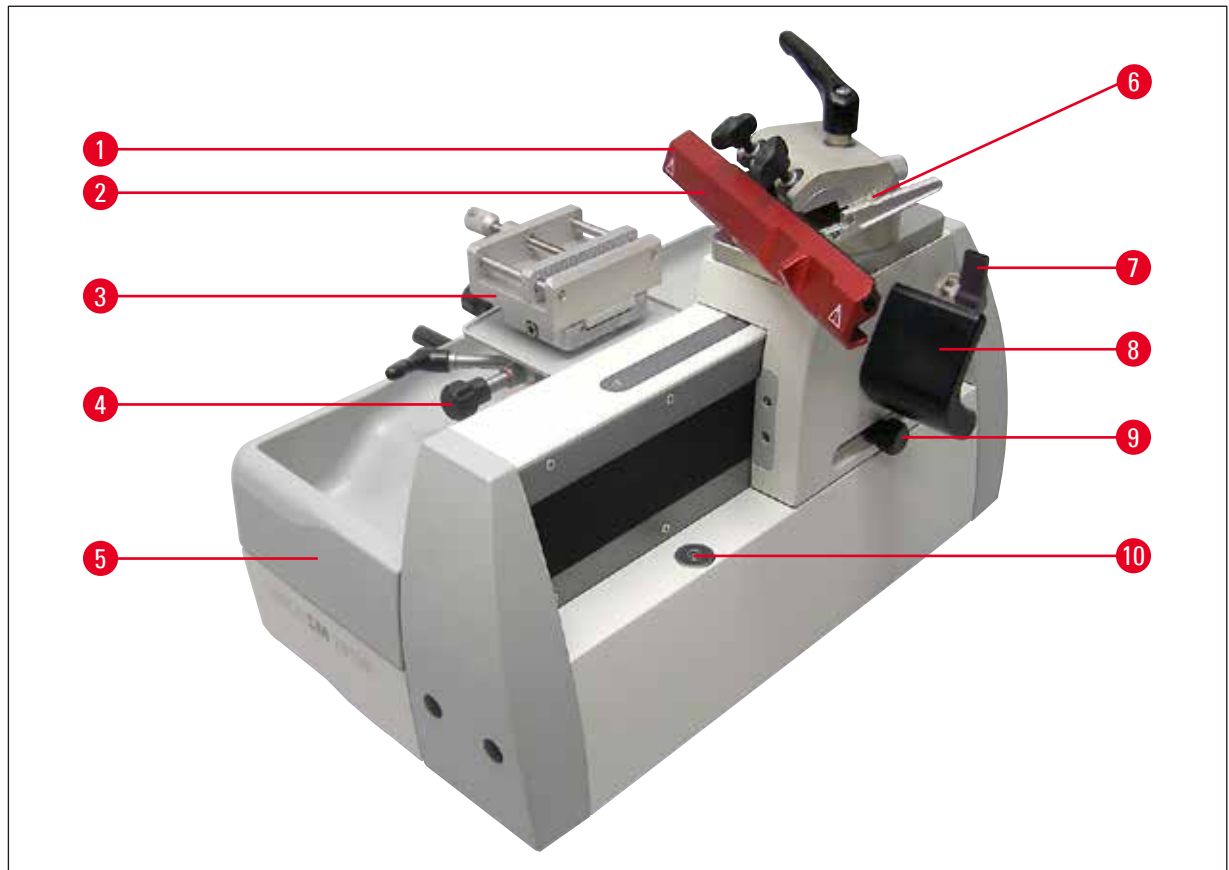


Fig. 4

1	Knife holder SN	7	Knife sledge lock
2	Knife guard on the knife holder	8	Ergo handle for moving the knife sledge
3	HN40 tensioning clamp	9	Adjusting knob of automatic feed
4	Setscrew for orientation perpendicular to cutting direction	10	Knife sledge
5	Removable section waste tray	11	Magnetic knife sledge immobilizer
6	Clearance angle scale		

3.2 Technical data

General

Approvals:	The instrument-specific marks are located on the name plate.
Operating temperature range:	+18 °C to +30 °C
Operating relative humidity:	20% to max. 80% non-condensing
Operating altitude:	Up to 2000 m above sea level
Transport temperature range:	-29 °C to +50 °C
Storage temperature range:	+ 5 °C to +50 °C
Transport and storage relative humidity:	10% to max. 85% non-condensing

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:

Qty	Designation	Order No.
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 (printed English with language CD 14 0508 80200).	14 0508 80001



Note

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



Note

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



Warning

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.



Fig. 5

Loosening the transport locking screw of the knife sledge



Note

The locking knob (→ Fig. 6-1) secures the knife sledge during transport. In daily operation, it is also used to lock the knife sledge in place.

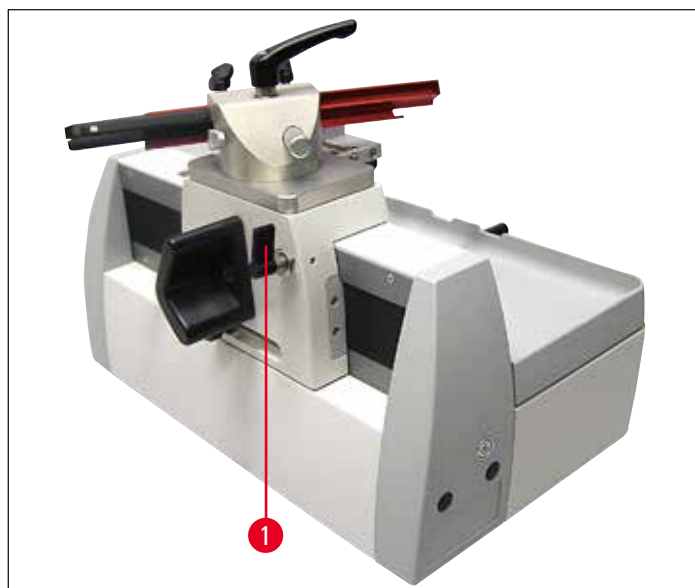


Fig. 6

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 (→ Fig. 7-1) on the right side of the instrument are height-adjustable.

- For alignment, loosen the locknuts (→ Fig. 7-2) using a size 10 open-end wrench.
- Adjust the instrument feet (→ Fig. 7-1) until the microtome is in a stable position at the installation location according to requirements.
- Retighten the locknuts.



Fig. 7

Setting the Ergo handle

The Ergo handle (→ Fig. 8-1), which is used to move the knife sledge, can be set individually to an ergonomic gripping position.

- To do this, loosen the fastening screw (→ Fig. 8-2) using a size 6 Allen key (→ Fig. 8-3).
- Turn the handle (→ Fig. 8-1) to the desired position and retighten the screw (→ Fig. 8-2).

