



Leica SM2010R

Sliding Microtome



Instruction Manual

Leica SM2010R

V1.2 English - 09/2008

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 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.

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

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Symbols in the text and their meanings



Dangers, warnings and cautions appear in a gray box and are marked by a warning triangle .



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

(5)

Numbers in parentheses refer to item numbers in illustrations.

Qualification of personnel

- The Leica SM2010R may be operated by trained laboratory personnel only.
- All laboratory personnel designated to operate the Leica instrument must read this instruction manual carefully and must be familiar with all technical features of the instrument before attempting to operate it.

Intended use of instrument

The Leica SM2010R 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 this manual applies only to the instrument type indicated on the cover page.

An identification label indicating the instrument serial number is attached at the left side of the 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

This instruction manual contains important instructions and information regarding the operational safety and maintenance of the instrument.

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



If additional requirements on accident prevention and environmental protection exist in the country of operation, this instruction manual must be supplemented by appropriate instructions to ensure compliance with such requirements.



**For current information about applicable standards, please refer to the CE declaration for the instrument and to our Internet site:
<http://www.histo-solutions.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 instruction labels on the instrument marked with a warning triangle indicate that the correct operating instructions (as described in this manual) must be followed when operating or replacing the instrument component bearing the label. 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 removed from the crate, the instrument may only be transported 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 feed wheel or the knob for setting the section thickness.

Warnings - Working at the instrument



- Take care when handling microtome knives and disposable 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.
- Caution! The knife sledge movement is extremely smooth. It may occur that the sledge moves during section removal. To prevent the sledge from moving accidentally, pull it to the front limit of the slideway, where it is held in position by the magnetic knife sledge immobilizer, before removing the section.
- 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 no liquids enter the interior of the instrument when cleaning!
- When using detergents, please comply with the safety precautions of the manufacturer and the laboratory regulations!

2. Safety

2.3 Integrated safety devices

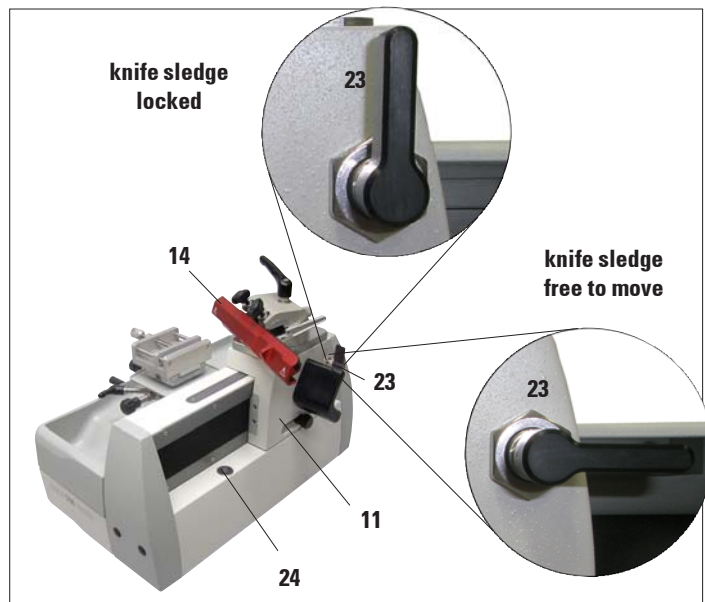


Fig. 2

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).

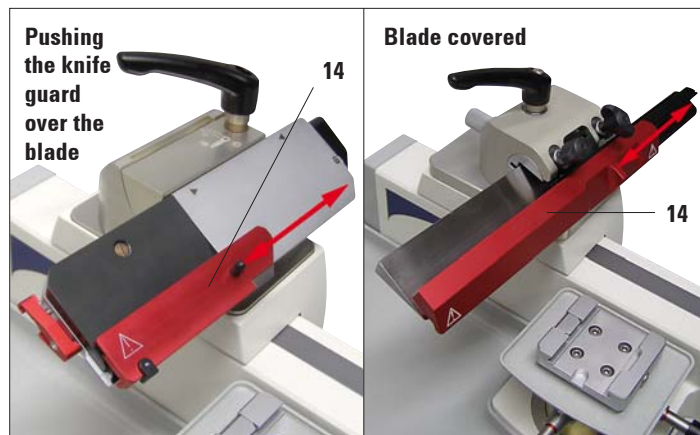


Fig. 3

The instrument is equipped with the following safety devices:

Knife guard (14) on the blade/knife holder, knife sledge locking knob (23) and magnetic knife sledge immobilizer (24).

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. To lock it in place, move the lever until it is vertical – in this position, it engages in the next possible position. 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, or 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

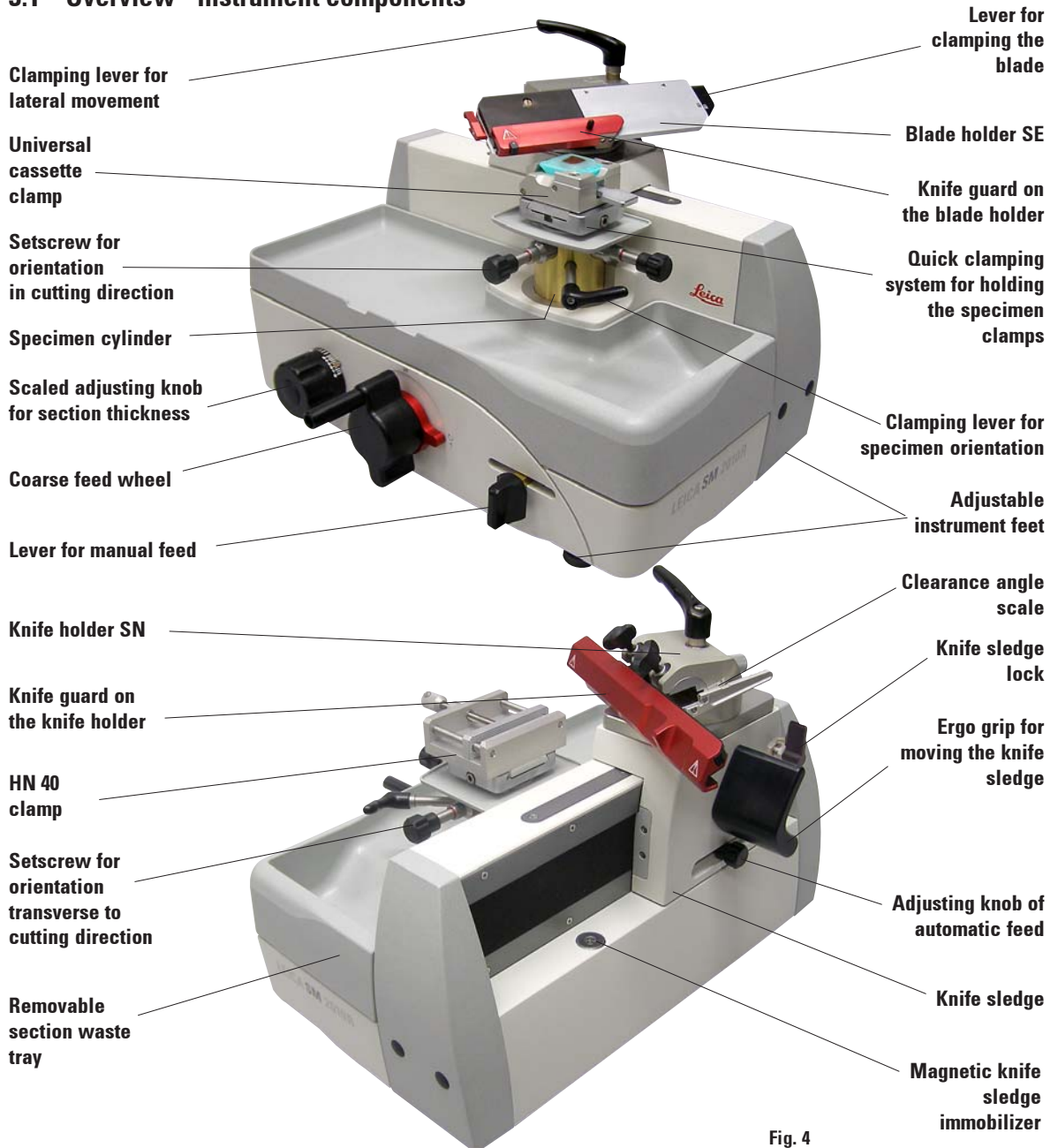


Fig. 4

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
Humidity during storage:	< 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 feed:	from 0.5 - 30 µm
Specimen feed:	approx. 50 mm
clearance angle:	-3° bis 10°
Maximum specimen size:	50 x 60 x 40 mm
Specimen orientation	
in cutting direction:	± 8 °
transverse to cutting direction:	± 8 °
Declination:	0° - 45° in cutting direction

