

Instructions for Use

RM2235

Rotary Microtome



Leica RM2235 V 1.8 RevC, English 09/2013

Order No.: 14 0500 80101 RevC

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

NOTE

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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

Symbols in the text and their meanings



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



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

(5)

**Numbers in parentheses refer to item
numbers in illustrations.**



Manufacturer



Date of Manufacture



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



In vitro diagnostics (IVD) medical
device



Observe the Instructions for Use



Order No.



Serial number

Qualification of personnel

- The Leica RM2235 may be operated by trained laboratory personnel only.
- All laboratory personnel designated to operate

the Leica instrument must read these Instruc-
tions for Use carefully and must be familiar
with all technical features of the instrument
before attempting to operate it.

Designated use

The Leica RM2235 is a manually operated ro-
tation 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 speci-
mens as well as harder specimens, as long as
they are suitable for being cut manually.

**Any other use of the instrument will be consid-
ered as improper use!**

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 at the left
side of the instrument. Fig. 1 is provided as an
example only and shows a valid nameplate for
this instrument.

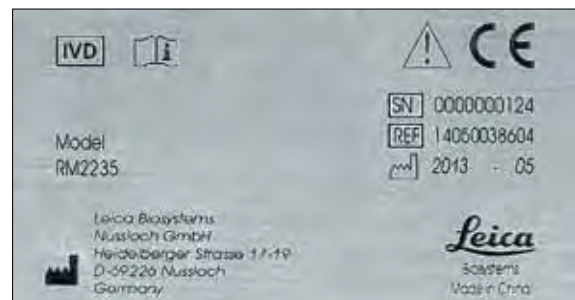


Fig. 1



The safety and caution notes in this chapter must be observed at all times. Be sure to read these notes 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 Instructions for Use are an important part of the product, and must be read carefully prior to startup and use and must always be kept near the instrument.

This instrument is built and inspected according to the Safety requirements for laboratory instruments.

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

www.LeicaBiosystems.com



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.

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



The protective devices located on the instrument and the accessories must not be removed or 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. Operating the instrument safely is, above all, the responsibility of the owner, as well as the designated personnel who operate, service or clean the instrument.

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

2. Safety

Warnings — Safety notes on the instrument itself



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

Warnings — Transport and installation



- Once unpacked, the instrument may be transported only in an upright position.
- Do not transport the instrument by holding it by the handwheel grips, coarse driving wheel or the knob for setting the section thickness.
- The protective devices located on the instrument and the accessories must not be removed or modified.

Safety instructions — working with the instrument



- Take care when handling microtome knives and disposable blades. The cutting edge is extremely sharp and can cause serious injuries!
- 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!
- Always clamp the specimen block BEFORE clamping the knife.

Safety instructions — working with the instrument



- Prior to manipulating the knife and specimen, or changing the specimen or knife, and during breaks, always lock the handwheel and cover the cutting edge with the knife guard.
- **ALWAYS** turn the handwheel clockwise; otherwise, the brake will not work properly.
- Always wear safety goggles when sectioning brittle specimens. Specimens may splinter!
- Specimen blocks must **NOT** be oriented during the retraction phase. If a block is oriented during retraction, the block will advance by the retraction value **PLUS** the selected section thickness before the next section. This may cause damage to both specimen and knife!
- Prior to sectioning, check that the specimen is securely clamped in the specimen clamp – failure to observe this poses the risk of damaging the specimen.

Hazards — servicing and cleaning



- Always lock the handwheel before cleaning!
- Do not use any solvents containing acetone or xylene for cleaning!
- Ensure that liquids do not enter the interior of the instrument during cleaning!
- When using cleaners, please comply with the safety instructions of the manufacturer and the laboratory safety regulations!

2. Safety

2.3 Integrated safety devices



Fig. 2

Locking the handwheel

There are two ways of locking the handwheel (12):

Using the lever (3) on the right side of the microtome base plate, the handwheel can be braked in almost any position.

- To brake, rotate the lever in a counterclockwise direction to position ●.



Caution!

The braking lever (3) must be exactly in position ●, so that the handwheel brake is applied correctly. If the lever is moved beyond this point, it is possible that the handwheel is no longer braked.

- To unlock the handwheel brake turn the lever (3) back to its original position. Position ○.
- To lock the handwheel, press the lever (5) outwards and continue to turn the handwheel slowly until it locks exactly in the 12 o'clock position.



When using both brake systems at the same time, always move the lever (3) to position ○ first. Otherwise, it may not be possible to release the lever (5).

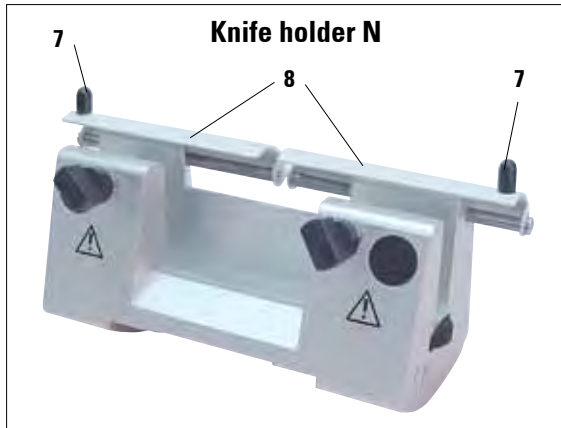


Fig. 3

Knife guard on the knife holder

Each knife holder is equipped with a tightly mounted knife guard (8, 9). This makes it possible to cover completely the cutting edge in every knife or blade position.

Knife holder N/NZ

The knife guard (8) of the knife holder N/NZ can be easily positioned via the two handles (7) (Fig. 3).

To cover the knife edge, push both cover strips of the knife guard to the center.

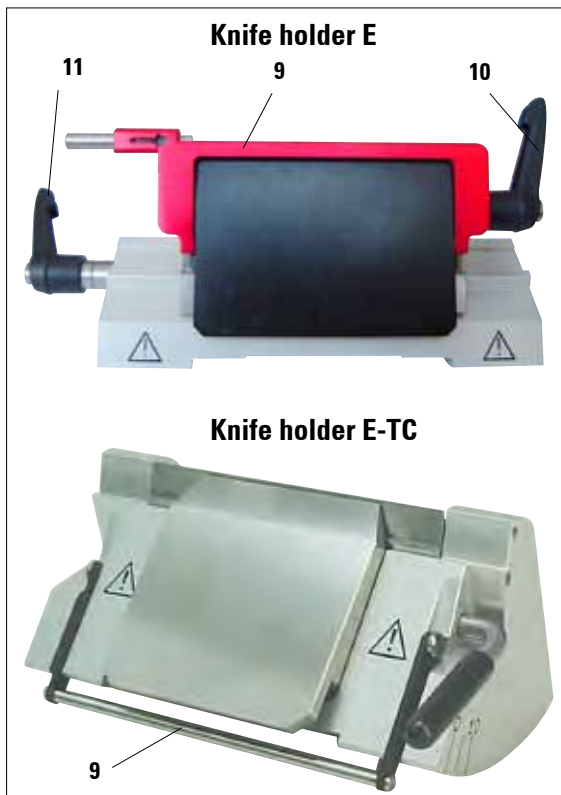


Fig. 4

Knife holder E/E-TC

The knife guard on knife holder E/E-TC consists of a red foldaway handle (9). To cover the cutting edge, fold the knife guard handle (9) upwards as illustrated in Fig. 4.



The clamping levers on the knife holder E are not interchangeable.
The two clamping levers (10, 11) must remain in the position shown at all times, as otherwise isolated malfunctions of the knife holder can occur.
Clamping lever for the blade (10) at the right, clamping lever for the lateral displacement (11) at the left.

3. Instrument Components and Specifications

3.1 Overview — instrument components

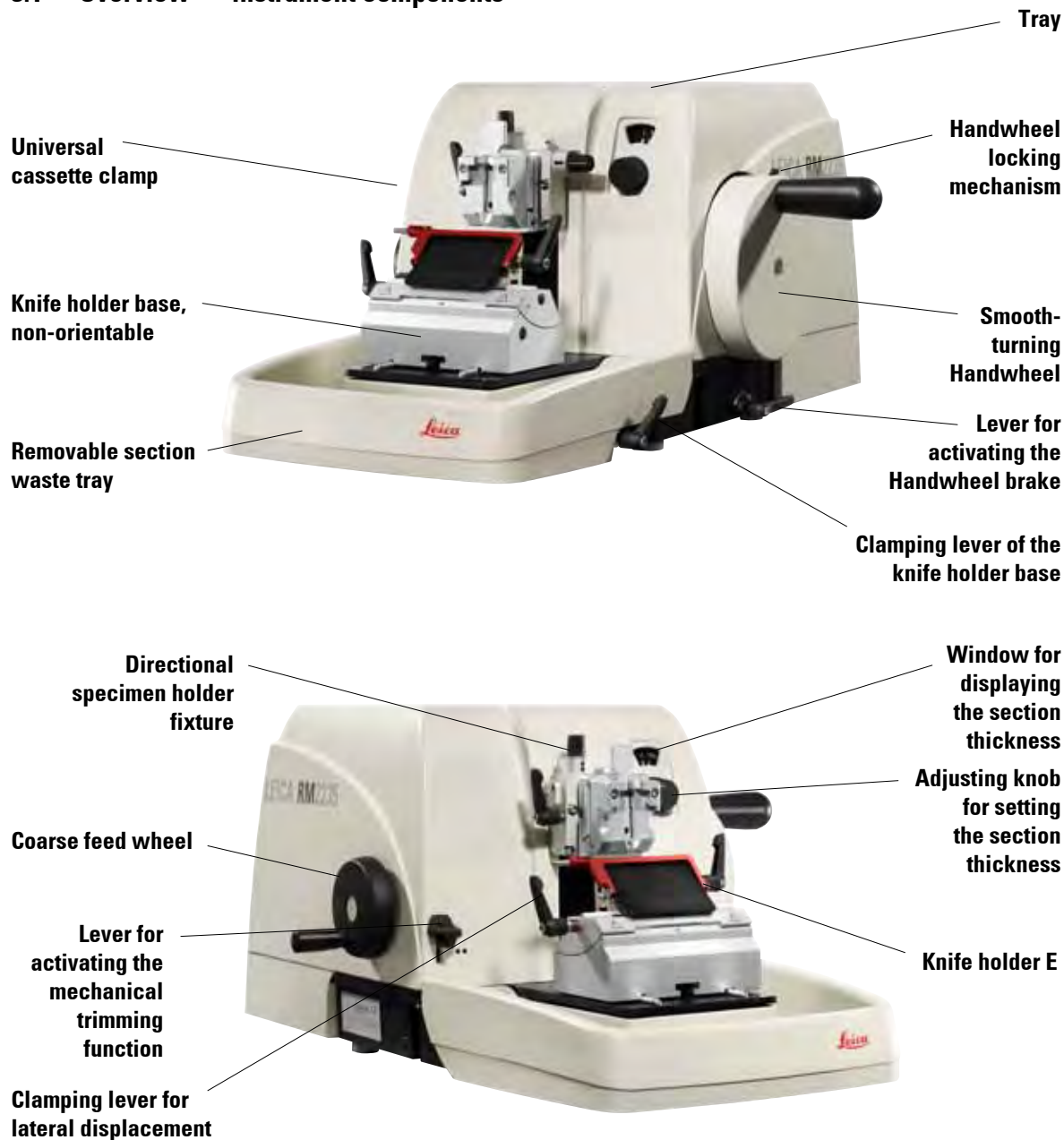


Fig. 5

3.2 Instrument specifications

Basic instrument with mechanical trim function, lateral coarse drive

The Leica RM2235 rotary microtome is equipped with a low-maintenance, slack-free micrometer drive, with vertical and horizontal specimen feed realized via low-maintenance cross roller bearings.

The instrument is equipped with two independent handwheel locking systems for even greater operating safety.

Leica's patented, user-adjustable force balance system compensates centrifugal forces arising while cutting via a pretensioned spring for extremely light handwheel action.

Advantage: a heavy counterweight in the handwheel is no longer needed. The spring tension is individually adjustable, corresponding to the weight of the respective attached specimen clamp or specimen.