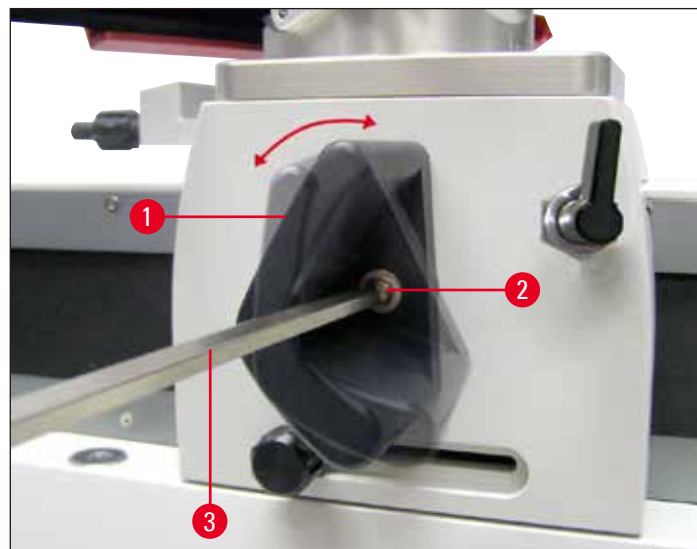


Fig. 8

4.5 Assembling the knife holder SN

Installing the intermediate plate



Warning

Important!

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

- Lock the knife sledge (→ Fig. 9-1) in place using the locking knob (→ Fig. 9-2) so that it cannot be moved.
- The intermediate plate (→ Fig. 9-3) intended for the knife holder SN, is mounted on the mounting table (→ Fig. 9-4) of the knife sledge (→ Fig. 9-1).
- As shown in (→ Fig. 9), place the intermediate plate on the mounting table. Make sure that the two index markings (→ Fig. 9-5) are at the top and point towards the back.

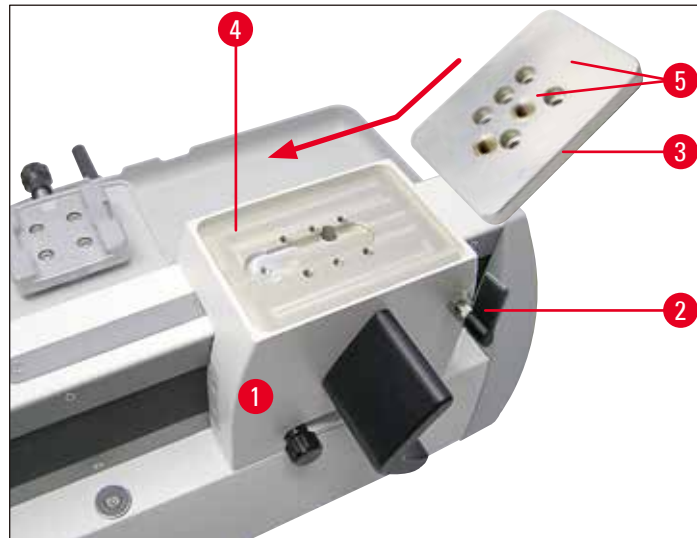


Fig. 9

- Insert the five countersunk screws (→ Fig. 10-1) (→ Fig. 10-2) (→ Fig. 10-3) (→ Fig. 10-4) (→ Fig. 10-5) into the bores and tighten them crosswise (in the sequence shown in (→ Fig. 10)) using an Allen key T25 (→ Fig. 10-6).



Fig. 10

Fastening the knife holder



Note

The knife holder SN (→ Fig. 11-2) has two bores (→ Fig. 11-4) (→ Fig. 11-5) and thus two different mounting positions for different sectioning requirements.

- Press the clamping lever (→ Fig. 11-1) of the knife holder (→ Fig. 11-2) downwards and screw the bottom of the thread (→ Fig. 11-3) into one of the two bores (→ Fig. 11-4) or (→ Fig. 11-5) of the intermediate plate (→ Fig. 11-6).

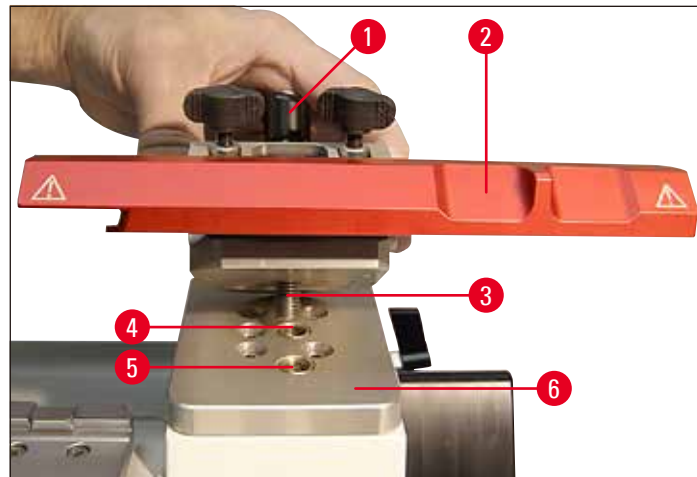


Fig. 11

- Continue turning the clamping lever (→ Fig. 12-1) in a clockwise direction until the knife holder is firmly screwed on (→ Fig. 12).



Fig. 12

**Note**

The clamping lever (→ Fig. 12-1) 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.

Setting the clearance angle (→ Fig. 13)

- Unscrew the knurled head screw (→ Fig. 13-1).
- Set the required angle with the adjusting lever (→ Fig. 13-2) using the scale for the clearance angle (→ Fig. 13-3). The upper edge (→ Fig. 13-4) red arrow in (→ Fig. 13)) of the lever (→ Fig. 13-2) has to align with the index mark of the selected degree value.
- Enlarged detail: Scale for setting the clearance angle.
- To fix the setting in place, retighten the knurled screw (→ Fig. 13-1).

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

- To do this, slightly unscrew the two clamping screws for the knife (→ Fig. 13-5) and, if necessary, also the knurled head screw (→ Fig. 13-1).
- Set the desired angle as described above.
- To fix the setting in place, retighten the knurled screw (→ Fig. 13-1).