Dimensions and weight

Width (including coarse feed wheel and spherical handle):	390 mm
Width (base plate):	256 mm
Depth:	430 mm
Height (total):	343 mm (with blade holder)
Working height (knife edge):	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.
- The micrometer feed system is located in an enclosed housing.
- The vertical cross roller bearings have a cover which provides reliable protection from ingress of section waste.
- The instrument has an ergonomically optimized object head position, the knife sledge, with its smooth movement, can be locked in place securely at increments of 10 mm.
- 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 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.
- Both the blade and knife holder 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 clearance angle adjustment.
- The smooth-turning, coarse feed wheel can be chosen with clockwise or counter clockwise rotation.
- Different specimen clamps can be inserted in the quick clamping system.

4. Setup the instrument

4.1 Standard delivery

The Leica SM2010R 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 Hexagon wrench T25	14 0194 45250
1 Open-end wrench, size 10	14 0330 04158
1 Magnet Replacement	14 0508 44762
1 Dust protection cover	14 0212 18961
1 Pair of cut resistant gloves, size S	14 0340 40859
1 instruction manual	14 0508 80001



The accessories ordered are included in a separate box. Carefully check the delivery against the packing list and the delivery note. Should there be any discrepancy, please directly contact the Leica selling unit handling your order.

4.2 Site requirements

- Stable, vibration-free laboratory bench with horizontal, even stage plate; practically vibration-free floor.
- No other instruments nearby which might cause vibrations.
- Room temperature permanently between + 10 °C and + 40 °C.
- Free access to coarse feed wheel and knife sledge.
- The instrument is designed for indoor use 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 feed 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.

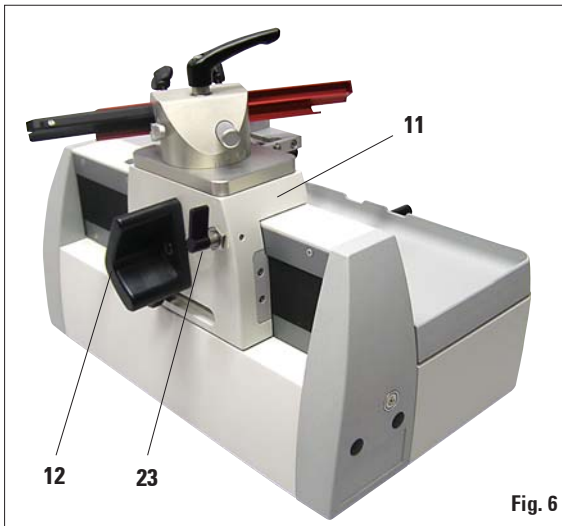


Fig. 6

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.

- To release the locking mechanism, move the handle of the locking knob (23) into a horizontal position. The knife sledge can now be moved using the ergonomically shaped handle (12).

4. Setup the instrument

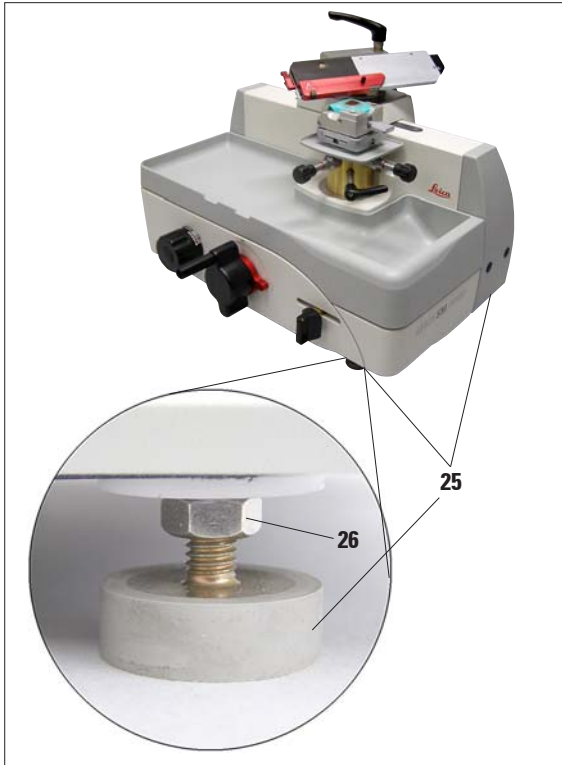


Fig. 7

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.

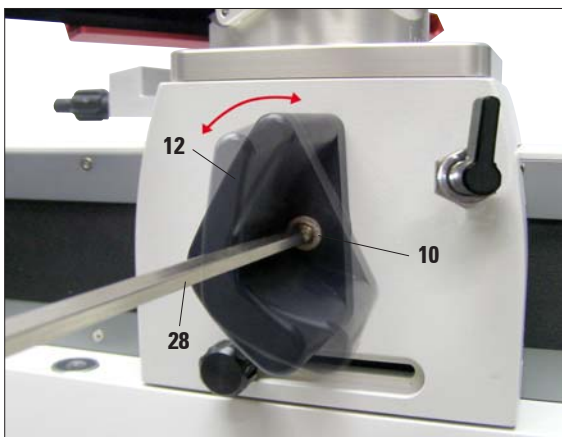


Fig. 8

Setting the Ergogrip

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

- To do this, loosen the fixation screw (10) using an Allen key SW 6 (28).
- Turn the grip (12) to the required position and tighten the screw (99) firmly again.

4.5 Mounting the knife holder SN

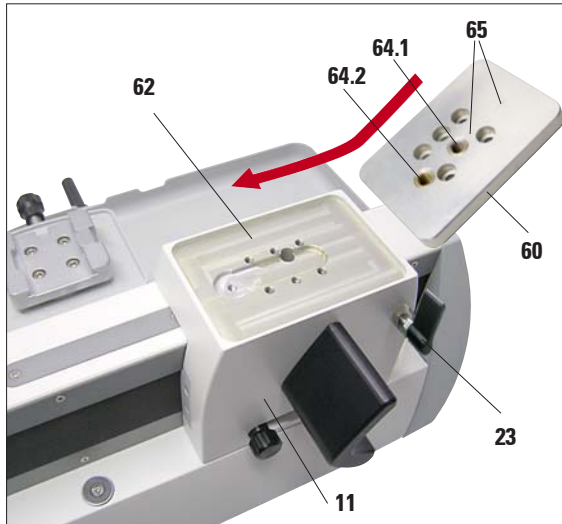


Fig. 9

Mounting the intermediate plate

- To do so, 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.

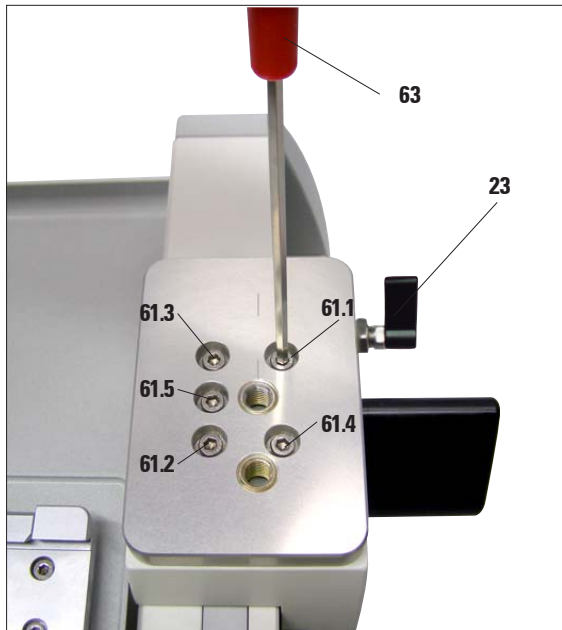


Fig. 10

- As shown in [Fig. 9](#), place the intermediate plate on the mounting table. Please make sure that the two index markings (65) are at the top and point towards the back.
- Insert the five fillister head screws (61.1-61.5) in the bores and using a Hexagon wrench T25 (63) tighten them firmly, cross-wise (in the sequence shown in [Fig. 10](#)).