The patented specimen retraction system can be switched on and off by the user. The instrument thus offers all of the advantages of specimen retraction while supporting work in "rocking mode", i.e. without a full handwheel rotation.

We recommend disabling specimen retraction when working in "rocking mode".

The coarse drive wheel is ergonomically positioned.

(For more information on the rotating direction, see [chapter 5.1.2](#))

3. Instrument components and specifications

3.3 Technical Data

General

Approvals:	The instrument-specific marks are located on the rear panel of the instrument next to the nameplate.
Operating temperature range:	+10 °C to +35 °C
Temperature range during storage:	+5 °C to +55 °C
Relative humidity:	max. 80 % non-condensing
Storage humidity:	< 80 %
Section thickness range:	1.0 - 60.0 µm
Section thickness settings:	from 1.0 - 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
Specimen feed:	approx. 24 mm, ± 2 mm
Vertical stroke:	70 mm
Max. cutting range without retraction:	69 mm (without specimen orientation 1 µm)
Maximum sectioning area with retraction:	62 mm
The specimen retraction can be turned off manually:	approx. 40 µm

Dimensions and weight

Width (including handwheel):	413 mm
Depth (including waste tray):	618 mm
Height (total):	305 mm (with tray on the hood)
Working height (knife blade):	168 mm (measured from the table)
Weight (without accessories):	approx. 37 kg

Optional equipment and optional accessories

Specimen orientation (option)	
Horizontal:	8°
Vertical:	8°
Angle of rotation:	± 90°
Trimming stages:	10 µm, 50 µm
Repositioning of knife holder base	
North-south:	± 25 mm

4.1 Standard delivery

The Leica RM2235 standard delivery includes:

1 Leica RM2235 basic instrument	
1 handwheel, complete	14 0500 38181
1 section waste tray	14 0502 37931
1 tool set, consisting of:.....	14 0500 38600
1 Allen key with handle No. 5.....	14 0194 04760
1 Allen key with handle No. 4.....	14 0194 04782
1 Allen key No. 3	14 0222 04138
1 screwdriver 3x50, 186 long.....	14 0170 11568
1 bottle (50 ml) of oil for drives, type 405.....	14 0336 06086
1 brush w/magnet.....	14 0183 40426
1 dust protective cover.....	14 0212 30350
1 Instructions for Use EN	14 0500 80101
1 language CD	14 0500 80200



The accessories ordered are included in a separate box.

Carefully check the delivery against the packing list and the delivery note. Should you find any discrepancies, please contact your Leica sales office without delay.

4.2 Installation 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 + 35 °C.
- Obstruction-free access to the handwheel.



Never operate the instrument in rooms with an explosion hazard.

4. Instrument Setup

4.3 Unpacking and installation



Fig. 6



When the instrument is delivered, check the tilt indicators on the packaging.

If the arrowhead is blue, the shipment was transported laying flat, was tilted at too great an angle or fell over during transport.

Note this on the shipping documents and check the shipment for possible damage.



- Loosen and unscrew the six upper screws (2).
- Remove the cover (1).
- Take the accessory carton (optional accessories) (3) and the cartons (4) from the standard scope of delivery.

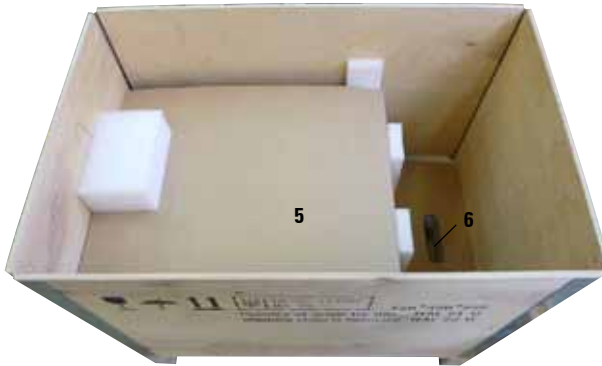


The transport crate and included retaining elements should be kept in case a return shipment is necessary later.



Fig. 7

4.3 Unpacking and installation (cont.)



- Take out the fixing module (5). To do so, hold it by the top edge of the module and in the recessed grip (6) and pull it out by pulling upwards.
- Lift the instrument* (7) by holding it by the base plate at the front and under the instrument on the back and lift it out of the formed cushion (8).



Never hold the instrument for transport by the handwheel or the rotary knob for section thickness adjustment.



- (*= the instrument illustration is provided as an example only.)

- Place the instrument on a stable laboratory table.

The two sliding elements (9) located on the rear of the base plate make it easier to move the instrument on the table.

- To move the instrument, hold it by the front of the base plate, lift it up gently and slide it on its slides.

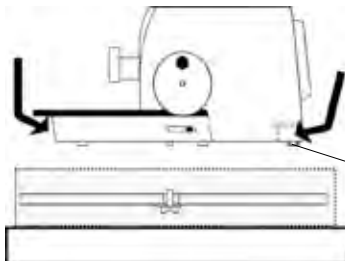


Fig. 8

9



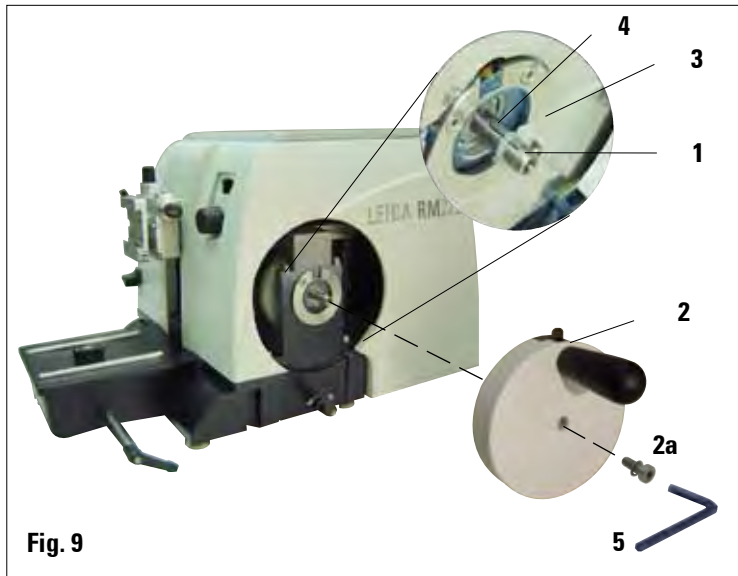
Observe the correct resting angle to the table to avoid pinching your fingers.

4. Instrument Setup

4.4 Assembling the handwheel



The handwheel has to be assembled before attempting to use the instrument.
The necessary parts and tools can be found in the toolkit supplied in the delivery.



The feather key (4) is loosely placed in the handwheel shaft (1) and fixed in place with a cable tie during transport.

- Remove the cable tie (3).
Caution!
Make sure not to lose the feather key!
- Place the handwheel (2) on the handwheel shaft (1) as shown.
- Tighten the screw (2a) located in the center hole of the handwheel with a Allen key No. 4 (5).
- Remove the cover foil from the self-adhesive cover disk and fix the cover disk on the handwheel.

4.5 Inserting the universal cassette clamp

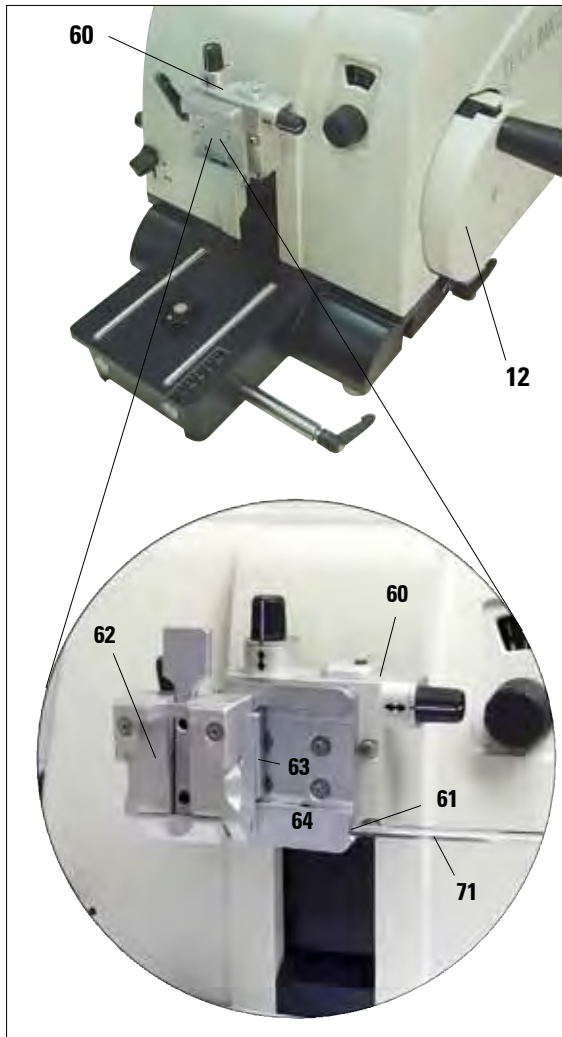


Fig. 10

There are two versions of the specimen holder fixture, one with and one without specimen orientation, which are interchangeable.

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

You can use the quick clamping system (64) to hold all available accessory specimen clamps (for more information, see [Chapter 6](#) "Optional accessories").

To do so, proceed as follows:

- Move the specimen head (60) to the upper end position by turning the handwheel (12) and engage the handwheel lock.
- To release the clamping system, turn the screw (61) of the quick clamping system (64) counterclockwise using an Allen key No. 4 (71).
- Push the guide (63) of the universal cassette clamp (62) from the left into the quick clamping system (64) as far as it will go.
- To clamp the cassette clamp turn the screw (61) clockwise 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 described here using the example of the cassette clamp.

4. Instrument Setup

4.6 Inserting the knife holder

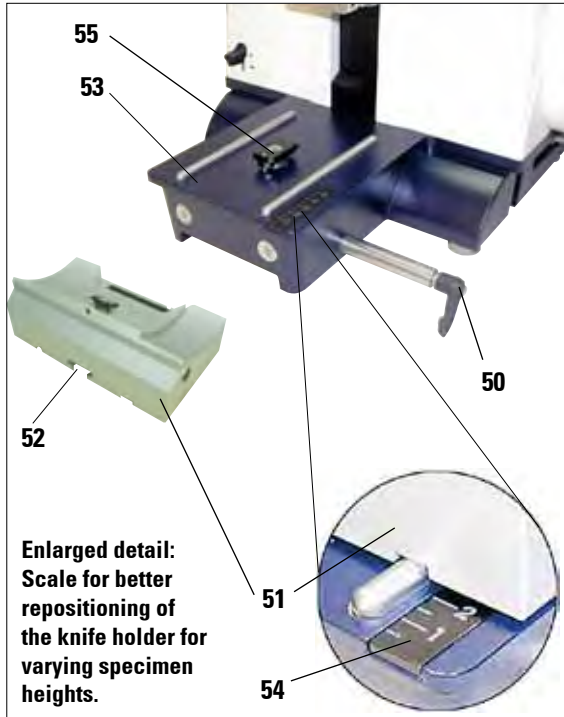


Fig. 11

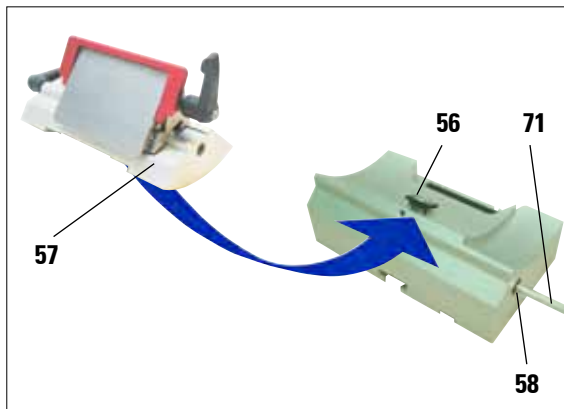


Fig. 12

Setting up the knife holder base

- Release the clamping lever (50) by rotating it counterclockwise.
- Insert the knife holder base (51) using the notch (52) on the bottom into the T-piece (55) of the microtome base plate (53).
- To secure the knife holder base, turn the clamping lever (50) clockwise.