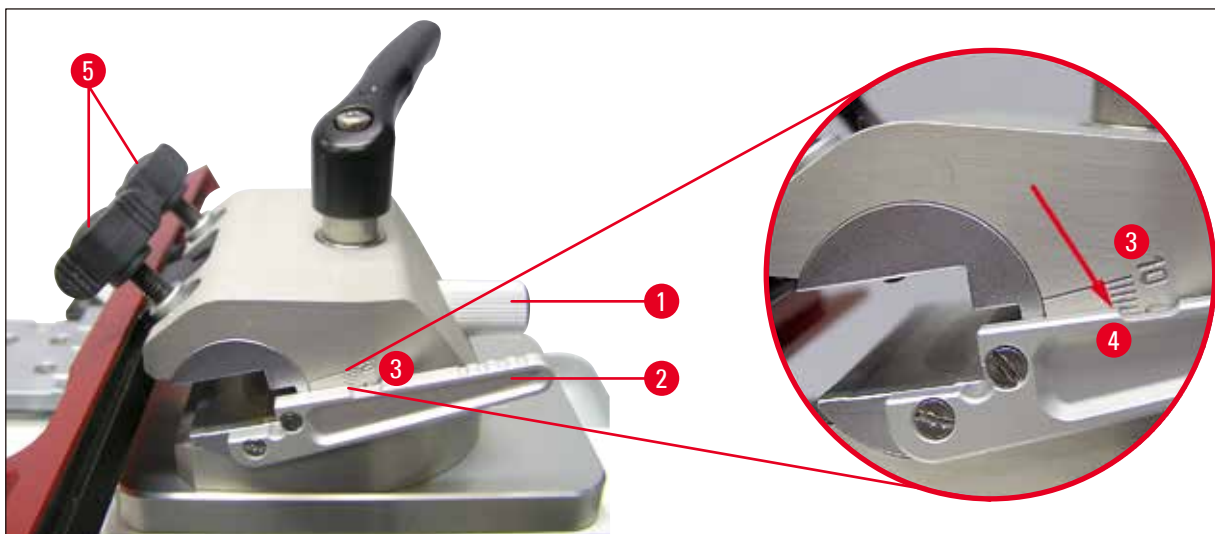


Fig. 13

Inclination (declination) of the knife holder SN

- Loosen the clamping lever (→ Fig. 14-1).
- Set the required declination (inclination of the knife holder from the cutting direction) on the scale (→ Fig. 14-2) at the back of the knife holder (→ Fig. 14-3).
- On the intermediate plate (→ Fig. 14-4) there is an index mark (→ Fig. 14-5) which serves as a point of reference for the scale division when adjusting the declination.
- For fixation, tighten the clamping lever (→ Fig. 14-1) firmly in the required position.



Fig. 14

4.6 Assembling the blade holder SE

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.



Warning

Important!

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

Mounting the grooved plate

- Lock the knife sledge (→ Fig. 15-1) in place using the locking knob (→ Fig. 15-2) so that it cannot be moved.
- The grooved plate (→ Fig. 15-3), which is intended for the blade holder SE, is mounted on the mounting table (→ Fig. 15-4) of the knife sledge (→ Fig. 15-1).

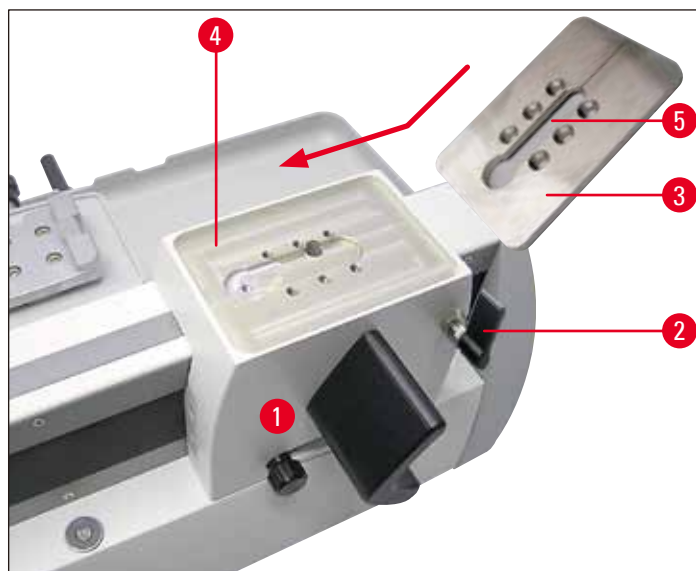


Fig. 15

- As shown in (→ Fig. 15), place the grooved plate on the mounting table. Make sure that the groove (→ Fig. 15-5) for inserting the blade holder has the rounded opening (→ Fig. 16-8) for the T-piece pointing forward.



Fig. 16

- Insert the six countersunk screws (→ Fig. 16-1) (→ Fig. 16-2) (→ Fig. 16-3) (→ Fig. 16-4) (→ Fig. 16-5) (→ Fig. 16-6) into the bores and tighten them crosswise (in the sequence shown in (→ Fig. 16)) using an Allen key T 25 (→ Fig. 16-7).

Inserting the blade holder SE

- Mount the blade holder (→ Fig. 17-1) on the grooved plate (→ Fig. 17-2) such that the T-piece (→ Fig. 17-3) on the underside is inserted in the groove (→ Fig. 17-4).
- Push the blade holder fully to the back such that the T-piece can be inserted in the round insertion opening (→ Fig. 17-5).

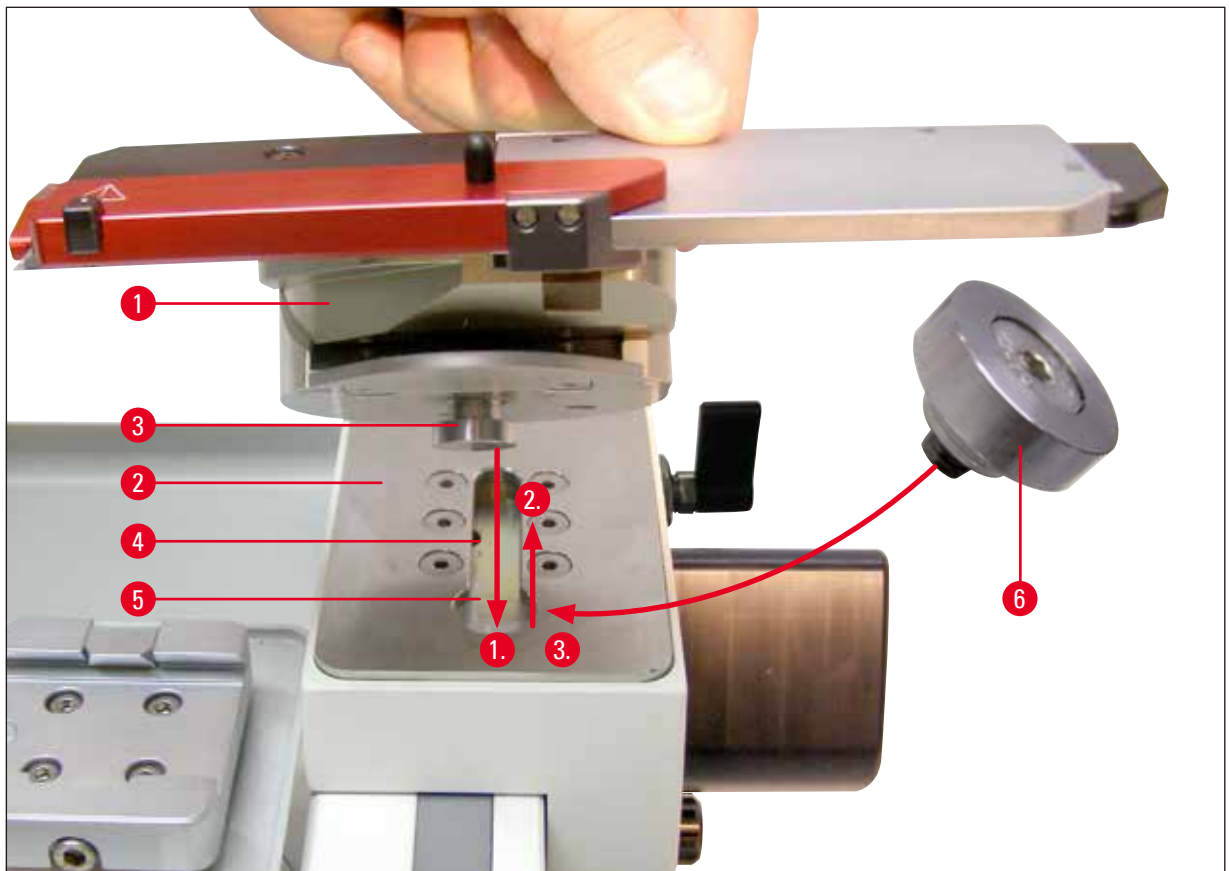


Fig. 17

- Then turn the blade holder (→ Fig. 17-1) approx. 90 ° (→ Fig. 18), insert the stopper (→ Fig. 17-6) that closes the insertion opening (→ Fig. 17-5), and tighten it using the Allen key T25 (→ Fig. 18-1).
- The stopper (→ Fig. 17-6) serves for closing the insertion opening (→ Fig. 17-5) for the T-piece in the grooved plate, in order that no section waste can accumulate there.
- To clamp the blade holder on the grooved plate, tighten the screw (→ Fig. 18-2) on the back of the blade holder base (→ Fig. 17) using a size 6 Allen key (→ Fig. 19).