4. Setup the instrument

Mounting the knife holder SN (continued)

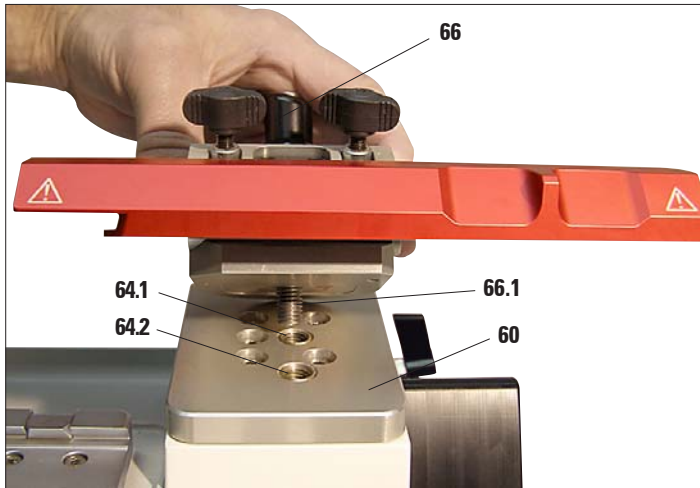


Fig. 11

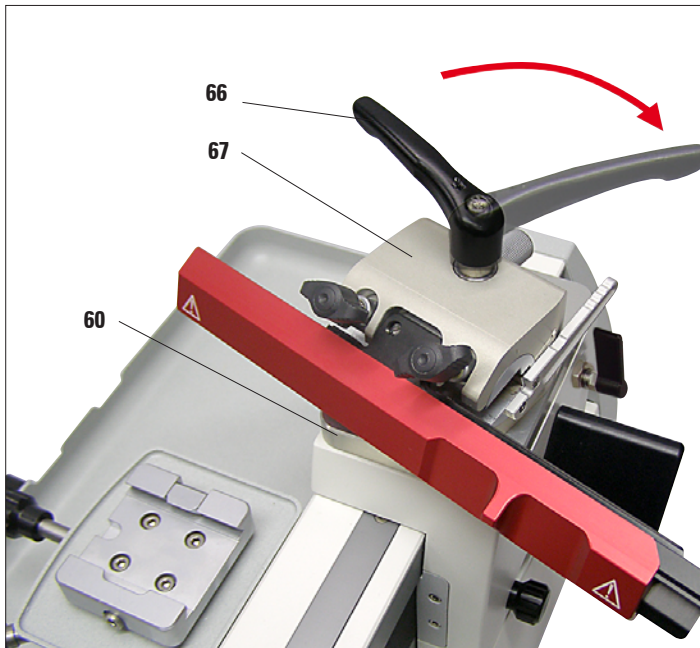


Fig. 12

Fastening the knife holder



Two mounting positions are available for the knife holder SN (67) to meet different sectioning requirements. The knife holder can be mounted in any of the two holes (64) of the knife sledge.

- Press the clamping lever (66) of the knife holder (67) downwards and with the lower part of the thread (66.1) turn in one of the two bores (64.1) or (64.2), Fig. 11) 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 plastic grip of the clamping lever (66) can be repositioned as preferred by the user. Pull the grip out of the lever, hold it in this position, and turn it to the desired position. It will lock automatically when released.

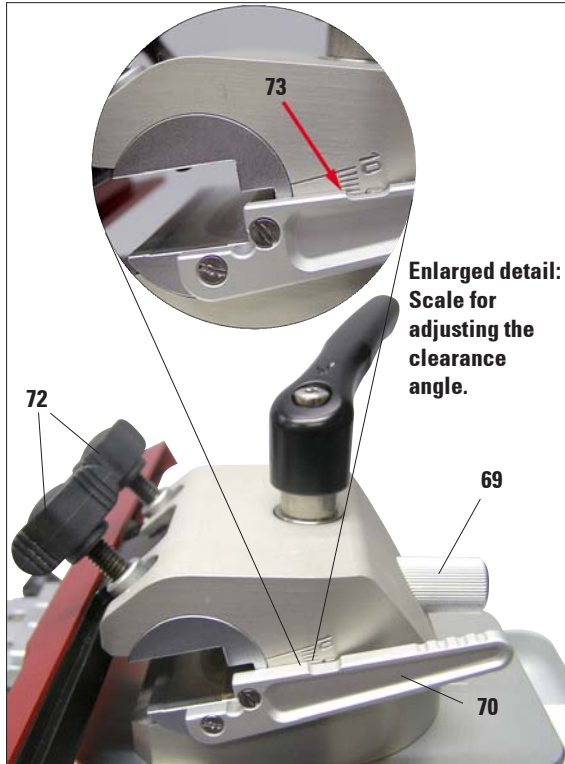


Fig. 13

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) (red arrow).
- For fixing the setting, tighten the knurled head screw (69) again.

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 required angle as described above.
- For fixing the setting, tighten the knurled head screw (69) again.

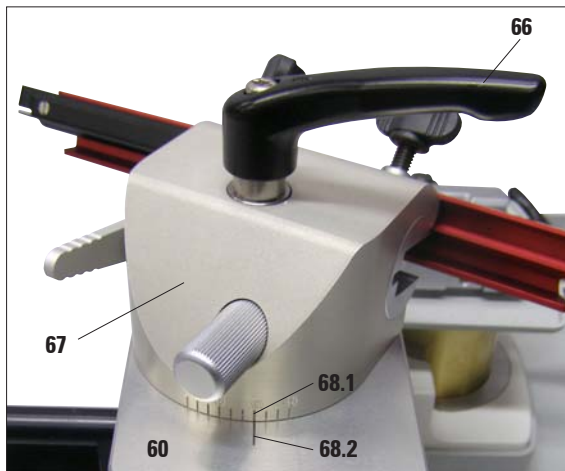


Fig. 14

Inclination (declination) of the knife holder SN (Fig. 14)

- Loosen the clamping lever (66).
- Then turn the knife holder (67) into the required position.
- Set the required declination (inclination of the knife holder from the cutting direction) on the scale (68.1) 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. Setup the instrument

4.6 Mounting the blade holder SE

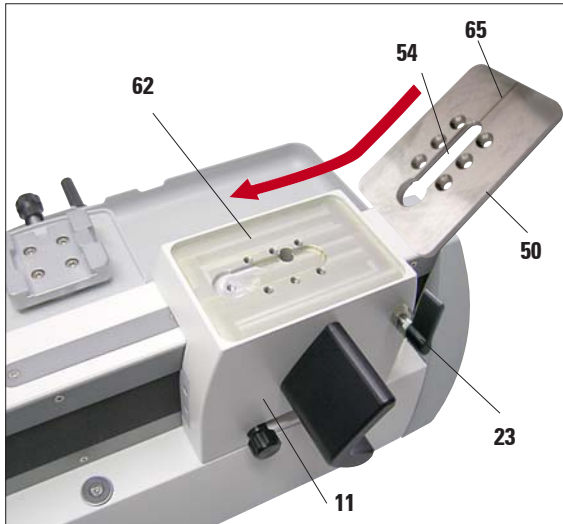


Fig. 15

The blade holder SN is designed for conventional disposable blades from all current manufacturers. It is available in two versions, for high-profile and for low-profile blades. The knife holder has a lateral movement, so that the entire width of the blade can be used.

Mounting the grooved plate

- To do so, 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.