The knife holder base (51) can be moved back and forth on the microtome base plate. This allows bringing the knife holder to optimal sectioning position in relation to the specimen.

There is a scale (54) on the right side of the microtome base plate. This enables faster and better positioning of the knife holder at the specimen if various combinations of standard specimens and specimen holders are used. The rear edge of the knife holder base (51) functions as the scale reference.

Inserting the knife holder

- Loosen the screw (58) using an Allen key No. 4 (71) until the knife holder (57) can be moved.
- Place the knife holder (57) with the underside groove onto the T-piece (56) of the knife holder base (51).
- To clamp, retighten the screw (58).

5.1 Operating elements and their functions



Fig. 13

5.1.1 Section thickness setting

The section thickness is set by turning the adjusting knob (33) at the front of the microtome on the right.

The adjusting knob has a notch for each value that can be set.

Setting range: 1 - 60 μm

from 1 - 10 μm in 1 μm increments

from 10 - 20 μm in 2 μm increments

from 20 - 60 μm in 5 μm increments.

The section thickness set in each case is displayed in the window (34).

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

5.1.2 Coarse driving wheel

The instrument can be ordered with clockwise or counterclockwise rotation. The given direction of rotation means "forwards" and relates to the feed movement of the specimen towards the knife.

The coarse motion serves for a fast horizontal forwards movement of the specimen - towards the knife - and backwards - away from the knife. When reaching the rear/front end positions, the coarse driving wheel can only be turned with difficulty. In the front end position, no more feed motion takes place.



Fig. 14



The coarse driving wheel also turns during sectioning. Therefore it must not block whilst the handwheel is being turned during sectioning; otherwise, no feed motion can take place and thus also no sectioning.

5. Operation

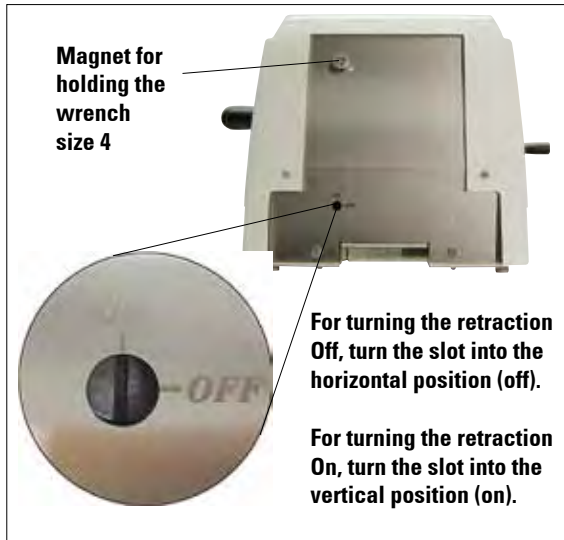


Fig. 15

5.1.3 Specimen retraction

The specimen retraction serves for protecting the knife and the specimen. When the retraction is switched on, the specimen is drawn back 40 μm into the upper end position after the sectioning stroke during the return movement. Before the feed motion of the new section thickness, the feed motion for the retraction value takes place.

The specimen retraction can be switched off manually at the back of the instrument (Fig. 15), if required, using the slotted-screwdriver supplied with the delivery.

Before switching the specimen retraction On and Off, run the specimen head to the upper end position by turning the handwheel.



Fig. 16

5.1.4 Mechanical trimming function

The RM2235 is fitted with a mechanical trimming function. The trimming lever has 3 notching positions (0, 10 μm , 30 μm).

The points (36) mark the two trimming stages:

- = 10 μm
- = 30 μm

- For activating the trimming function, press the lever downwards into one of the two notching positions and keep depressed. After each rotation of the handwheel, a feed motion of 10 μm or 30 μm takes place.
- After letting go of the lever, it automatically springs back to its original position (zero position). The trimming function is thereby deactivated.



The section thickness that has been set is not added to the selected trimming value.

If the section thickness that has been set is greater than the selected trimming value, the section thickness is fed.

5.1.5 Specimen holder with precision orientation



In the quick clamping device of the specimen holder fixture with precision orientation, all specimen clamps available as optional accessories can be used (implemented).

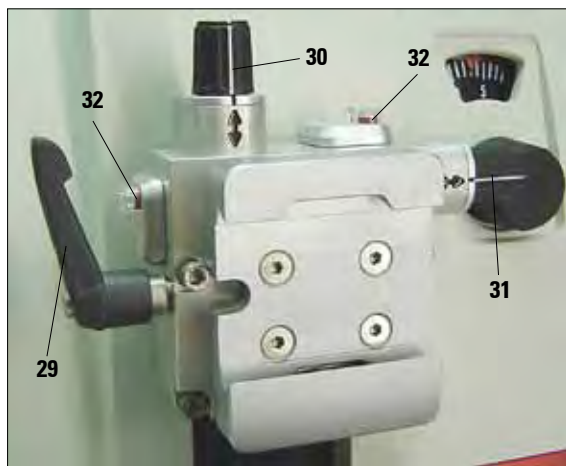


Fig. 17

Display of the zero position

For better display of the zero position, the orientation has two red indicators (32).

When both indicators are visible and both set-screws are in zero position at the same time (notch point, white marking on "0"), the specimen is in zero position.



When the large standard specimen clamp (50 x 55 mm) is used, the specimen orientation of 8° in north-south direction is no longer possible. The usable angle is only about 4° in this case.

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

Orienting the specimen



Specimen blocks must NOT be oriented during the retraction phase!
If a block is oriented during retraction, the block will advance by the retraction value PLUS the selected section thickness before the next section. This may cause damage to both specimen and knife!

- Raise the specimen head to the upper end position and activate the handwheel lock.
- To release the clamp, turn the eccentric lever (29) forwards.
- Turn setscrew (30) to orient the specimen in north-south direction. Turn setscrew (31) to orient the specimen in east-west 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 ease of estimation, there is a white mark on the handle and a click stop that is noticeable during turning.

- To lock the current orientation, turn the eccentric lever (29) backwards.

5. Operation

5.2 Adjusting the clearance angle

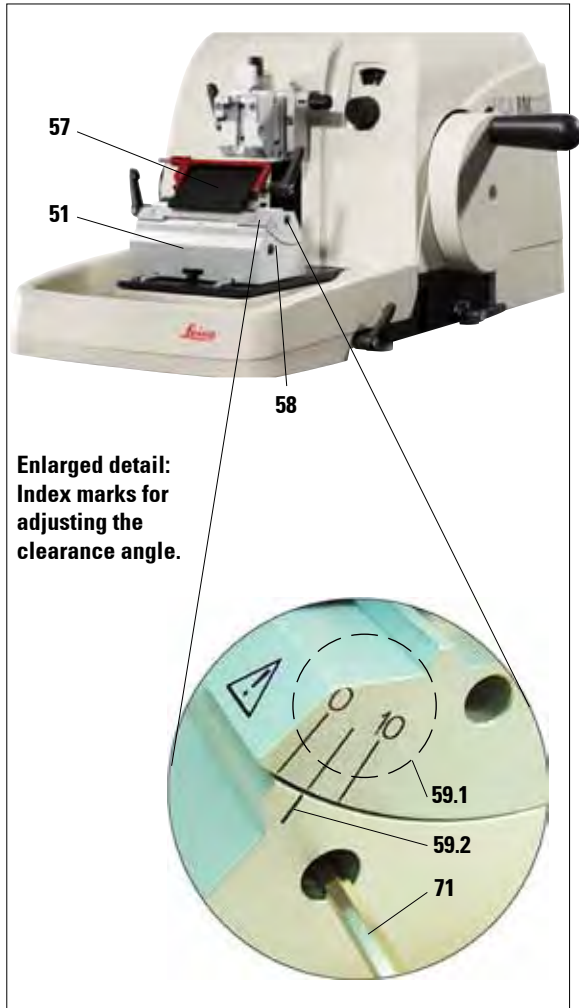


Fig. 18

- The index marks (0°, 5° and 10°) for adjustment of the clearance angle (59.1) are located on the right side of the knife holder (57).
- There is also an index mark (59.2) on the right side of the knife holder base (51) which serves as a reference point when adjusting the clearance angle.
- Loosen the screw (58) using an Allen key No. 4 (71) until the knife holder (57) can be moved.
- Move the knife holder until the index mark of the desired clearance angle coincides with the reference line on the knife holder base.
Example:
Enlarged detail showing a clearance angle setting of 5°.



The recommended clearance angle setting for knife holder E is approx. 5°. The usable angle is only about 4° in this case.

- Hold down the knife holder in this position and retighten the screw (58) for clamping.



Fig. 19

5.3 Fine adjustment of the force balance

If another accessory of a different weight is mounted on the specimen head (33), you must check whether it is necessary to readjust the force balance.

Checking the correct setting:

- Attach the new accessory and clamp the specimen.
- Set the specimen head to half the height of the vertical travel range by turning the handwheel (Fig. 19).

If the specimen head remains in this exact position, the setting is correct.

If the specimen head moves, i.e. it is raised or lowered, fine adjustment is necessary.



Failure to adjust the force balance may result in injury while working.

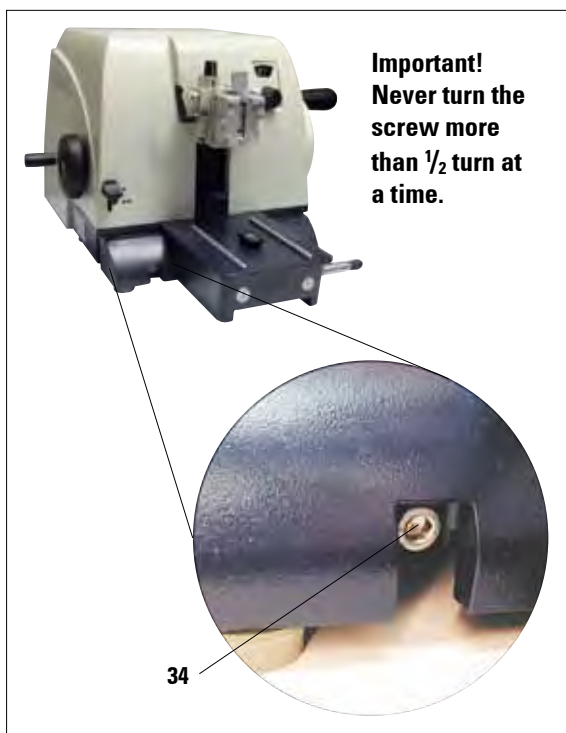


Fig. 20

The force balance is adjusted using the screw (34), which can be accessed by removing the section waste tray on the bottom of the base plate of the microtome. Use the Allen key provided, No. 5 (with handle) for the adjustment.

- If the specimen head moves **downwards**, turn the screw approx. $\frac{1}{2}$ turn **clockwise**.
- If the specimen head moves **upwards**, turn the screw (34) approx. $\frac{1}{2}$ turn **counterclockwise**.
- Continue this procedure until the specimen head no longer moves once released.

5. Operation

5.4 Clamping the specimen



Always clamp the specimen block BEFORE clamping the knife or the blade.

Lock the handwheel and cover the knife edge with the knife guard prior to any manipulation of knife or specimen, prior to changing the specimen block and during all work breaks!

- Rotate the handwheel until the specimen clamp is in the uppermost position.
- Block the handwheel (allow lever (5) Fig. 2 to notch) and activate the brake.
- Insert a specimen into the specimen clamp.



A detailed description for inserting the specimen into various specimen clamps and specimen holders is provided in [Chapter 6](#) "Optional accessories".

5.5 Clamping the knife / disposable blade



Take care when handling microtome knives and disposable blades. The cutting edge is extremely sharp and can cause serious injuries!

- Carefully insert knife or disposable blade into the knife holder and clamp.
- Make sure that the blade is clamped parallel to the upper edge of the pressure plate.
(For more information [see Chapter 6.3.2, Fig. 33](#))



A detailed description for inserting the blade or the knife into the individual knife holders is provided in [Chapter 6](#), "Optional accessories".