Fig. 18

Inclination (declination) of the blade holder SE

- Unscrew the Allen screw (→ Fig. 19-1) 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 (→ Fig. 19-2) at the back of the blade holder (→ Fig. 14-3).
- On the grooved plate (→ Fig. 14-4) there is an index mark (→ Fig. 19-3) which serves as a point of reference for the scale division when adjusting the declination.
- For fixation, tighten the screw (→ Fig. 19-1) firmly in the required position.

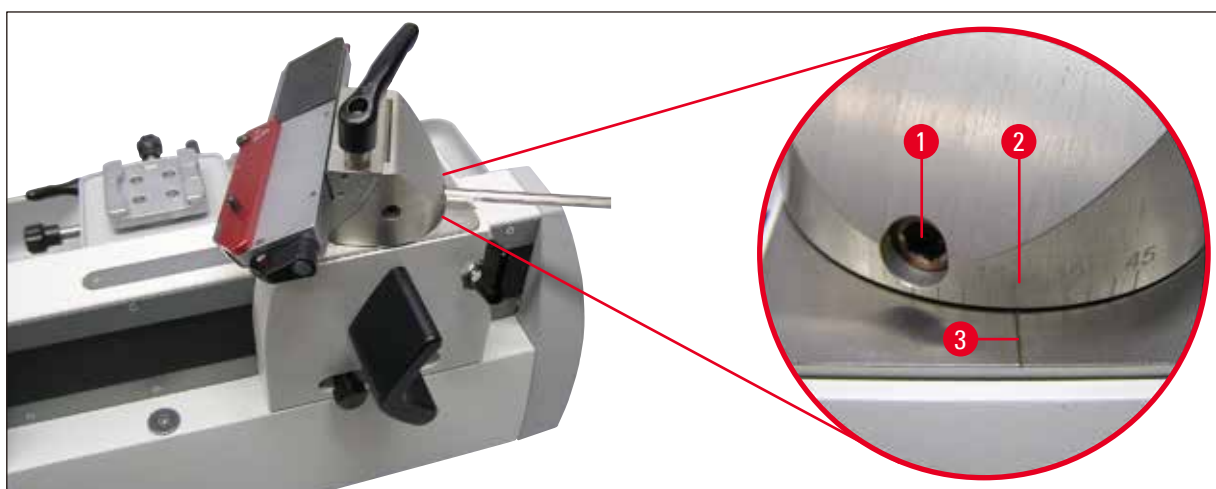


Fig. 19

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 on the segment arc to the right into the "open" position (→ Fig. 20-1).
- Now the blade runner can be moved laterally (→ Fig. 20). To clamp, turn the lever (→ Fig. 20-1) back to the left.

The two triangular marks (→ Fig. 20-2) indicate the area in which the blade rail can be moved laterally, relative to the circular mark (→ Fig. 20-3).

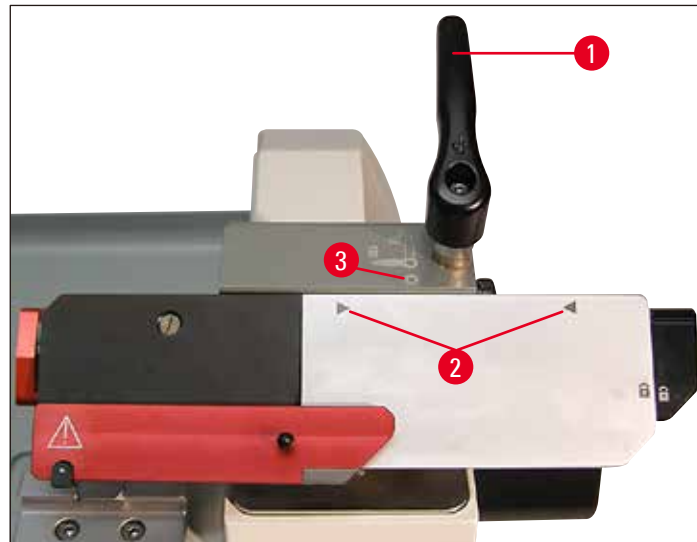


Fig. 20

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 (→ Fig. 21-2) are on the right side of the segment arc (→ Fig. 21-1).
- There is also an index mark on the right side of the knife holder basis (→ Fig. 21-3) which serves as a reference point when adjusting the clearance angle.
- Loosen the screw (→ Fig. 21-4) using a size 4 Allen key until the segment arc (→ Fig. 21-1) can be moved.

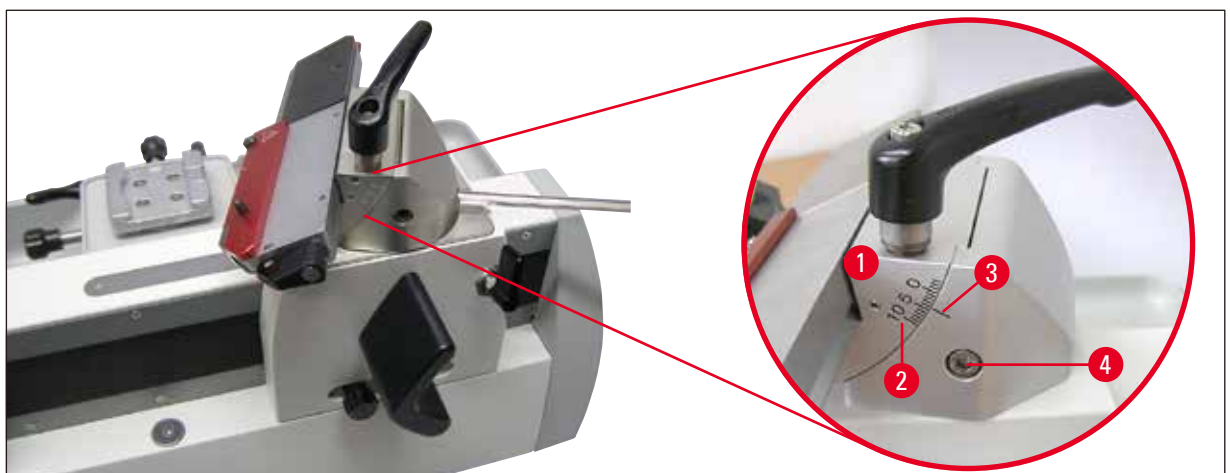


Fig. 21

- Using the blade holder, move the segment arc until the index mark coincides with that of the desired setting.
- Hold down the blade holder in this position and retighten the screw (→ Fig. 21-4) for clamping.