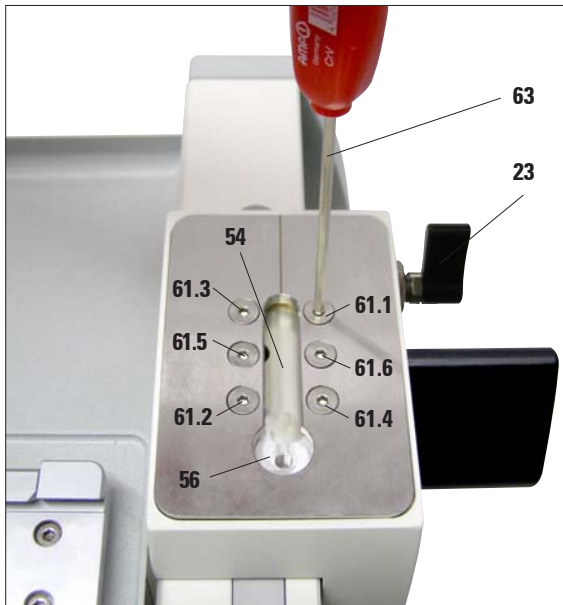
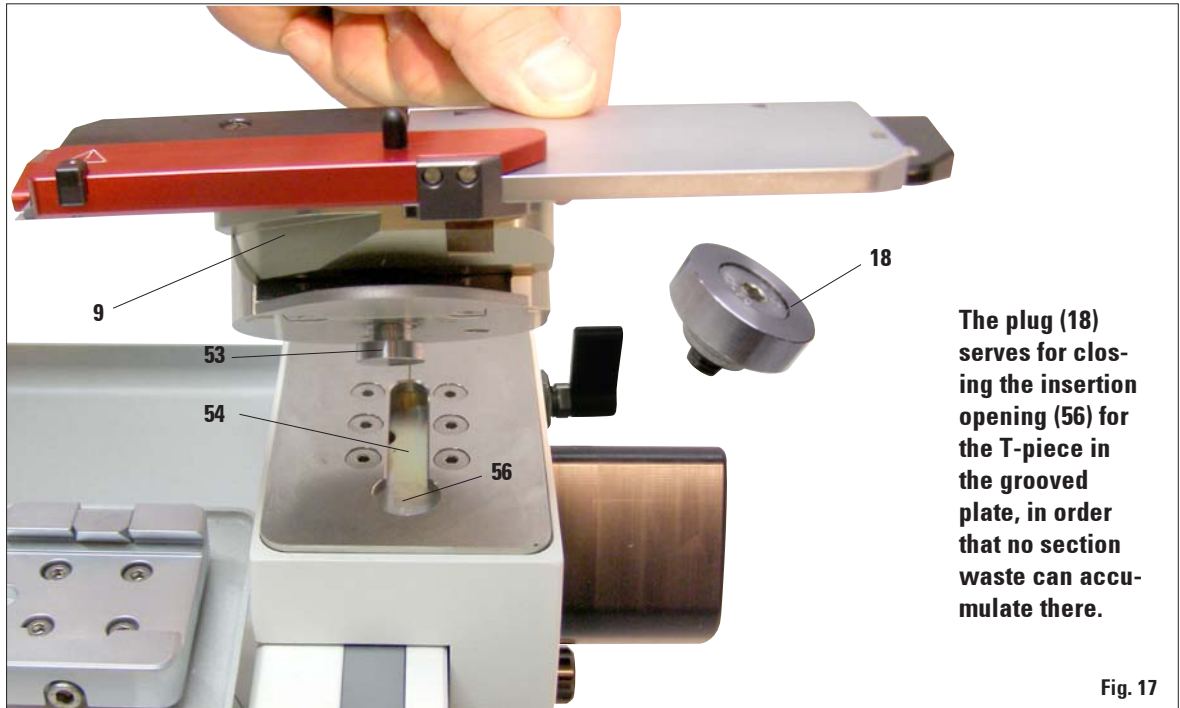


Abb. 16

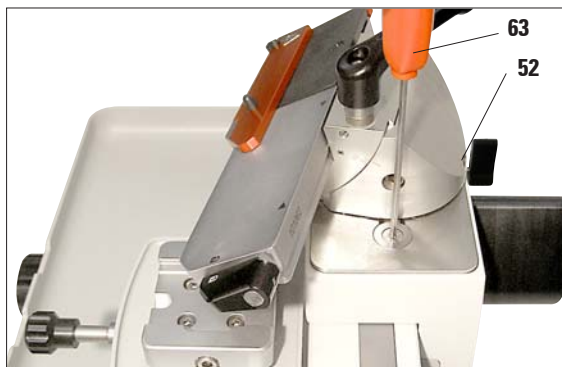
- As shown in Fig. 15, place the grooved plate on the mounting table. Please make sure that the groove (54) for inserting the blade holder has the rounded end (56) pointing forwards (Fig. 16).
- Insert the six countersunk screws (61.1-61.6) in the bores, and using an Hexagon wrench T25 (63) tighten them firmly, crosswise (in the sequence shown in Fig. 16).

Mounting the blade holder SE (continued)

Inserting the blade holder SE



- 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) through approx. 90° and insert the stopper (18) that closes the insertion opening (56), and tighten it firmly using the Hexagon wrench T25 (63).
- For clamping the blade holder on the groove plate, tighten the screw (52) at the back of the blade-holder base (17) using an Allen key SW 6 (63) (Fig. 19).

4. Setup the instrument

Mounting the blade holder SE (continued)

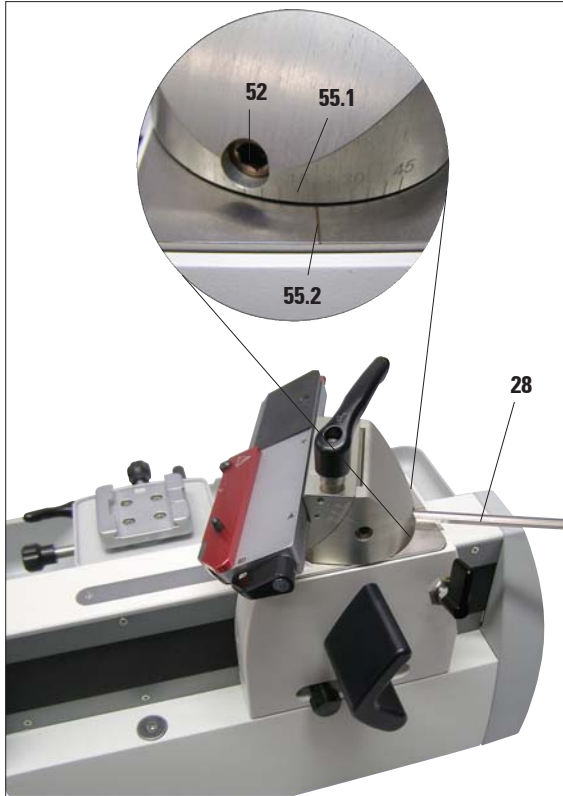


Fig. 19

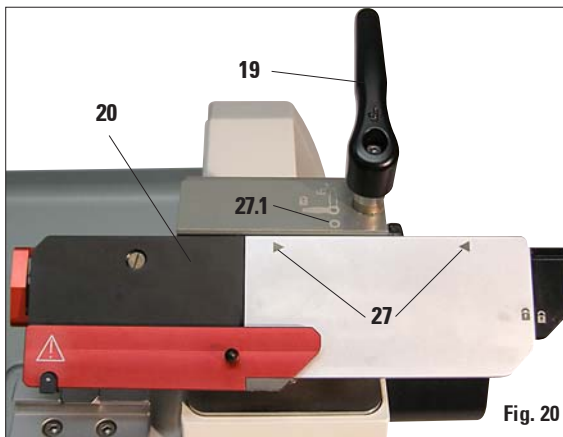


Fig. 20

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 (28).
- 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 movement feature of the knife holder base enables the use of the entire length of the blade or knife, eliminating the need for readjusting the knife holder.

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

The two triangular marks (27) indicate the range in which the blade holder can be moved - in relation to the circularly marking (21) - laterally.