5.6 Sectioning



Always turn the handwheel evenly in clockwise direction; otherwise, the brake will not work properly. The rotation speed of the handwheel must be adapted to suit the hardness of the specimen. For harder specimens, use a slower speed.

Cutting into the specimen (trimming)



- Run the specimen to the rear end position by turning the coarse driving wheel.
- Push the knife holder on the knife-holder base almost until it is just before the specimen.
- Orientate the position of the specimen surface (only in the case of specimen holders that can be orientated).
- Release the handwheel lock, or handwheel brake, respectively.
- Using the trimming lever select the required trimming stage.
- Begin the cutting process by turning the handwheel.
- Stop the cutting process when the required specimen level has been reached.
- Let go of the trimming lever.

Remove the sections



- Set the required section thickness, or check the value setting on the display, respectively.

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

- To do so, laterally displace the blade or knife in the knife holder. When using the knife holder E with lateral displacement, it is sufficient to move the knife holder sideways.
- For sectioning, turn the handwheel evenly in a clockwise direction.



**Take care not to block the coarse driving wheel when turning the handwheel!
Otherwise there will be no feed motion of the section thickness and thus no sectioning will occur.**

- Pick up the sections and mount them on microscope slides.

5. Operation

5.7 Changing the specimen or interrupting sectioning



Lock the handwheel 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!

- Raise the specimen to the upper end position and activate the mechanical handwheel lock.
- Cover the sectioning edge with the knife guard.
- Remove the specimen from the specimen clamp and mount a new sample to continue.
- Run the specimen clamps with the coarse driving wheel back far enough until the new specimen can start being cut.

5.8 Finishing the daily routine

- Move the specimen to the upper end position by turning the handwheel and engage the handwheel lock.



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!

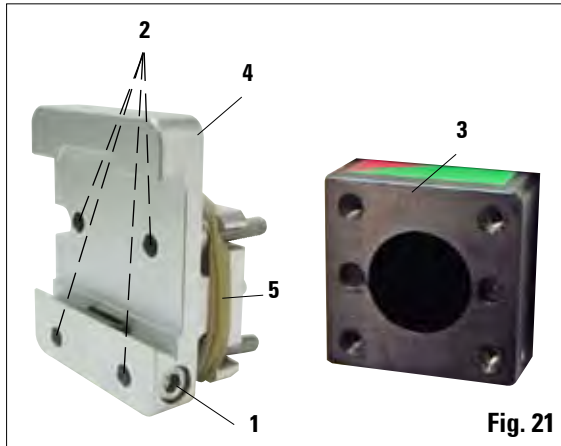
- Remove the blade from the knife holder and insert it in the receptacle at the bottom of the dispenser, or remove the knife from the knife holder and put it back in the knife case.
- Remove the specimen from the specimen clamp.
- Push all section debris into the section waste tray and empty the tray.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

6.1 Assembly for fixture for specimen clamps



Depending upon the purchase order, the basic instrument is delivered with the directional or rigid fixture for specimen clamps which must be assembled first. All specimen clamps available as accessories can be used in both fixtures for specimen clamps.

Before assembling the fixture for specimen clamps, activate the mechanical handwheel lock!

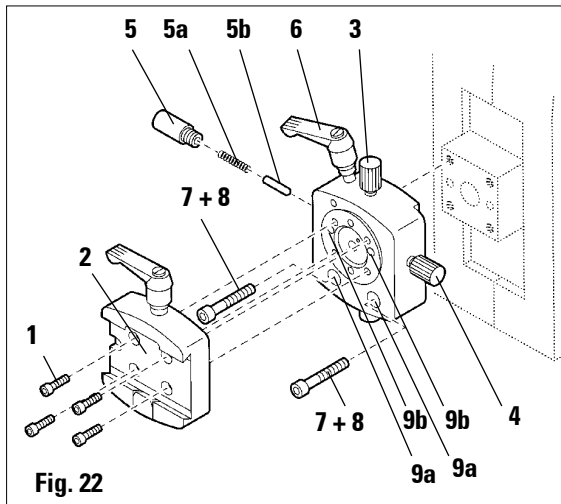


6.1.1 Rigid fixture for specimen clamps

- Screw the rigid fixture for specimen clamps (4) onto the specimen head (3): Remove the screw (1), place the specimen holder fixture (4) onto the specimen head (3) from the front and tighten the screws (2) with an Allen key No. 3. Next, insert the screw (1) from the side and briefly tighten it with an Allen key No. 4.



Remove the rubber ring only after attaching the specimen head!



6.1.2 Directional fixture for specimen clamps

- Finally, place the dovetail holder (2) and fasten by screwing in the 4 screws (1) using an Allen key No. 3.
- Loosen the eccentric bolt (6) by turning it counterclockwise.
- Completely unscrew the thrust piece (5) with a flat-tip screwdriver and pull it out with spring (5a) and pin (5b).
- Completely unscrew the setscrews (3) and (4).
- Attach the directional fixture for specimen clamps as shown.
- Insert the screws (7+8) in the bore (2 screws (8) are accessible through the bore (9a) and evenly screw them in using an Allen key No. 3.
- Insert the spring (5a) and pin (5b) with the flatter side into the thrust piece (5). Completely screw in the thrust piece with a flat-tip screwdriver.
- Completely screw in the setscrews (3+4).

6. Optional Accessories

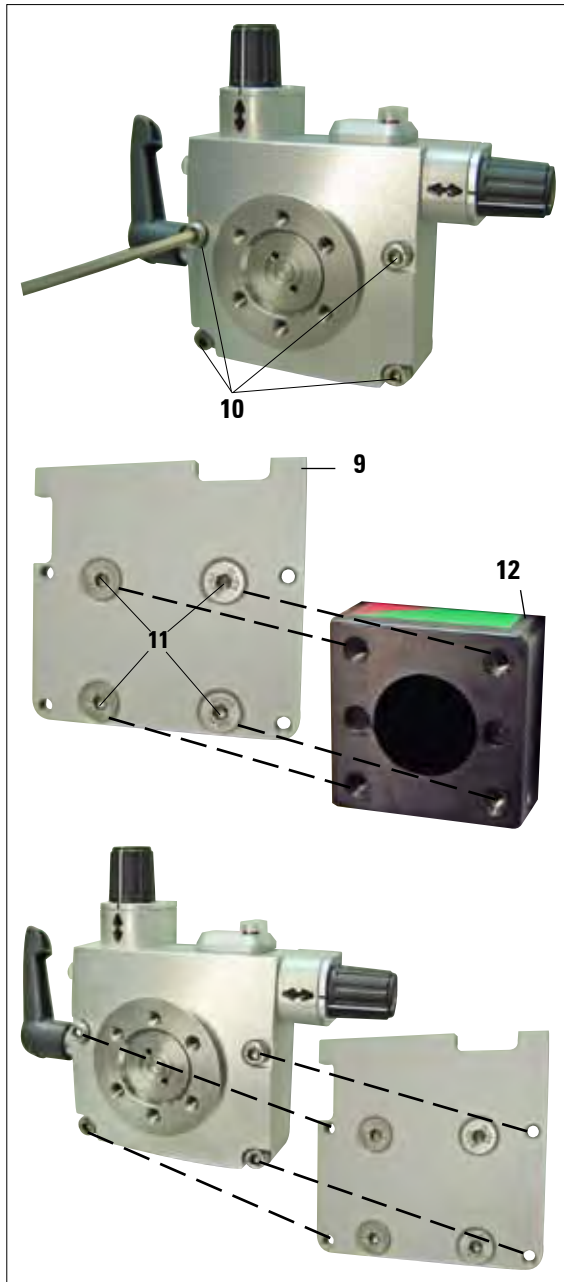


Fig. 23

6.1.3 Fine-directional fixture for specimen clamps

- Before the fine-directional fixture for specimen clamps can be mounted, loosen 4 screws (10) (Allen key No. 3) and carefully remove the fixture for specimen clamps from the baseplate (9).
- Using the 4 supplied screws (11) and the Allen key No. 3, fasten the baseplate to the specimen head (12).
- Now, screw the fine-directional fixture for specimen clamps with the 4 screws (10) and the Allen key No. 3 onto the specimen head.



If the fine-directional fixture for specimen clamps is not used, retain the baseplate and 4 screws (11) together with the fine-directional fixture for specimen clamps!

6.1.4 Quick clamping system

It is used as specimen holder for use with the fine-directional fixture for specimen clamps with zero point indicators or the directional fixture for specimen clamps.

- Screw the 4 screws (**13**) into bore A with an Allen key No. 2.5 and tighten them.

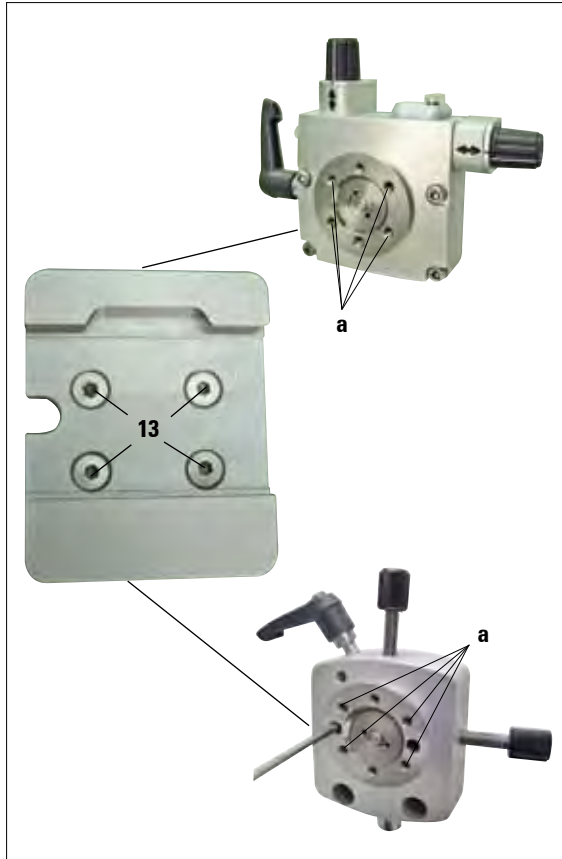


Fig. 24

6. Optional Accessories

6.2 Specimen clamps and holders



All specimen clamps available as accessories can be integrated into either the directional or non-directional specimen holder fixture.

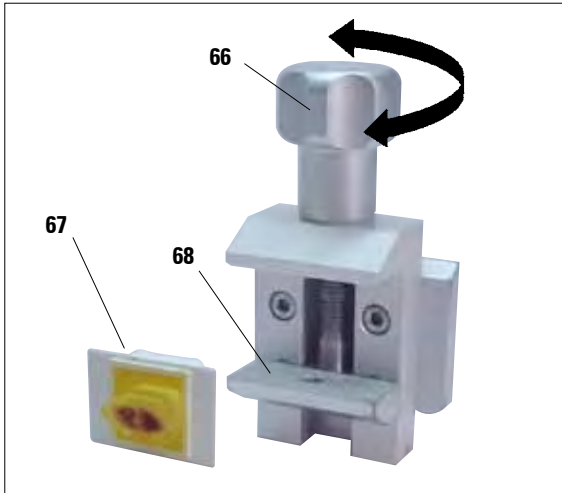


Fig. 25

6.2.1 Standard specimen clamp

The standard specimen clamp is available in two sizes: 40 x 40 mm and 50 x 55 mm.

They are designed for direct clamping of rectangular blocks. In addition, they accommodate the foil clamps.

- Turn the knurled screw (66) counterclockwise to move the movable jaw (68) downward.
- Mount the specimen (67) as required.
- Turn the knurled screw (66) clockwise to move the movable jaw upward against the fixed jaw to securely clamp the sample.



When clamping cassettes, make sure that they are not clamped too tightly, since the cassette bodies can bend and result in sections that are too thick or thin, or the entire specimen may fall out and become damaged.