Enlarged detail: Scale for setting the clearance angle.

Example: Enlarged detail showing a clearance angle setting of 4°.

**Note**

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

4.7 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 (→ Fig. 23-2) to hold all the available accessory specimen clamps (for more information, see (→ 7. Optional accessories-2)).

To do so, proceed as follows:

- Move the object head (→ Fig. 22-1) to the lower end position by turning the coarse driving wheel (→ Fig. 22-2).



Fig. 22

- To loosen the clamping system, turn the screw (→ Fig. 23-1) of the quick clamping system (→ Fig. 23-2) counterclockwise using a size 4 Allen key (→ Fig. 23-3).

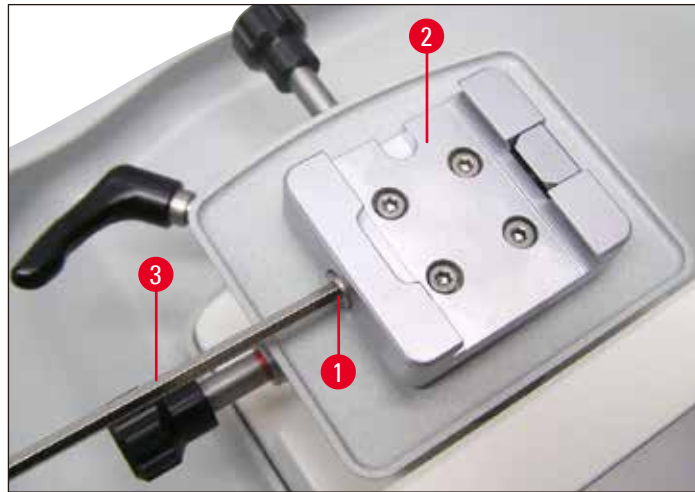


Fig. 23

- Push the guide (→ Fig. 24-1) of the universal cassette clamp (→ Fig. 24-2) from the left into the quick clamping system (→ Fig. 24-3) as far as it will go.
- To clamp the cassette clamp, turn the screw (→ Fig. 24-4) clockwise as far as it will go using the size 4 Allen key.

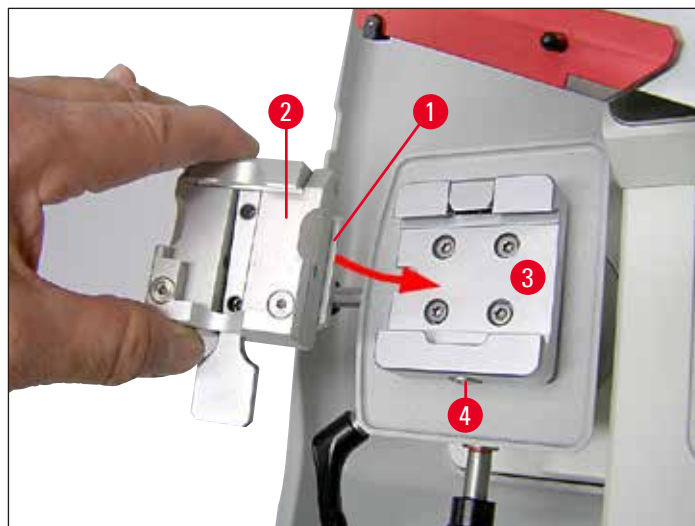


Fig. 24

**Note**

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.

5. Operation

5.1 Operating elements and their functions

5.1.1 Section thickness setting

The section thickness is set by turning the adjusting knob (→ Fig. 25-1) 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 μm

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

The selected section thickness (on the scale) must agree with the red pointer (→ Fig. 25-2).



Fig. 25

5.1.2 Coarse driving wheel

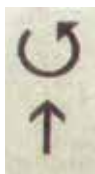
The coarse feed serves for fast vertical upward movement of the object (towards the knife) and downward movement (away from the knife).

The coarse driving wheel (→ Fig. 25-3) has a direction selection lever (→ Fig. 25-4) 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.

5.1.3 Manual feed

The lever (→ Fig. 26-1) 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 (→ Fig. 26-2).

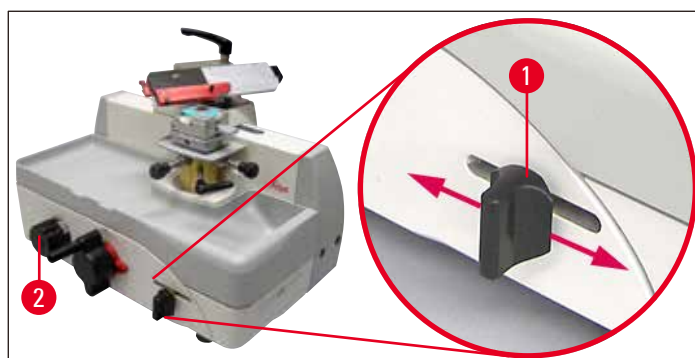


Fig. 26

5.1.4 Automatic feed

The position of the adjusting knob (→ Fig. 27-1) determines the point of the knife sledge movement where the automatic feed takes place. It should take place immediately in front of the specimen.



Caution

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 (→ Fig. 27-2) until it is just in front of the specimen (→ Fig. 27-3) and lock it in this position using the locking knob (→ Fig. 27-4).
- Loosen the adjusting button (→ Fig. 27-1) 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.

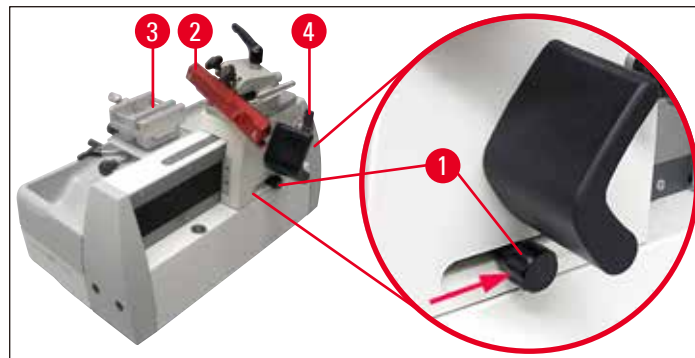


Fig. 27



Note

If the adjusting button (→ Fig. 27-1) is locked in the frontmost (left) position, there is no feed motion.

5.1.5 Directional fixture for specimen clamps



Note

All object clamps available as optional accessories can be inserted into the quick clamping device (→ Fig. 28-5) of the directional specimen holder fixture, all object clamps available as optional accessories can be used.

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 (→ Fig. 28-1)) upwards.



Caution

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

- Turn setscrew (→ Fig. 28-2) to orient the specimen in the cutting direction. Turn setscrew (→ Fig. 28-3) 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 (→ Fig. 28-1) backwards.