Mounting the blade holder SE (continued)

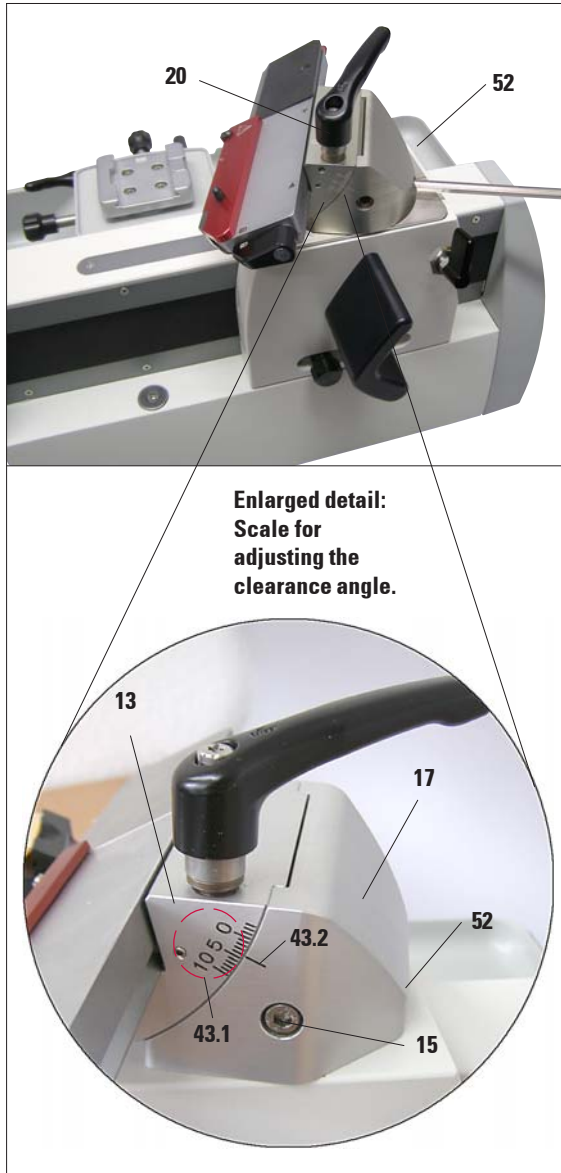


Fig. 21

Adjusting the clearance angle



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 (-3° 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 (43.2) on the right side of the knife holder basis (17) 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. Setup the instrument

4.7 Inserting the universal cassette clamp

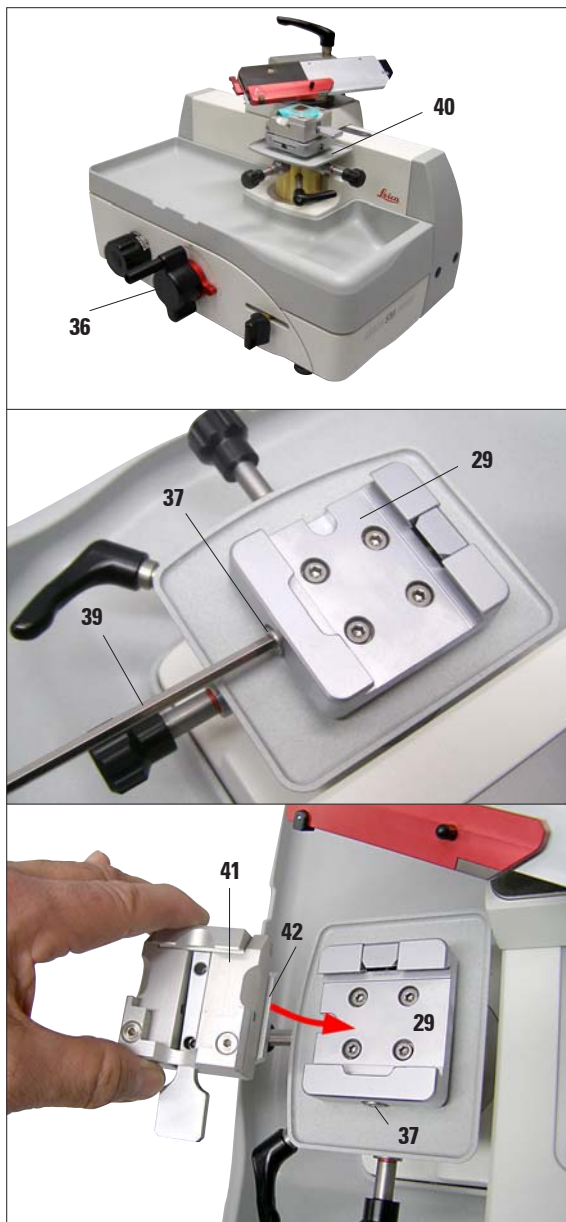


Fig. 22

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 feed wheel (36).
- To loosen the clamping system, turn the screw (37) of the quick clamping system (29) counter clockwise 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 (28) as far as it will go.
- To clamp the cassette clamp, tighten the screw (37) in a clockwise direction using the size 4 Allen key as far as it will go.



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

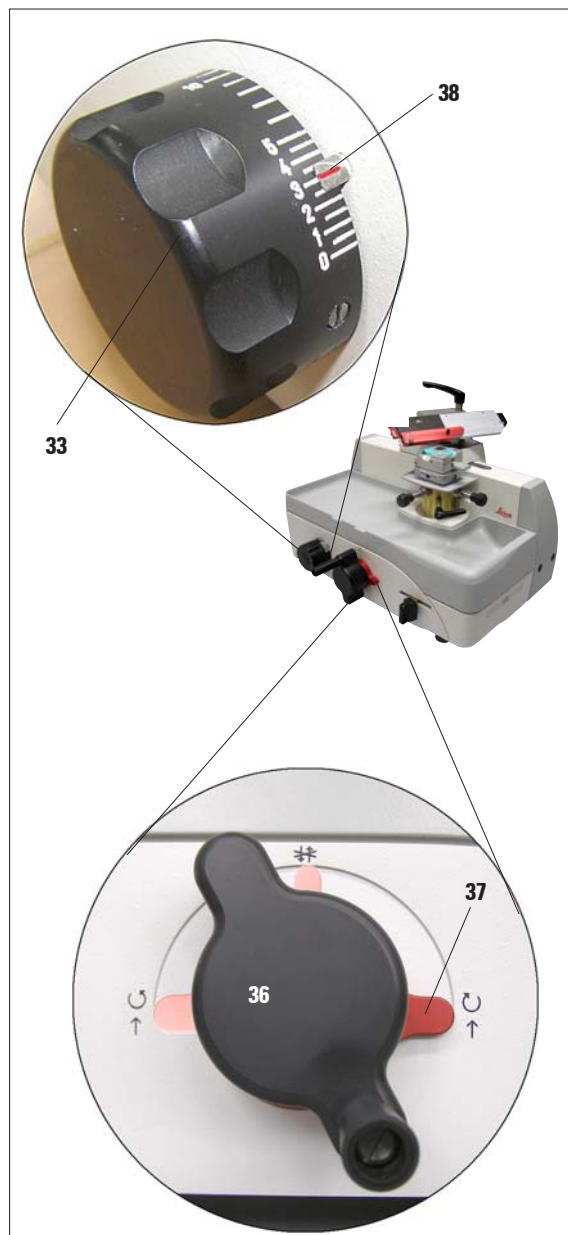


Fig. 23

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 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 (38).

5.1.2 Coarse feed 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 feed 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 feed wheel does not result in a feed motion.

The coarse feed wheel does not turn as well during sectioning.

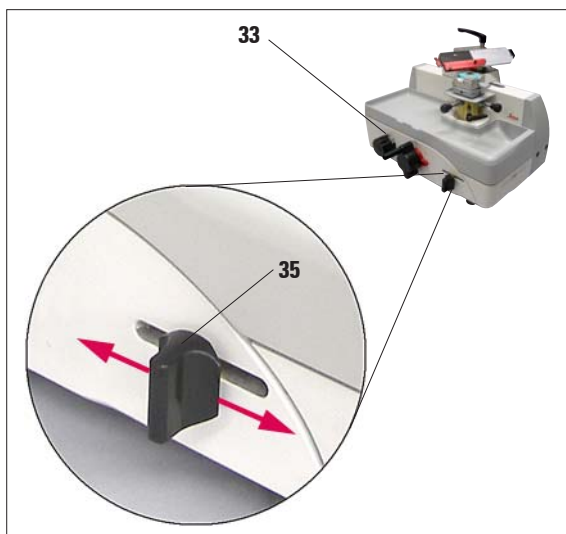


Fig. 24

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.