6.2.2 Vee insert

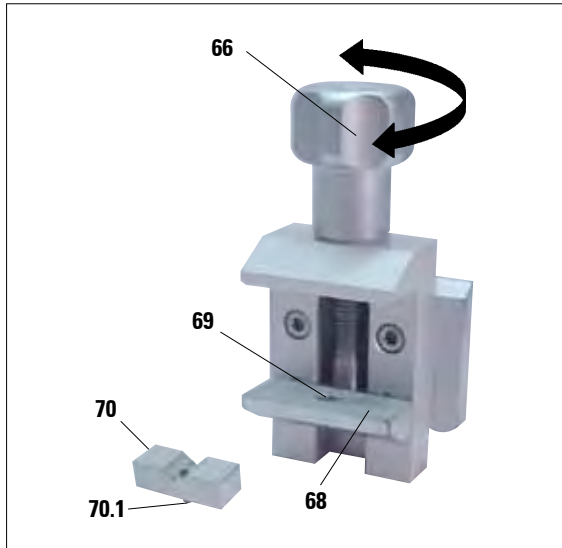


Fig. 26

The vee insert (**70**) is mounted in the hole provided in the lower movable jaw of the standard specimen clamp.

This makes it possible to clamp round specimens in the standard specimen clamp.

- Turn the knurled screw (**66**) counterclockwise to move the movable jaw (**68**) downward.
- Insert the pin (**70.1**) of the vee insert (**70**) in the hole (**69**) of the lower jaw (**68**).
- Mount the specimen as required.
- Turn the knurled screw (**66**) clockwise to move the movable jaw with the vee insert upward against the fixed jaw to securely clamp the sample.

6. Optional Accessories

6.2.3 Foil clamp type 1

The foil clamp type 1 is appropriate both for clamping very small and thin foil pieces and flat, angular specimens. It is mounted in the standard specimen clamp.

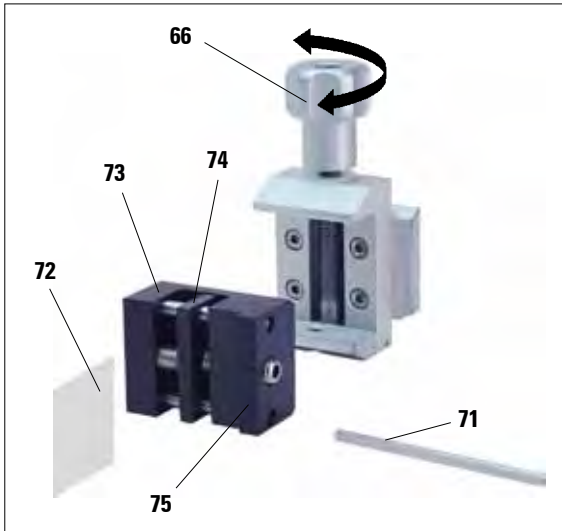


Fig. 27

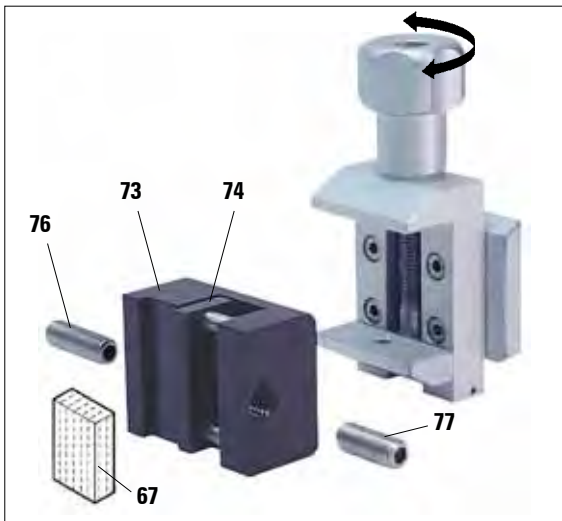


Fig. 28

Clamping of foil pieces

- Move the movable jaw (74) to the right as required by turning the setscrew with an Allen key No. 4 (71).
- Place the foil (72) between the movable jaw (74) and the fixed jaw (73).
- To clamp the foil, screw the movable jaw (74) against the fixed jaw (73) by using the Allen key.
- Insert the foil clamp (75) in the standard specimen clamp as shown.
- Turn the knurled screw (66) clockwise to clamp the foil clamp in the standard specimen clamp.

Clamping of flat, angular specimens

To clamp angular specimens, replace the long setscrew (76) with the short setscrew (77) provided with the foil clamp.

- Unscrew the long setscrew (76) to the left with an Allen key size 4 (71).
- Screw the short setscrew (77) in the hole.
- Place the sample (67) between the movable jaw (74) and the fixed jaw (73).
- To clamp the sample, screw the movable jaw (74) by turning the setscrew (77) against the fixed jaw (73).
- Insert the foil clamp in the standard specimen clamp as shown.
- Turn the knurled screw (66) clockwise to clamp the foil clamp in the standard specimen clamp.

6.2.4 Universal cassette clamp

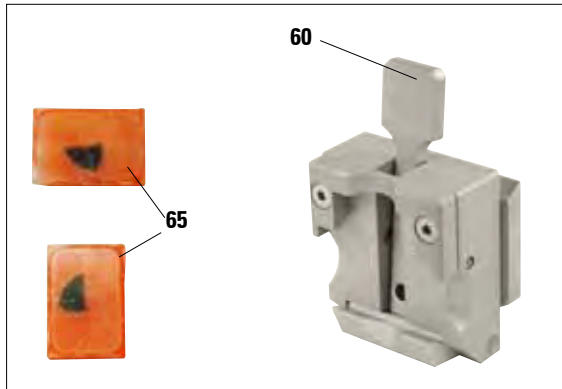


Fig. 29



Prior to sectioning, laboratory personnel **MUST check that the cassette is seated securely in the universal cassette clamp.**

- Push the lever (60) forwards.
- Mount the cassette (65) horizontally or vertically as required.
- To clamp the cassette, release the lever (60).



Leica / Surgipath cassettes with minimum dimensions of 39.8 x 28 mm and maximum dimensions of 40.9 x 28 mm may be clamped in the universal cassette clamp (UCC) horizontally as well as vertically.

When using other – particularly thin-walled – cassettes, the cassette may become deformed or other problems may arise with the clamping system. If the user tries clamping the cassette and realizes that it is not securely clamped into place, an alternative tensioning clamp must be used.

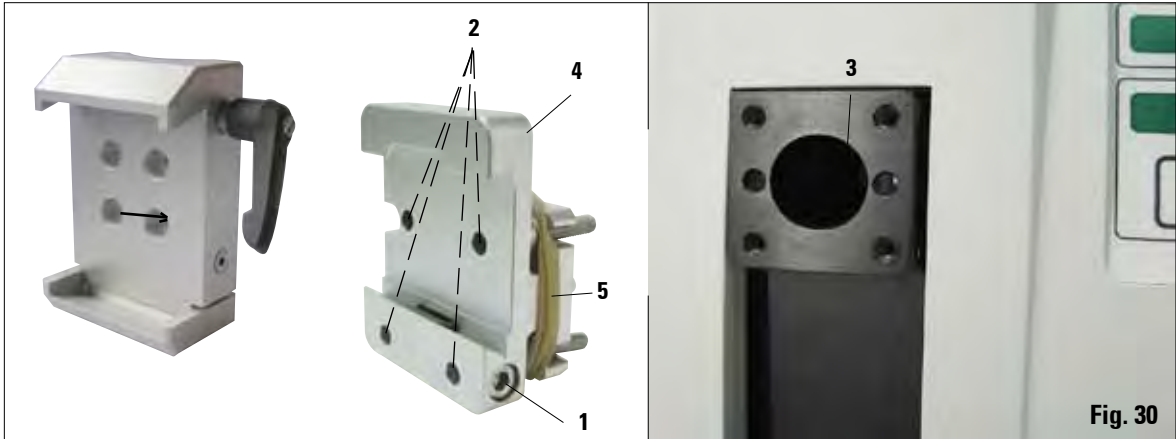
When using cassettes whose lid is molded on, make sure that the broken edge left by removing the lid does not prevent the specimen from being securely clamped – if necessary, the specimen must be clamped horizontally.

Before clamping the cassette into the universal cassette clamp, remove excess wax on the outside of the cassette to ensure that the cassette clamps in securely.

Wax deposits on the outside of the cassette can make the universal cassette clamp dirty. The dirt prevents the cassette from clamping in securely and can lead to sections being too thick or thin, chattering within the section and, in the worst-case scenario, damage to the specimen. Prior to sectioning, the user has to verify that the specimen is clamped securely and, if necessary, remove wax deposits from the universal cassette clamp according to the specifications in [Chapter 8.1 "Cleaning and maintenance – Universal cassette clamp"](#).

6. Optional Accessories

6.2.5 Super mega-cassette clamp



Assembly of the super mega-cassette clamp

The super mega cassette clamp should preferably be used with the rigid fixture for specimen clamps.

To do so, proceed as follows:



Remove the rubber ring (5) only after having attached the cassette clamp on the specimen head!

- Screw the rigid fixture for specimen clamps (4) onto the specimen head (3):
Remove the screw (1), place the specimen holder fixture (4) onto the specimen head (3) from the front and tighten the screws (2) with an Allen key No. 3.
Next, insert the screw (1) from the side and briefly tighten it with an Allen key No. 4.
- Insert the super mega cassette clamp from the side on the left into the dovetail guide of the rigid fixture for specimen clamps and tighten screw (1).



If the directional fixture for specimen clamps is used with the rigid knife holder base, the orientation must be in position "0" and the cover for backlighting illumination must be detached. (Danger of collision if not observed!)

NEVER use the super mega-cassette clamp with backlighting illumination!

6.2.6 Holder for round specimens



The holder for round specimens is designed to accommodate cylindrical specimens. Inserts for specimens of 6, 15 and 25 mm diameter are available.

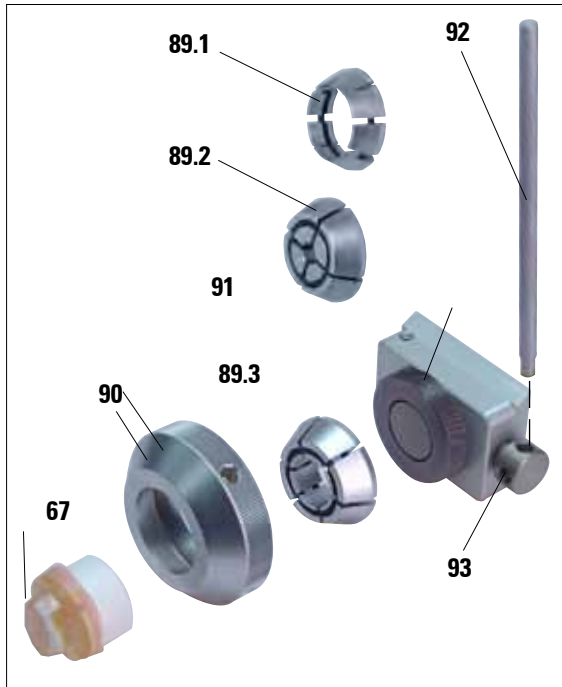


Fig. 31

- To mount the required insert (**89.1-3**) turn the clamping ring (**90**) counterclockwise and remove it.
- Place the required insert into the tension ring (**90**) and screw the tension ring onto the thread (**91**) by turning it clockwise.
- Mount the specimen (**67**) and clamp it by turning the clamping ring (**90**) clockwise.
- To orient the inserted specimen, insert the pin (**92**) into the bore (**93**) and rotate it counterclockwise to release the clamp. You can now rotate the specimen so that the side you want faces upwards.
- To lock it in the position you have chosen, tighten the pin (**92**) by turning it clockwise.

6. Optional Accessories

6.3 Knife holder base and knife holder



Fig. 32

The plastic handles of all clamping levers on the instrument and knife holders can be turned to the position that is most convenient for each user.

Pull the grip (94) out of the lever, hold it in this position, and rotate it to the desired position. It will then lock automatically when released.