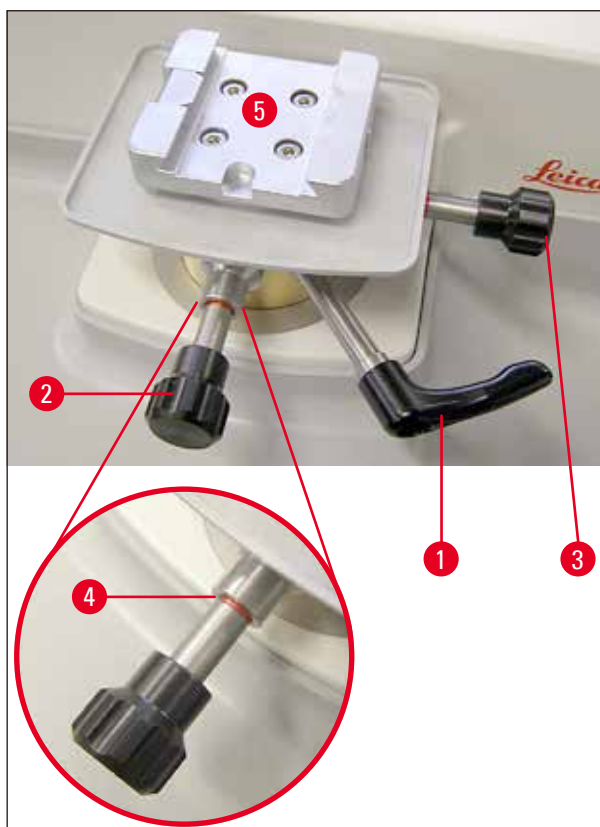


Fig. 28

Display of the zero position

For better display of the zero position, each setscrew (→ Fig. 28-2) (→ Fig. 28-3) has a red mark (→ Fig. 28-4).

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°).

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



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 (→ Fig. 29-1) to the very bottom position by turning the coarse driving wheel.
- Lock the knife sledge in place using the locking knob (→ Fig. 29-2).
- Cover the blade edge with the knife guard (→ Fig. 29-3) toward the right.
- Push the clamping lever (→ Fig. 29-4) upwards to open the clamp.
- Insert the cassette (→ Fig. 29-5) into the cassette clamp.
- To clamp the cassette, release the lever (→ Fig. 29-4).

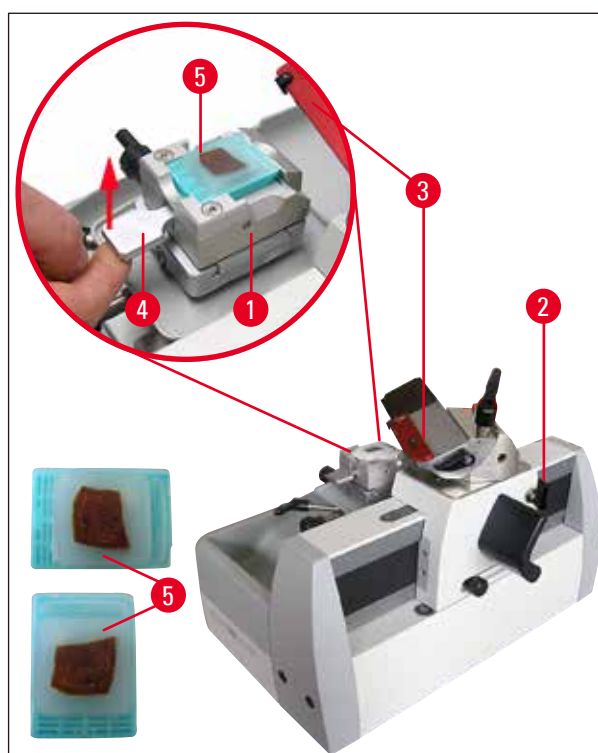


Fig. 29



Note

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

5.3 Clamping a disposable blade



Warning

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

- Push the knife guard (→ Fig. 30-1) towards the right and push the lever (→ Fig. 30-2) upwards to release the clamp of the pressure plate (→ Fig. 30-3).
- Flap the insertion aid (→ Fig. 30-4) downwards.
- Position the dispenser (→ Fig. 30-5) with the disposable blades sideways and push the blade (→ Fig. 30-6) into the blade holder.
- Using a brush stick (→ Fig. 30-7), carefully push the blade into its final position. The notch (→ Fig. 30-8) makes it easier to push the blade all the way underneath the pressure plate.
- Push the clamping lever (→ Fig. 30-1) downwards to clamp the blade.
- Make sure that the blade is clamped parallel to the front edge of the pressure plate.

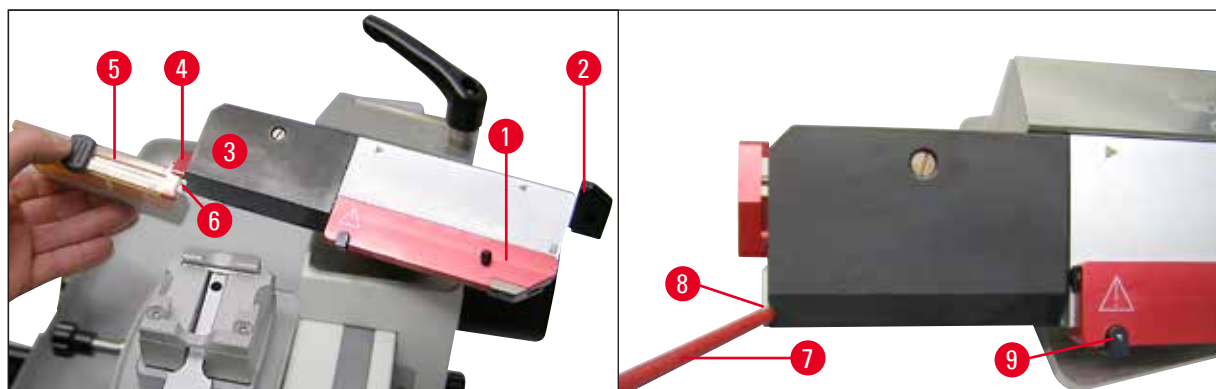


Fig. 30

Removal aid

A removal aid is provided for removing used blades (→ Fig. 31-1).

- Loosen the clamping lever (→ Fig. 31-2) of the pressure plate (→ Fig. 31-3).
- Push the knife guard (→ Fig. 31-4) towards the left while holding down the black push button (→ Fig. 31-5) (→ Fig. 30-9). This pushes out the blade far enough sideways that it can be removed easily.

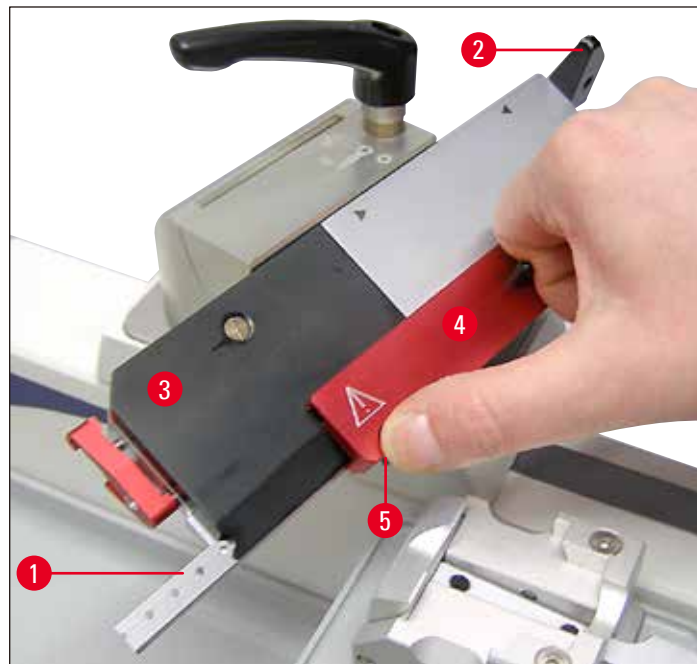


Fig. 31

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 (→ Fig. 32-1) and the matching insertion aid (→ Fig. 32-2) have to be replaced.