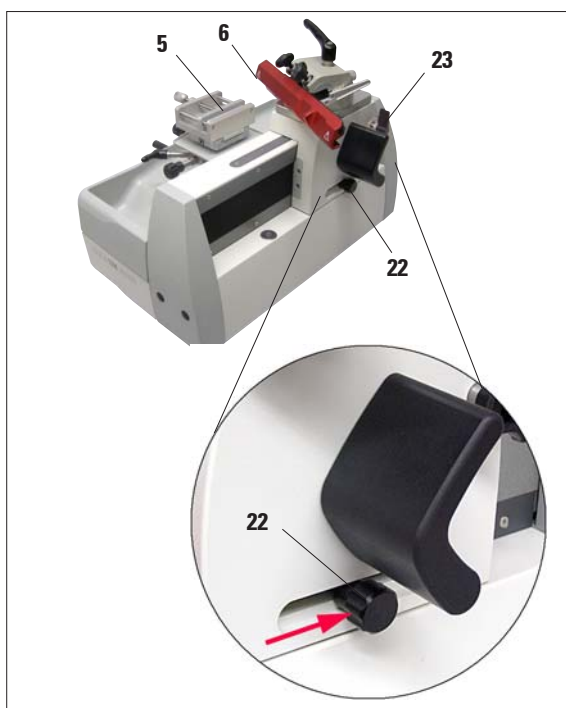


Fig. 25

- 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 is locked in the frontmost (left) position (Fig. 25), there is no feed motion.

5. Operation

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.

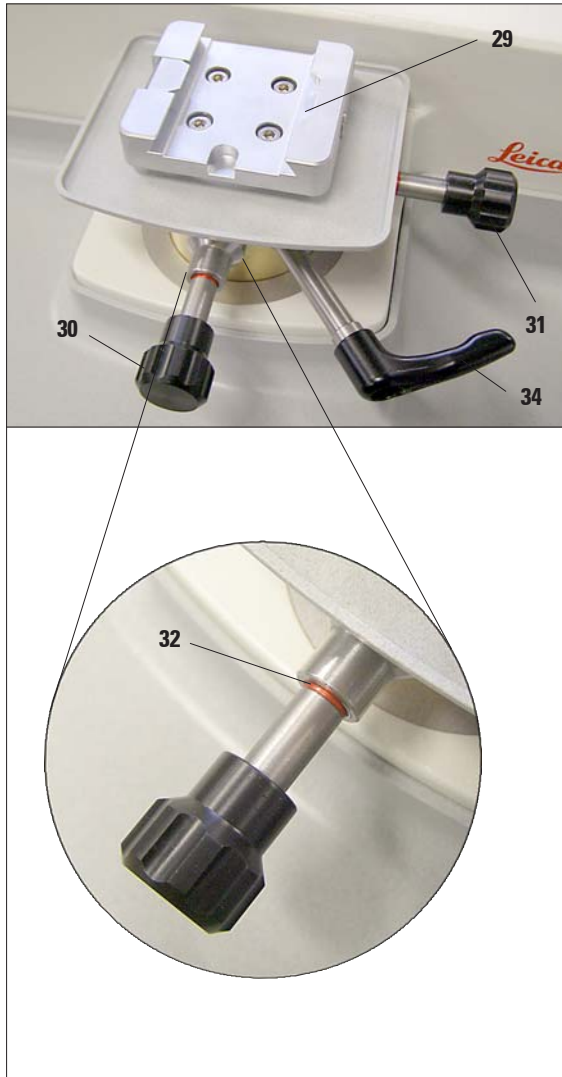


Fig. 26

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.

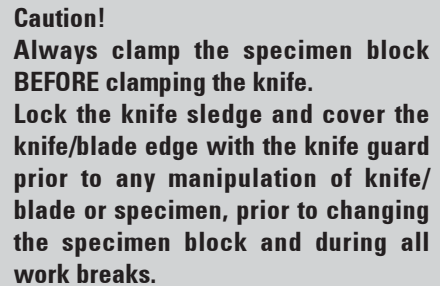
- To lock the current orientation, turn the eccentric lever (34) backwards.

Display of the zero position

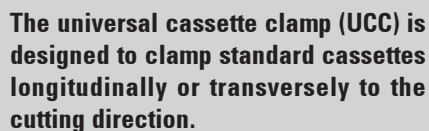
For better display of the zero position, each setscrew (30, 31) has a red mark (32).

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°).

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



- Move the cassette clamp **(41)** to the very bottom position by turning the coarse feed 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 **(43)** upwards to open the clamp.
- Insert the cassette **(45)** into the cassette clamp.
- To clamp the cassette, release the lever **(43)**.



5.3 Clamping a disposable blade

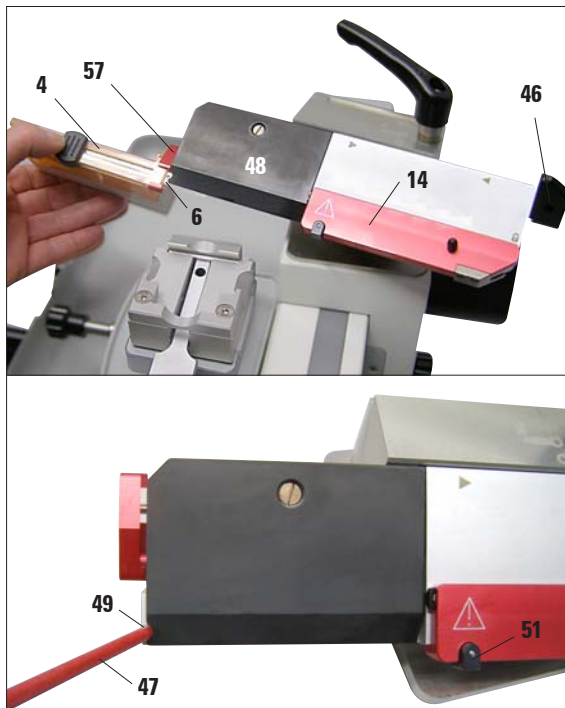


Fig. 28

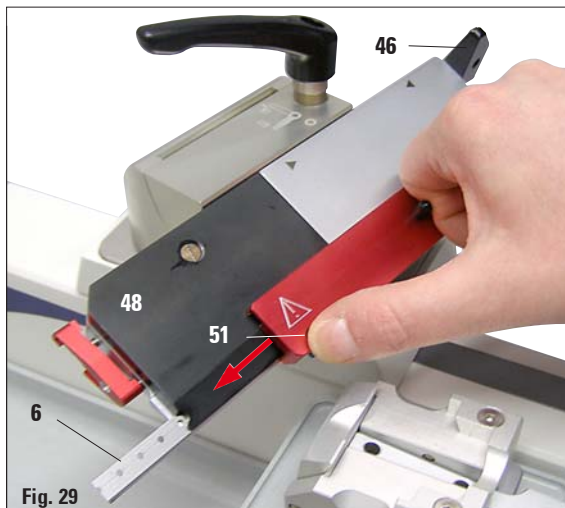


Fig. 29



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

Prior to inserting a blade, both blade holder and knife holder base must have been installed on the instrument!

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).
- Carefully insert the blade (6) into the blade holder (Fig. 28).
- 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.

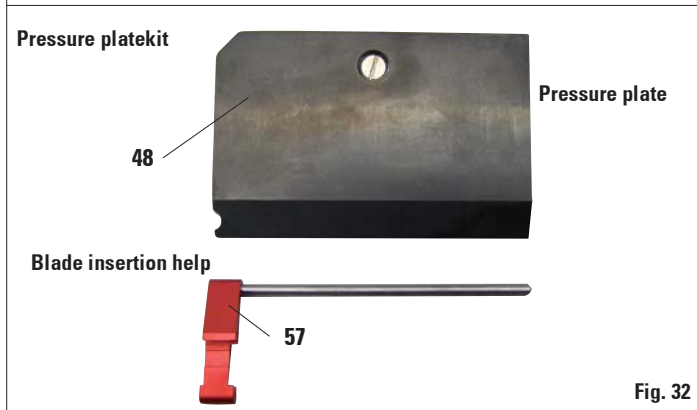
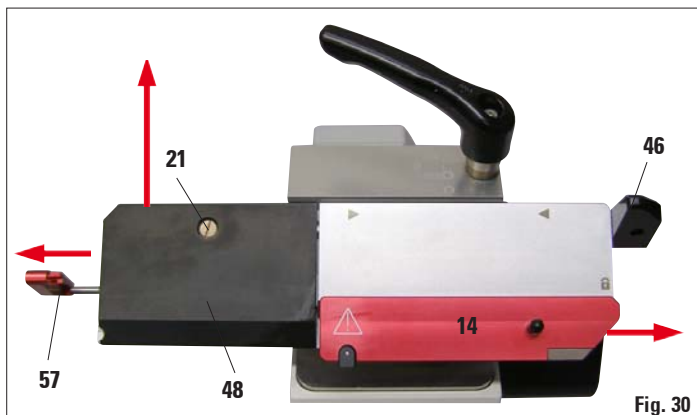
Ejector (Fig. 29)

An ejector is provided for removing used blades.