6.3.1 Knife holder base, without lateral displacement feature

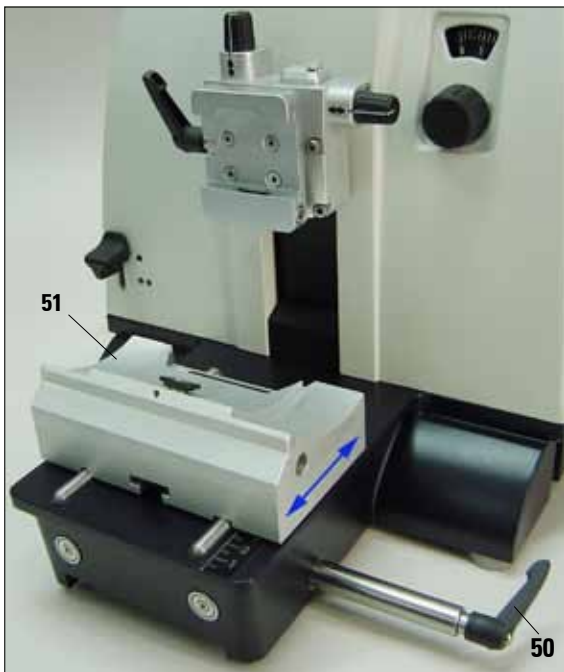


Fig. 33

Repositioning the knife holder base

The one-piece knife holder base (rigid) (51) can be moved forwards and backwards on the microtome base plate.

This vertical displacement allows bringing the knife holder into the optimal cutting position in relation to the specimen.

- To release, rotate the clamping lever (50) on the right side of the microtome base plate counterclockwise.
- Reposition the knife holder together with the knife holder base forward or backward as appropriate.
- Secure the clamping mechanism by rotating the lever (50) clockwise.

6.3.2 Knife holder E/E-TC



The knife holder E-TC is designed for the Leica TC-65 tungsten carbide blades.



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

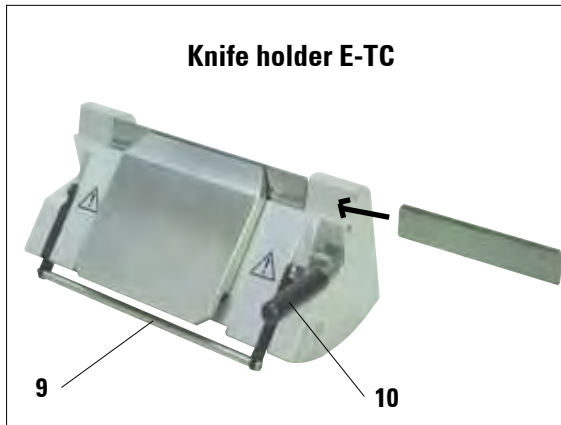


Fig. 34

Inserting the blade, knife holder E and E-TC

- Fold knife guard (9) downward.
- To insert the blade, flip the right clamping lever (10) forward and down.
- Carefully insert the blade from the side. Make sure that the blade is clamped parallel to the upper edge of the pressure plate.
- To clamp the blade, rotate clamping lever (10) back upwards.



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

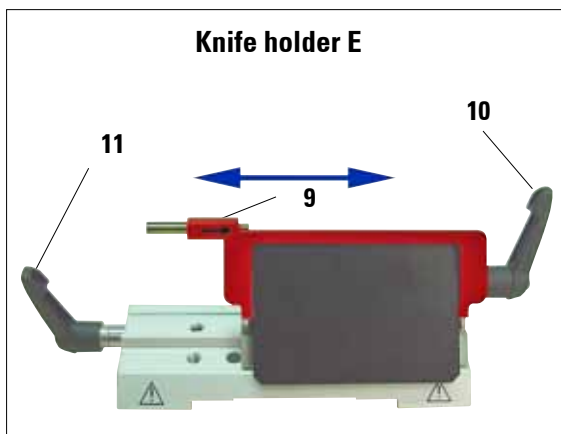


Fig. 35



The clamping levers on the knife holder are not interchangeable. The two clamping levers (10, 11) must remain in the position shown at all times, as otherwise isolated malfunctions of the knife holder can occur.

Clamping lever for the blade (10) at the right, clamping lever for the lateral displacement (11) at the left.

6. Optional Accessories

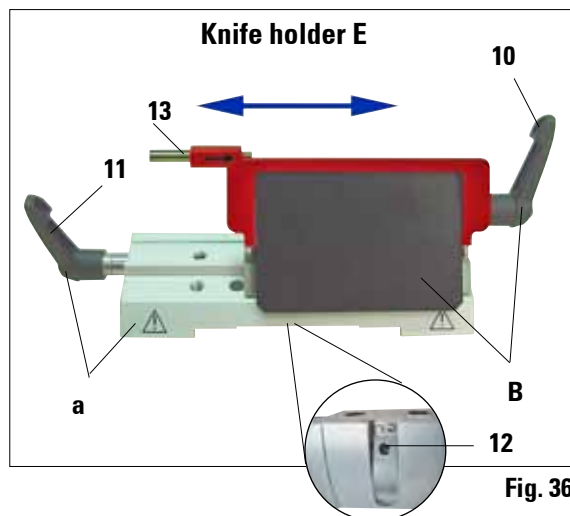


Fig. 36

Lateral displacement (only for knife holder E)

The lateral displacement feature of the knife holder base enables the use of the entire length of the blade, eliminating the need for readjusting the knife holder. The knife holder E consists of a segment arch **A** (with lever **(11)**) and the clamp mount **B** (with lever **(10)** and ejector **(13)**).

The extreme left and right positions as well as the middle position are each marked with a click stop.

- To release the clamp, rotate the lever **(11)** on the left side of the knife holder forwards.
- Move the knife holder sideways.
- To clamp, rotate the lever **(11)** back.

Note on the knife holder E:

The knife holder E is an important precision component, the quality and precise adjustment of which have a lasting effect on the entire function of the microtome. In case of malfunctions or damages to the clamp mount, it is always required to replace the clamp mount, including the pertinent clamping lever.

Leica Biosystems offers special prices for new clamp mounts in case of damages to the clamp mount after the warranty has expired.

In this way, perfect function of the device can be ensured over the course of many years.

Setting of the clamping system of the clamp mount on the segment arch

To ensure a proper sectioning result, clamp mount B must be securely clamped onto segment arch A.

The clamping is carried out using an eccentric at the lever **(11)**. The clamping force is adjusted with the setscrew **(12)** on the underside of the segment arch. The setting of the clamping is carried out so that the clamping lever can be rotated to the stop with constantly increasing resistance.

Adjust the clamping with a 2.5 mm Allen key at the setscrew **(12)** so that the lever initially "slips" when the lever is activated. Continue turning the setscrew **(12)** a little bit (approx. $\frac{1}{4}$ turn to the left or right) then check that the lever no longer "slips", but also does not jam "heavily".

(The language CD features a short video film for this purpose.)

Knife holder E with a water trough for low-profile blades

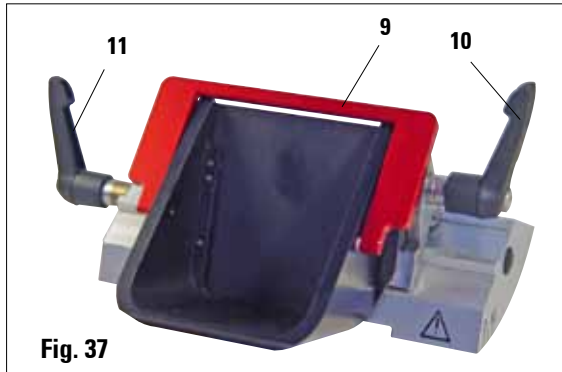


Fig. 37

The knife holder E with a water trough is only for low-profile blades.

The knife guard on knife holder E consists of a red foldaway handle (9). To cover the cutting edge, fold the knife guard handle (9) upwards as illustrated in the figure.



The clamping levers on the knife holder are not interchangeable. The two clamping levers (10 and 11) must remain in the position shown at all times, as otherwise isolated malfunctions of the knife holder can occur.

Clamping lever for the blade (10) at the right, clamping lever for the lateral displacement (11) at the left.

Use

Floating thin paraffin sections (for example, for subsequent immunostaining procedures) on the surface of the water. Flat paraffin sections can be removed from the surface of the water using glass slides.



Fig. 38

The vessel is filled with water up to the blade. After trimming, remove the section waste from the tray and create the sections to be prepared. The sections floating on the surface of the water can be removed using the glass slide.

6. Optional Accessories

6.3.3 Knife holder N/NZ



The knife holders N and NZ are appropriate for standard steel and tungsten carbide knives, profile c and d, up to 16 cm long. The integrated height adjustment feature allows you to also use knives that have been resharpened numerous times.

Mounting the knife support bar

- Push knife guard (8) to the center.
- Set the knife support bar (46) onto the height adjustment screws (not visible) in the position shown. The flat ends of the height adjustment screws must be located in the slots at each end of the knife support bar.



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

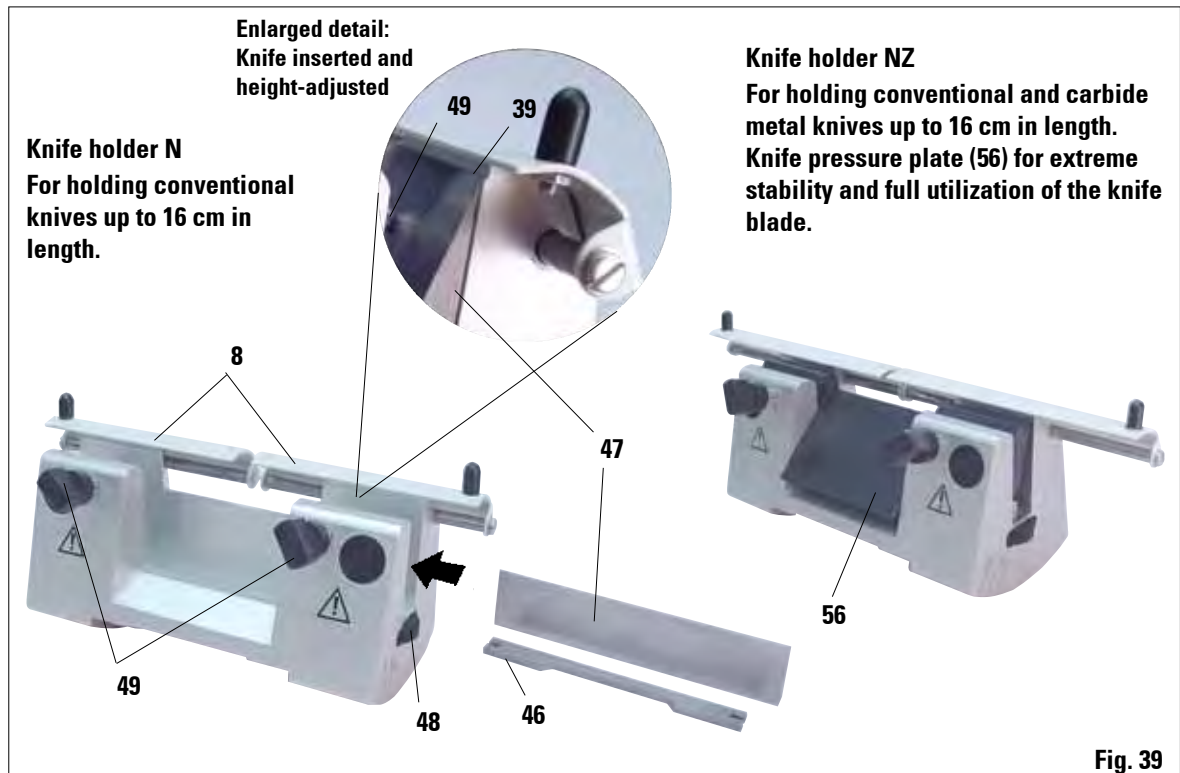


Fig. 39

Inserting the knife

- Rotate the knurled nuts **(48)** on the right and left of the knife holder forward in opposite directions, lowering the knife support bar to the lowest possible position, thus ensuring that the knife edge will not be damaged when inserting the knife.
- Unscrew the clamping screws **(49)** as far out as possible (rotate counterclockwise).
- Hold the knife **(47)** at the knife base and carefully insert it in the holder from the side as shown with the cutting edge facing upward.