To replace them, proceed as follows:

- Push the knife guard (→ Fig. 32-3) towards the right and push the lever (→ Fig. 32-4) upwards to release the clamp of the pressure plate (→ Fig. 32-1).

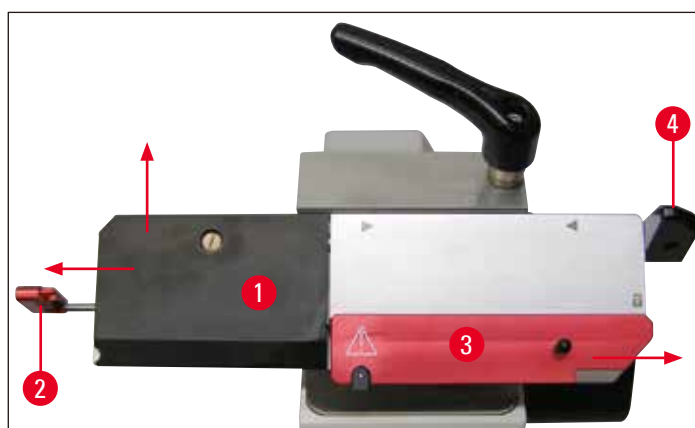


Fig. 32

- Now carefully pull the insertion aid (→ Fig. 32-2) out to the left (→ Fig. 32). The pressure plate (→ Fig. 32-1) can now be taken off (→ Fig. 33).



Fig. 33

- To mount another pressure plate, please proceed in the reverse sequence. Only use the pressure plate together with the matching insertion aid.

5 Operation

- Pressure plate kit (→ Fig. 34). Pressure plate (→ Fig. 34-1) Insertion aid (→ Fig. 34-2)



Fig. 34



Warning

The slotted screw (→ Fig. 34-3) in the pressure plate is adjusted at the factory and glued in. It must not be altered.

5.5 Inserting the knife



Warning

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 (→ Fig. 35-1) in place using the locking knob (→ Fig. 35-2).
- Please make sure that the knife holder is firmly clamped using the clamping lever (→ Fig. 35-3) and that the knurled head screw (→ Fig. 35-4) is tightened.
- Push the knife guard (→ Fig. 35-5) to the right and loosen the clamping screws (→ Fig. 35-6) sufficiently to allow the knife to be inserted.
- Take the knife out of the knife case and insert it carefully.

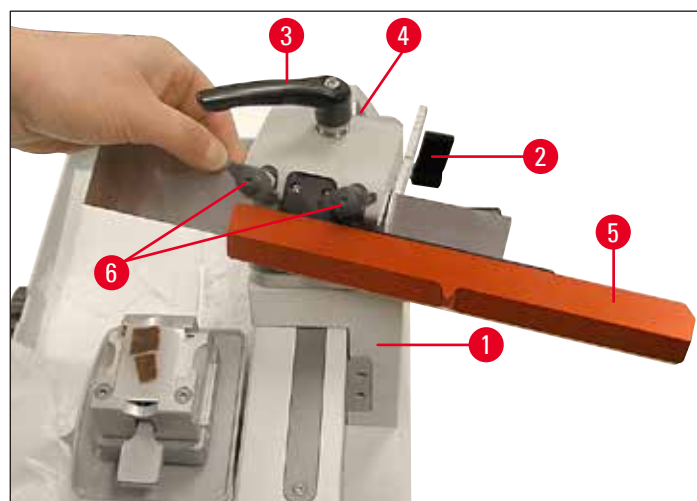


Fig. 35

- Tighten the two clamping screws (→ Fig. 36-1) in alternation until both are secure and cover the knife with the knife guard (→ Fig. 36-2).

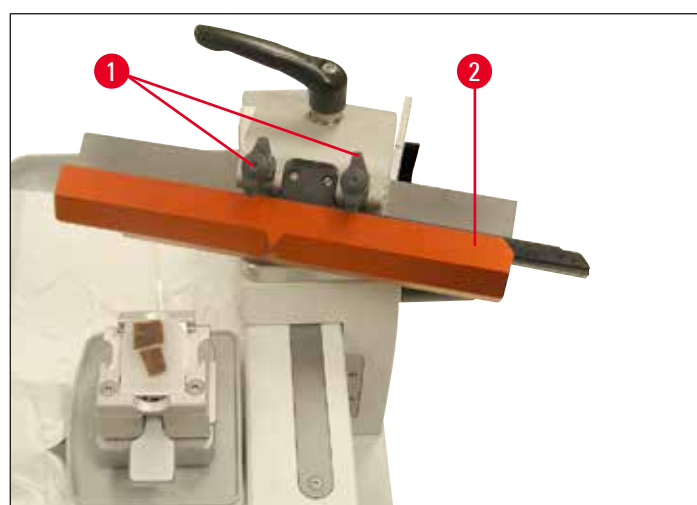


Fig. 36

**Note**

Proceed the same way to clamp a blade rail.

5.6 Sectioning

Cutting into the specimen (trimming)

For trimming, the specimen feed can be disengaged either by turning the coarse driving wheel (→ Fig. 37-4) or by operating the manual feed lever (→ Fig. 37-6).

- Hold the knife sledge (→ Fig. 37-1) at the grip (→ Fig. 37-2) and place the sledge behind the specimen.
- Pull the knife guard (→ Fig. 37-3) of the blade/knife holder to the right.
- To feed the specimen towards the knife, turn the coarse driving wheel (→ Fig. 37-4);
or
select the required section thickness with the section thickness adjusting knob (→ Fig. 37-5) and move the manual feed lever (→ Fig. 37-6). 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.