- 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 Changing the pressure plate



The blade holder SE can be retrofitted from low profile blades to the use of high profile blades. To do this, the pressure plate (48) and the respectively matching insertion aid (57) have to be exchanged in each case.

To do this, 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 out the blade insertion help (57) 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 stuck in. It must not be altered.

5.5 Inserting the knife or disposable blade holder

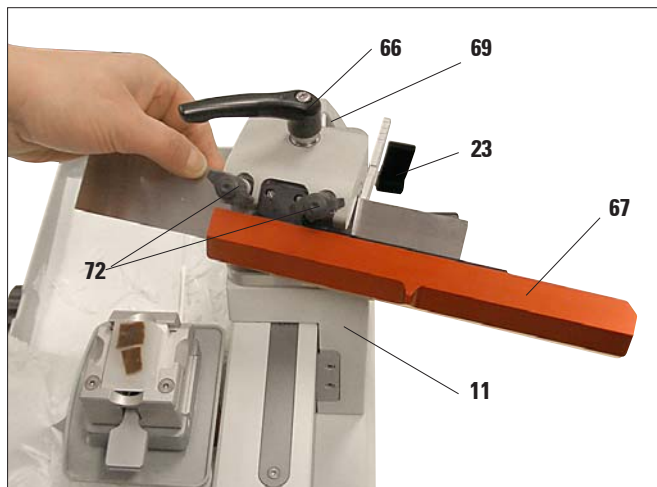


Fig. 33



Take care when handling microtome knives and disposable blades!

The cutting edge is extremely sharp and may cause severe injury!

- 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 (72) sufficiently to allow the knife to be inserted.
- Carefully insert the knife into the knife holder from the left and hold in place (Fig. 33).
- To clamp turn the knife clamping screws (72) alternately clockwise until both screwed tightly and cover the knife over with the knife guard.

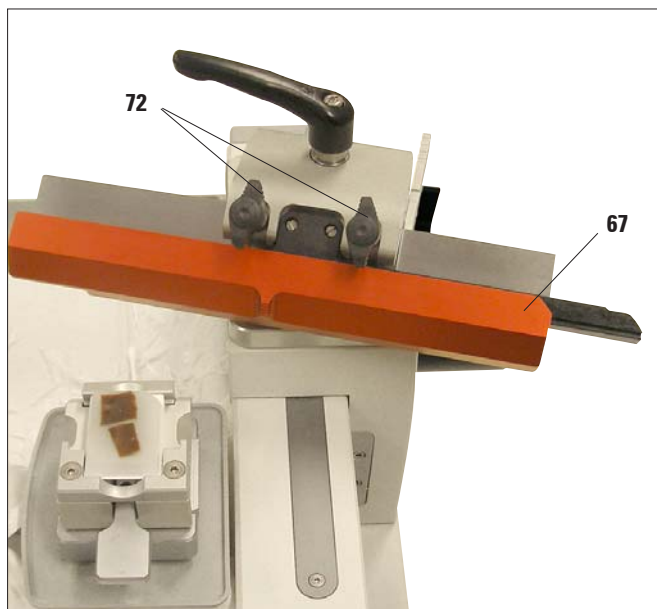


Fig. 34



For clamping a disposable blade holder, please proceed in the same way.

5. Operation

5.6 Sectioning

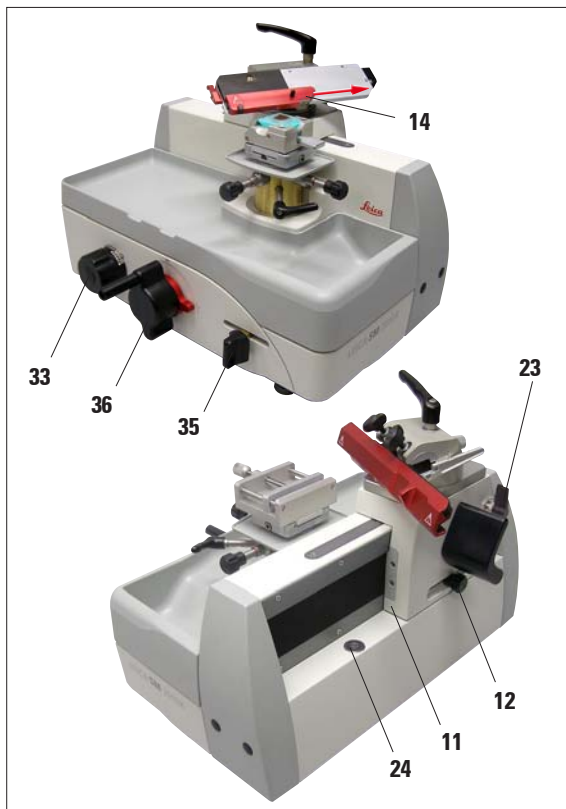


Fig. 35



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

Caution!

The knife sledge movement is extremely smooth. It may occur that the sledge moves during section removal. To prevent the sledge from moving accidentally, pull it to the front limit of the slideway, where it is held in position by the magnetic knife sledge immobilizer (24), before removing the section.

Cutting into the specimen (trimming)

For trimming, the specimen feed can be disengaged either by turning the coarse feed 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 holder/ knife holder to the right.
- To feed the specimen towards the knife, turn the coarse feed 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).



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.

- 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 object 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 feed 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 feed 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 knife 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 detergents, please comply with the safety instructions of the manufacturer and observe 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 no liquids enter the interior of the instrument when 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 knife 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 informations

Supermega-cassette clamp with adapter, silver	14 0508 42634
UCC 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 tray with adapter, silver	14 0508 44829
Freezing stage with adapter	14 0508 42858
Knife holder SN, cpl.	14 0508 44670
Blade holder for low profile disposable blades, cpl.	14 0508 43196
Blade holder for high profile disposable blades, cpl.	14 0508 42775
Pressure plate kit for low profile disposable blades, cpl.	14 0508 43693
Pressure plate kit for high profile disposable blades, cpl.	14 0508 43694
High profile blade holder EC 240 H	14 0368 33012
Low profile blade holder EC 240 L	14 0368 33013
Low profile blade rail - set.....	14 0368 38111
Knife guard, plastic	14 0368 33772
Knife, 16 cm long, profile c	14 0216 07100
Knife, 16 cm long, profile d	14 0216 07132
Knife, 22 cm long, profile c	14 0216 07116
Leica Disposable Blades, low profile type 819 1x50	14 0358 38925
Leica Disposable Blades, high profile type 818 1x50	14 0358 38926
Ball handle with ergonomic extension	14 0508 43308
Ball handle, cpl.	14 0508 42565

7.2 Accessories



Fig. 35

Supermegacassette clamp,
with adapter
to be used with quick release system

maximum specimen size:
75x52x35 mm (LxW x H)

Order-No. 14 0508 42634



Fig. 36

Universal Cassette Clamp (UCC),
with adapter
to be used with quick release system

maximum specimen size 40x29 mm (LxW)

NOTE:
Approx. measurements according to cassette
type used.