Knife height adjustment

When adjusting the clearance angle, the knife edge should be positioned as exactly as possible in the actual center of rotation of the knife holder. The lay-on edge **(39)** of the rear clamping chucks serves as a reference position for correct knife height adjustment. The knife edge should be parallel with the locating edges.

- Rotate the knurled nuts **(48)** uniformly and backwards until the knife blade is parallel to the lay-on edge **(39)** (see detailed illustration) of the rear clamping chucks.
- To clamp the knife **(47)** evenly screw the two knife clamping screws **(49)** inward (rotate clockwise).

Lateral repositioning of the knife

- Push knife guard **(8)** to the center.
- Loosen the clamping screws **(49)** by turning them counterclockwise.
- Push the knife **(47)** to the left or right as required.
- To clamp the knife **(47)**, always tighten the clamping screw **(49)** first which is located on the side to which the knife has been repositioned by turning it clockwise.

6. Optional Accessories

6.4 Section waste tray

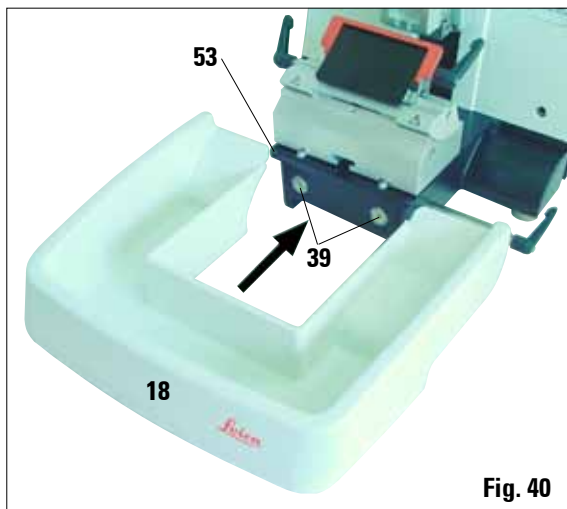


Fig. 40

- Push the section waste tray (18) from the front to the microtome base plate (53) until it is held in place by the two magnets (39) (on the front of the microtome base plate). To remove the section waste tray, lift it slightly and pull it off towards the back.

6.5 Backlighting

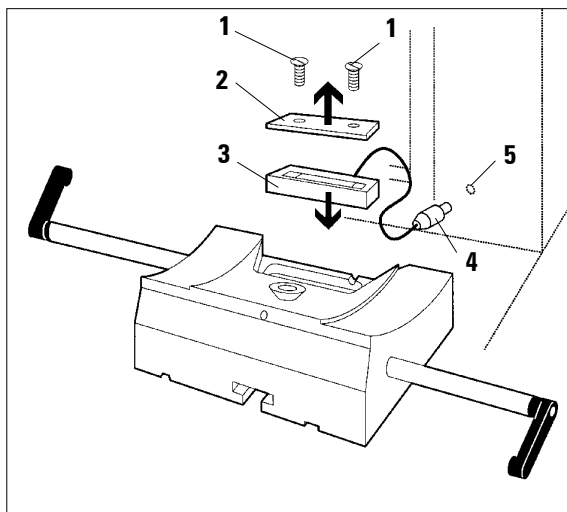


Fig. 41



The backlighting is inserted into the front of the one-piece knife holder base.

- Remove the two screws (1) using a slotted screwdriver and then remove the cover plate (2).
- Insert the backlighting (3) in the recess at the rear of the knife holder base.
- Insert the plug (4) for the backlighting into the socket (5) of the microtome and connect the plug of the power adapter to an AC power socket.

The backlighting illuminates once the microtome is turned on with the power switch.



NEVER use the backlighting illumination with the super mega-cassette clamp!

6.6 Tray



Fig. 42

The tray is mounted on the hood of the microtome so that the small feet on the underside fit into the cutouts on the hood.

It is for storage of the utensils used during sectioning as well as the sectioned specimens.

6.7 Freezer pack

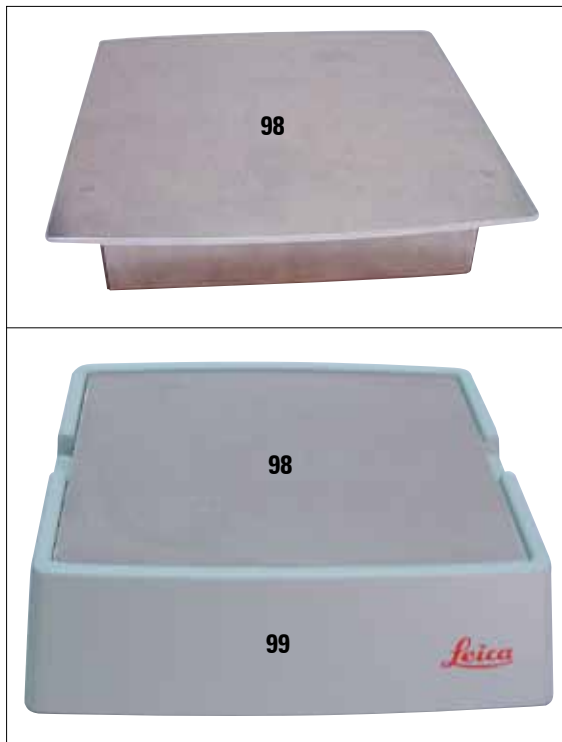


Fig. 43

The freezer pack consists of the freezer plate (98) and the insulation jacket (99). It is for cooling (or keeping cold) paraffin specimens. Up to 35 standard cassettes can be cooled at the same time. The specimens require approx. 20 min. for being cooled from room temperature (approx. 20 °C) to "sectioning temperature".

The cooling performance depends on the ambient temperature and the volume of the specimens being cooled.

The insulation jacket can be placed on the hood of the microtome in the same manner as the tray, or it can be placed next to the instrument.



When using the freezer pack on the instrument the tray (Fig. 42) must be removed.

- Remove the freezer plate from the insulation jacket and place it in a deep freezer, ideally overnight (but for at least six hours) at approx. -23 °C.
- Reassemble the freezer plate and insulation jacket and place them on the bench or the instrument.

6. Optional Accessories

6.8 Universal microscope carrier

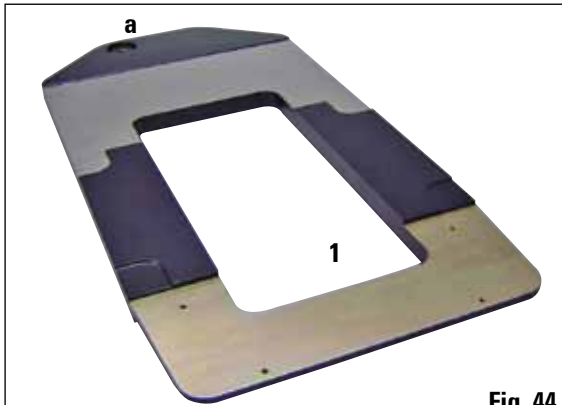


Fig. 44



Fig. 45

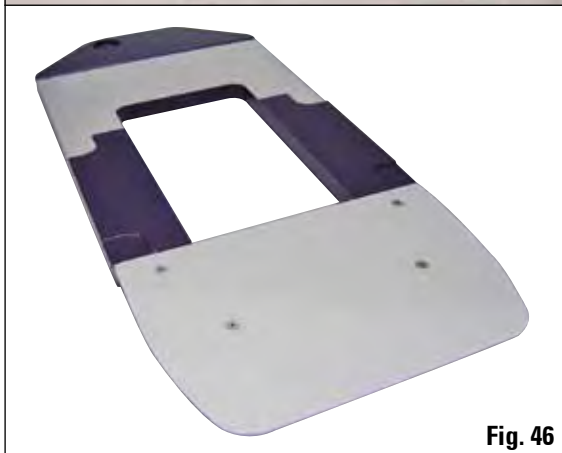


Fig. 46



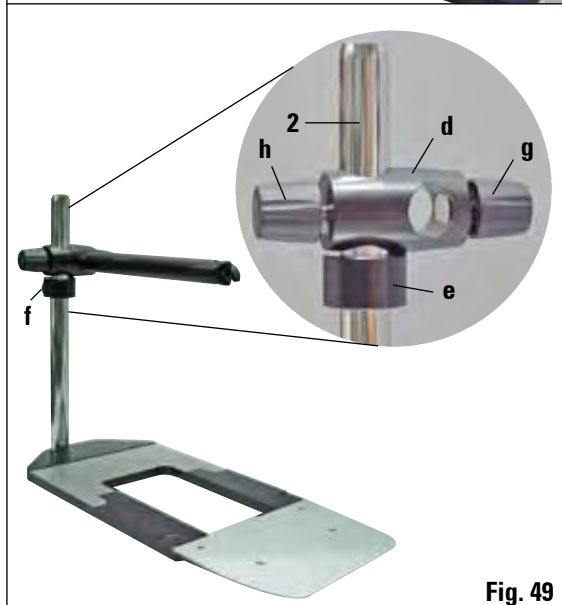
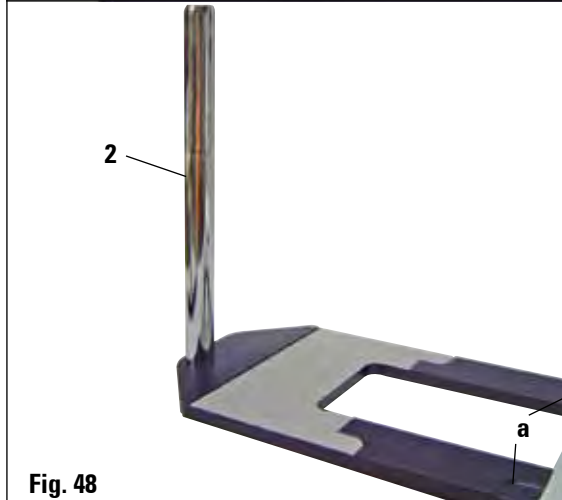
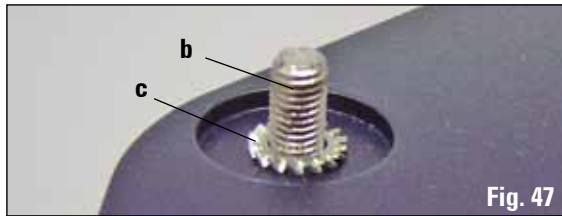
Unpack all accessories in the package and check for completeness.

- 1 - Baseplate with drilling (a)
- 2 - Vertical column with size 8 cap screw (b) and lock washer (c)
- 3 - Horizontal arm with cross-member (d) and support ring (e)
- 4 - Support plate, large (for RM2235, RM2245 and RM2255)
- 5 - Support plate, small (for RM2265)
- 6 - Allen key size 3
- 7 - 4 countersunk screws to install support plate
- 8 - Allen key size 8

Assembling the universal microscope carrier

1. Attach baseplate

- Select the large (5) or small (4) support plate, depending on the microtome to be used.
- Attach the support plate to the baseplate with the included 4 countersunk screws (7) using the Allen key No. 3 (6).



2. Attach vertical column

- Insert the cap screw (b) into the hole of the baseplate from below. Place the lock washer (c) on the cap screw from above.
- Thread the silver vertical column (2) onto the baseplate from above and tighten with the Allen key No. 8.



The lock washer must be positioned between the baseplate and vertical column to prevent unintentional turning of the column.



Extreme danger of tipping! After installing the vertical column, immediately place the microtome onto the baseplate so that the front feet of the microtome are positioned in the shallow recesses (A).

3. Attach horizontal arm

- Slide the support ring (e) onto the vertical column and position it so that the lock nut (f) is facing to the back. Tighten the lock nut.
- Slide the cross-member (d) onto the column. Ensure that the lock screw (g) is facing to the right of the baseplate. The horizontal arm must be centered over the microscope.
- Slide the horizontal arm (3), flat side facing the lock screw (g), into the cross-member (d) and tighten.



For more information on connecting and using the microscope, magnifying lens or cold-light source, please see the appropriate Instructions for Use.

6. Optional Accessories

6.9 Magnifying lens



The magnifying lens provides a 2x magnification and can be used with all Leica 2200 series rotary microtomes.