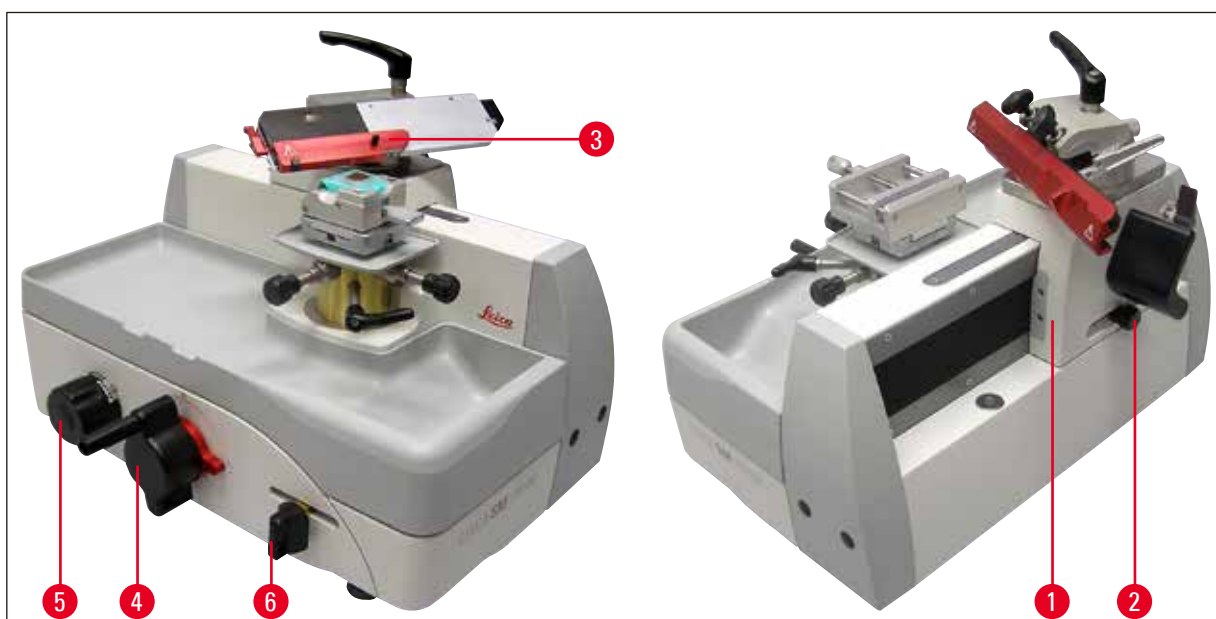


Fig. 37

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 (→ Fig. 37-5).
- 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.


Warning

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


Note

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.

5.7 Changing the specimen or interrupting sectioning


Warning

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


Warning

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!

- Raise the specimen to the lower end position by turning the coarse driving wheel and lock the knife sledge. 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 (→ p. 42 – 6.1 [Cleaning the instrument](#)).

6. Cleaning and maintenance

6.1 Cleaning the instrument



Warning

- 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



Warning

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

Designation	Order No.
Supermega 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. 38

Supernova cassette clamp,

with adapter, silver

for mounting in the quick change system for specimen imaging

Maximum specimen size: 75x52x35 mm (L x W x H)

Order No.:**14 0508 42634**

Fig. 39

Universal cassette clamp (UCC),

with adapter, silver

for mounting in the quick change system for specimen imaging

Maximum specimen size: 40 x 29 mm (L x W)

Order No.:**14 0508 42635**

Fig. 40

HN40 tensioning clamp,

with adapter, silver

for mounting in the quick change system for specimen imaging

Maximum specimen size: 59 x 45 mm (L x W)

Order No**14 0508 42637**



Fig. 41

Standard specimen clamp,

with adapter, silver

for mounting in the quick change system for specimen imaging

Maximum specimen size: 79 x 60 mm (L x W)

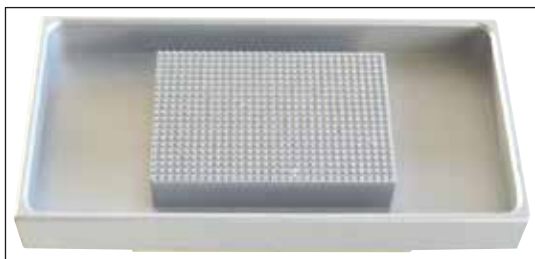
Order No**14 0508 42632**

Fig. 42

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. 43

Dust cover**Order No.****14 0216 07100**



Fig. 44

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

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
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

Fig. 45



Fig. 46

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 countersunk screws M5x12 Torx 14 3000 00227

1 knife holder attachment SN 14 0508 44857

Order No

14 0508 44670



Fig. 47

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.

Order No

14 0368 33013



Fig. 48

Low-profile blade rail set, assembly

Shipment in a plastic case with one pressure plate and all required tools and accessories.

Order No

14 0368 38111



Fig. 49

Plastic knife guard,

for blade rails

Order No

14 0368 33772

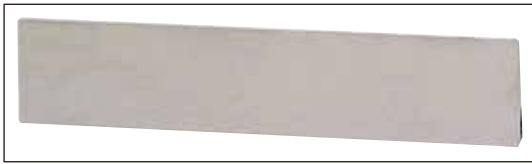


Fig. 50

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. 51

Knife, 16 cm

Profile D, steel

Note: including knife case 14 0213 11140

Order No.**14 0216 07132**

Fig. 52

Knife, 22 cm

Profile C, steel

for paraffin and cryosections;

Note: including knife case 14 0213 11141

Order No**14 0216 07116**

Fig. 53

Ball handle, assembly**Order No****14 0508 42565**



Fig. 54

Leica low-profile disposable blades - Type 819

Length 80 mm, height 8 mm

1 package of 50 pieces

Order No**14 0358 38925**

Fig. 55

Leica high-profile disposable blades - Type 818

Length 80 mm, height 14 mm

1 package of 50 pieces

Order No**14 0358 38926**

8. Troubleshooting



Note

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.

8.1 Possible faults

Problem	Possible cause	Correction action
Thick/thin sections The sections alternate between being thick and thin. In extreme cases, there are no sections whatsoever	• The blade is not clamped properly. • Blunt blade/knife. • Angle of inclination of the knife/blade and therefore also clearance angle too small.	• Reclamp the blade. • Laterally displace the blade/knife holder or insert a new blade/knife. • Methodically experiment with larger clearance angle settings until you have found the optimum angle.
Section compression The sections are very compressed, show folds or are squeezed together.	• The blade/knife is blunt. • The specimen is too warm. • The clearance angle is too wide.	• Use another area of the blade/knife, or use a new blade/knife. • Cool the specimen before sectioning. • Methodically reduce the clearance angle setting until you have found the optimum angle.
The sections have scratches and chatter marks	• The clearance angle is too wide. • Unsuitable knife profile • Insufficient clamping to the object holder system and/or the blade/knife holder	• Methodically reduce the clearance angle setting until you have found the optimum angle. • Use a knife with another profile. • Check all screw and clamp connections on the object holder system and the knife holder. If necessary, tighten the levers and screws.

8.2 Instrument malfunctions

Problem	Possible cause	Correction action
There is no further feed motion and thus no sectioning. High blade consumption	• The front end position has been reached. • Too great of a sectioning force was applied.	• Run the specimen downwards by turning the coarse driving wheel. • Adjust the sectioning speed and/or section thickness when trimming. Select a smaller section thickness, move knife sledge more slowly.

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.

10. Decontamination Confirmation

Every product that is returned to Leica Biosystems or that requires on-site maintenance must be properly cleaned and decontaminated. You can find the dedicated template of the decontamination confirmation on our website www.LeicaBiosystems.com within the product menu. This template has to be used for gathering all required data.

When returning a product, a copy of the filled and signed confirmation has to be enclosed or passed on to the service technician. The responsibility for products that are sent back without this confirmation or with an incomplete confirmation lies with the sender. Returned goods that are considered to be a potential source of danger by the company will be sent back at the expense and risk of the sender.

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