Order-No. 14 0508 42635



Fig. 37

HN40-specimen clamp,
with adapter
to be used with quick release system

maximum specimen size: 59x45 mm (LxW)

Order-No. 14 0508 42637

7. Optional accessories



Fig. 38

Standard specimen clamp, with adapter
to be used with quick release system

maximum specimen size: 79x60 mm (LxW)

Order-No. 14 0508 42632

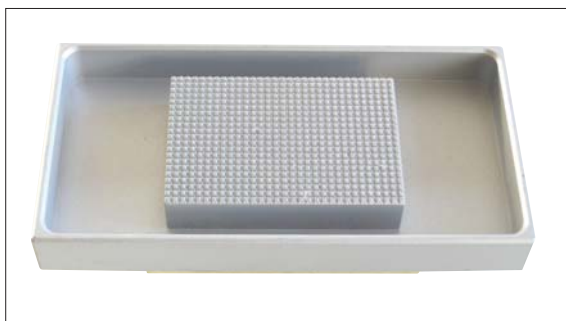


Fig. 39

Dry ice tray, with adapter

Order-No. 14 0508 42641

1 pair of **thermal gloves**, Size 8

Order-No. 14 0340 45631



Fig. 40

Freezing stage, with adapter
to be used with quick release system

maximum specimen size: 80x50 mm (LxW)

Order-No. 14 0508 44829



Fig. 41

Blade holder SE for low profile and high profile disposable blades, complete

Easily changeable from low to high profile by exchanging front pressure plate. Clearance angle adjustment by allen key. Scale for reproducible declination angle setting up to 45°. Safe blade handling by insertion help, magnet and blade removal help. Central blade clamping. Precise and safe lateral displacement function allows use of full blade length. Space saving safety guard with integrated blade removal help in signal color.

Blade holder SE **Order-No. 14 0508 43196**
(for low profile disposable blades)

Blade holder SE **Order-No. 14 0508 42775**
(for high profile disposable blades)

Standardlieferumfang:

- 1 blade holder base 14 0508 44719
- 1 adapter plate blade holder 14 0508 43643
- 1 stopper 14 0508 44664
- 6 countersunk screws M5 x 12 Torx .. 14 3000 00227
- 1 finger guard, plastic 14 0368 33772
- 1 blade holder SE, cpl.
 - segment arc SB 14 0508 44853
 - segment arc BB 14 0508 44854



Fig. 42

Pressure plate kit for low profile and high profile disposable blades

Low Profile **Order-No. 14 0508 43693**

Standard delivery low profile:

- 1 pressure plate SB 14 0508 43692
- 1 Blade insertion help SB 14 0508 43686

High Profile **Order-No. 14 0508 43694**

Standard delivery high profile:

- 1 pressure plate SB 14 0508 43691
- 1 Blade insertion help SB 14 0508 43687

7. Optional accessories



Fig. 43

Knife holder SN,

for reusable knives or disposable blade rails. Clearance angle adjustment by allen key. Scale for reproducible declination angle setting up to 45°. Two clamping screws for fast and stable cutting tool clamping. Safe and precise lateral displacement function allows use of entire cutting tool. Integrated, space saving safety guard in signal color.

Standard delivery:

- 1 distance piece 14 0508 44671
- 5 allen screws M 5x 16 14 2101 03128
- 1 Knife holder insert SN 14 0508 44857

Order-No. 14 0508 44670



Fig. 44

Blade holder EC 240 H

blade rail for high profile blades comes in plastic case with all tools and accessories required.

Order-No. 14 0368 33012



Fig. 45

Blade holder EC 240 L

blade rail for low profile blades comes in plastic case with two pressure plates and all tools and accessories required.

Order-No. 14 0368 33013



Fig. 46

Low profile blade rail - set

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

Order-No. 14 0368 38111



Fig. 47

Plastic safety guard

Order-No. 14 0368 33772

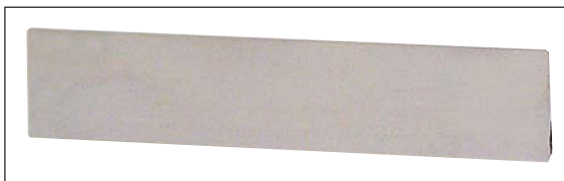


Fig. 48

Knife, 16 cm long, profile c

plane on both sides, for paraffin and frozen sections

Note: Knife case 14 0213 11140 included

Order-No. 14 0216 07100

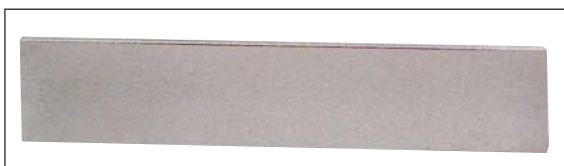


Fig. 49

Knife, 16 cm long, profile d

Note: Knife case 14 0213 11140 included

Order-No. 14 0216 07132

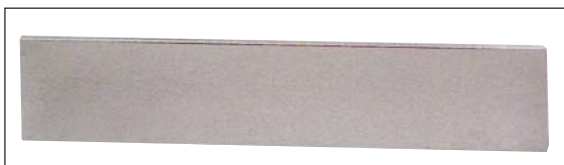


Fig. 50

Knife, 22 cm long, profile c

for paraffin and cryosectioning

Note: Knife case 14 0213 11141 included

Order-No. 14 0216 07116



Fig. 51

Protective cover

Order-No. 14 0216 07100

7. Optional accessories



Fig. 52

Leica Disposable Blades, low profile (819)

80 mm long, 8 mm high

1 Package of 50 blades

Order-No. 14 0358 38925



Fig. 53

Leica Disposable Blades, high profile (818)

80 mm long, 14 mm high

1 Package of 50 blades

Order-No. 14 0358 38926



Fig. 54

Ball handle, with ergonomic extension

Order-No. 14 0508 43308



Fig. 55

Ball handle, assy.

Order-No. 14 0508 42565



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
8.1 Possible faults		
1. Thick/thin sections The sections alternate between being thick and thin. In extreme cases, there are no sections whatsoever.	<ul style="list-style-type: none"> • The blade is not clamped properly. • Blunt blade/knife. • Angle of inclination of the knife/blade and therefore also clearance angle too small. 	<ul style="list-style-type: none"> • Reclamp the blade. • Laterally displace the blade holder/knife holder or insert a new blade/new knife. • Methodically experiment with larger clearance angle settings until you have found the optimum angle.
2. Section compression The sections are very compressed, show folds or are squeezed together.	<ul style="list-style-type: none"> • The blade/knife is blunt. • The specimen is too warm. • The clearance angle is too wide. 	<ul style="list-style-type: none"> • 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.
3. The sections show scratches and chatter marks	<ul style="list-style-type: none"> • The clearance angle is too wide. • Unsuitable knife profile • Insufficient clamping to the object holder system and/or the blade holder/knife holder 	<ul style="list-style-type: none"> • 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		
1. There is no further feed motion and thus no sectioning.	<ul style="list-style-type: none"> • The front end position has been reached. 	<ul style="list-style-type: none"> • Run the specimen downwards by turning the coarse feed wheel.
2. High blade consumption	<ul style="list-style-type: none"> • Too great of a sectioning force was applied. 	<ul style="list-style-type: none"> • 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 agreed 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.



EC Declaration of Conformity



We herewith declare, in exclusive responsibility, that the

Leica SM2010R – Slidingmicrotom

was developed, designed and manufactured to conform with the:

- Direktive 98/79/EC of the European Parliament and of the Council and
 - Direktive 2006/42/EG
- including their amendments up to the date mentioned below.

The following harmonized standards were applied:

- **EN 61010-2-101: 2002**
Safety requirements for electrical equipment for measurement, control and laboratory use -
Part 2-101: Particular requirements for in vitro diagnostic (IVD) medical equipment
- **EN 14971: 2007**
Medical devices - Application of risk management to medical devices
- **EN 591: 2001**
Instructions for use for in vitro diagnostic instruments
- **EN ISO 12100-1: 2003**
Safety of machinery.
Basic concepts, general principles for design.
Part 1: Basic terminology, methodology
- **EN ISO 12100-2: 2003**
Safety of machinery.
Basic concepts, general principles for design.
Part 2: Technical principles and specifications.

In addition, the following in-house standards were applied:

- **DIN EN ISO 9001: 2000.**

Leica Biosystems Nussloch GmbH
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February 18, 2008

Anne De Greef-Safft
President Biosystem Division