- Open the screw (3) on the horizontal arm of the microscope carrier in a counterclockwise direction.
- Insert the silver connection piece (1) as far as it will go. Tighten the screw (3).
- The adapter (2) allows a fiber-optic light guide to be installed.

- The instrument illustrations in Fig. 51 and Fig. 52 are an example only.

- Adjust the position of the magnifying lens to the specimen being processed.

The magnifying lens can be swiveled completely to the side if necessary.



Always protect the magnifier glass from exposure to direct sunlight! Exposure to sunlight may cause a burning glass effect. Danger of fire!

- Use the provided protective cap (4) to cover the magnifying lens.

6.10 Additional accessories

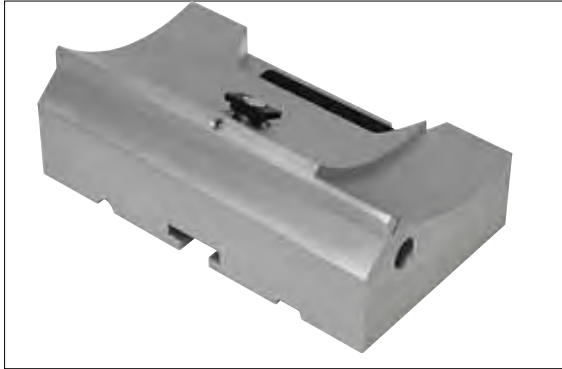


Fig. 53

Knife holder base, non-orientable

Silver for knife holders N, NZ, E, and E-TC

Order No. 14 0502 37962



Fig. 54

Knife holder N,

silver, for holding conventional knives up to 16 cm in length, height adjustment of the knife blade, separate clearance angle adjustment, movable knife guard.

Order No. 14 0502 37993



Fig. 55

Knife holder NZ, silver

for holding conventional and carbide metal knives up to 16 cm in length, knife pressure plate for extreme stability and full utilization of the knife blade, height adjustment of the knife blade, separate clearance angle adjustment, movable knife guard.

Order No. 14 0502 37994

6. Optional Accessories



Fig. 56

Knife holder E,

for low-profile disposable blades,
(80 x 8 x 0.25 mm), silver, for RM22xx

Quick clamp system with ability to shift the blade
laterally.

3 click-stop positions make it easier to utilize the
entire blade.

Color-coded, foldaway knife guard.

With blade ejector

Order No. 14 0502 40508

For high-profile disposable blades,
(80 x 14 x 0.35 mm), silver, for RM22xx

Order No. 14 0502 40509



Fig. 57

Knife holder E,

for low-profile disposable blades,
(80 x 8 x 0.25 mm), silver, for RM22xx

with a water trough,

Quick clamp system with
ability to shift the blade laterally.

3 click-stop positions make it easier to utilize the
entire blade.

Color-coded, foldaway knife guard.

With blade ejector

Order No. 14 0502 38961

6. Optional Accessories



Fig. 58

Knife holder E-TC,

for carbide metal disposable blades TC-65, silver
Quick clamp system,
rustproof clamping plate made of stainless steel,
rear pressure plate made of carbide metal

Order No. 14 0502 37997



Fig. 59

Disposable blades — low profile (819)

80 x 8 x 0.25 mm

01 package of 50 pcs. **14 0358 38925**

10 packages of 50 pcs. **14 0358 38382**



Fig. 60

Disposable blades — high-profile (818)

80 x 14 x 0.35 mm

01 package of 50 pcs. **14 0358 38926**

10 packages of 50 pcs. **14 0358 38383**

6. Optional Accessories



Fig. 61

Disposable blades Leica TC-65

Leica TC-65 microtome, disposable blade system for sectioning hard specimen materials. The Leica TC-65 carbide metal disposable blades were specially developed for the requirements in labs where hard, blunt materials are routinely sectioned. The one-of-a-kind fine-grain carbide metal guarantees sections to approx. 1 μ m. The blades are fully recyclable.

Length: 65 mm

Thickness: 1 mm

Height: 11 mm

1 pack of 5 pcs.

Order No. 14 0216 26379

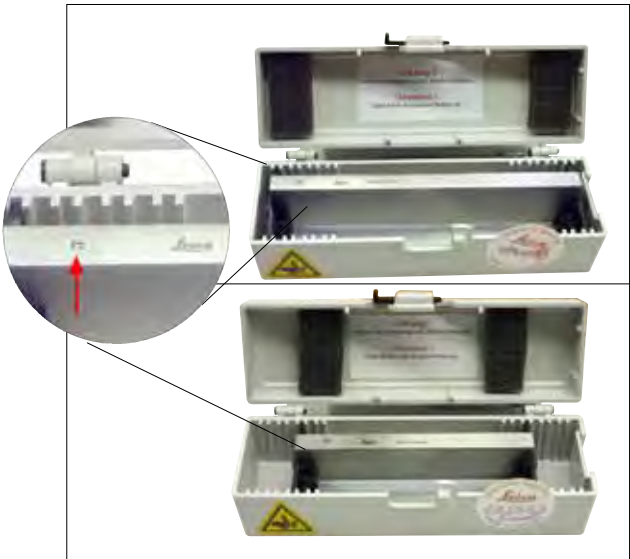


Fig. 62

Knife 16 cm - profile c - steel

Knife, 16 cm long, profile c

Note: Knife case 14 0213 11140 included

Order No. 14 0216 07100

Knife 16 cm, profile d - steel

Knife, 16 cm long, profile d

Note: Knife case 14 0213 11140 included

Order No. 14 0216 07132

6. Optional Accessories



Fig. 63

Knife, 16 cm, profile d, tungsten carbide

Knife, 16 cm long, tungsten carbide, profile d

Note: Knife case 14 0213 11140 included

Order No. 14 0216 04813

Knife 16 cm, profile c, tungsten carbide

Knife, 16 cm, tungsten carbide, profile c

Note: Knife case 14 0213 11140 included

Order No. 14 0216 04206



Fig. 64



Fig. 65

Knife case

Variable knife case (plastic),
for 1 or 2 knives: 10 - 16 cm long

(Carbide metal or SM2500 knife: only for 1 knife!)

Order No. 14 0213 11140

6. Optional Accessories

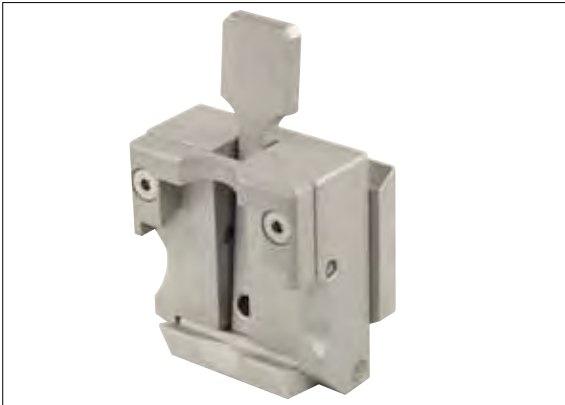


Fig. 66

Universal cassette clamp

with adapter
RM2125 RTS, silver

For use with standard cassettes with dimensions that are 39.8 x 28 mm at minimum and 40.9 x 28 mm at maximum.

Order No. 14 0502 37999

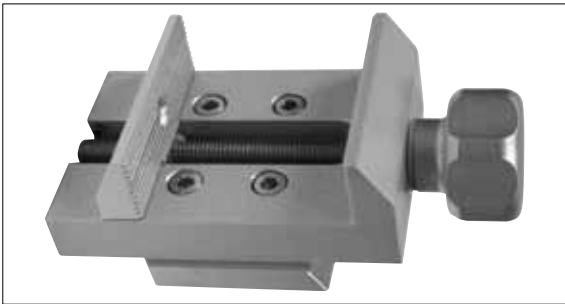


Fig. 67

Standard specimen clamp

50 x 55 mm, with adapter, silver

Order No. 14 0502 38005

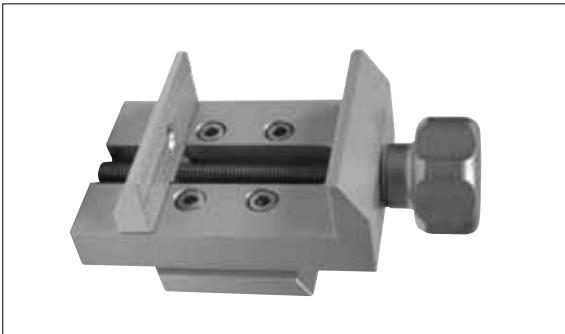


Fig. 68

Standard specimen clamp

40 x 40 mm, with adapter, silver

Order No. 14 0502 37998

6. Optional Accessories



Fig. 69

specimen holder fixture, directional
silver

For holding the standard clamp,
universal cassette clamp,
round specimen holder and EM specimen holder,
including installation hardware

Note: Quick clamping system
14 0502 37718 has to be ordered separately

Order No. 14 0502 38949



Fig. 70

Specimen holder fixture, non-directional

silver, for holding the standard clamp, universal
cassette clamp, round specimen holder and EM
specimen holder, including installation hardware

Order No. 14 0502 38160

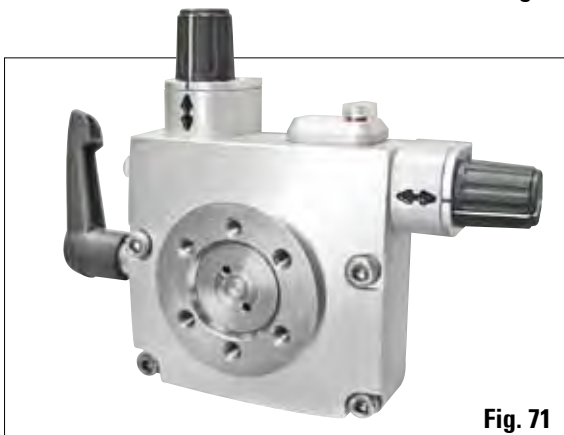


Fig. 71

Specimen holder fixture, fine directional, silver,
with 2 zero point indicators, XY orientation 8° per
direction, click stops every 2°

Note: Quick clamping system 14 0502 37718 must
be ordered separately.

Order No. 14 0502 37717

6. Optional Accessories



Fig. 72

Quick clamping system,
for specimen holder for use with the fine-directional fixture for specimen clamps with zero point indicators 14 0502 37717 or the directional fixture for specimen clamps 14 0502 38949

Order No. 14 0502 37718

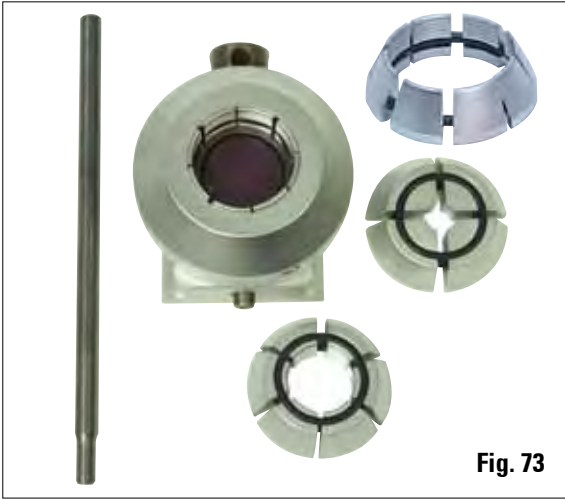


Fig. 73

Round specimen holder
for 6, 15 and 25 mm specimen diameters, with adapter, with 3 clamping rings, silver

Order No. 14 0502 38002

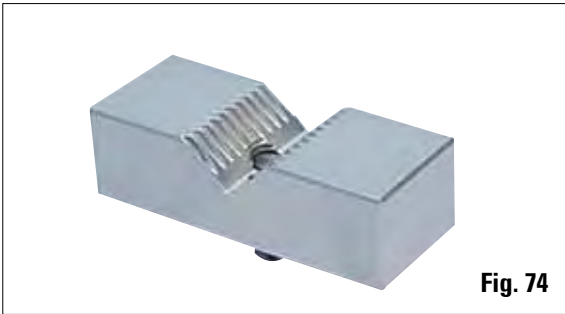


Fig. 74

Vee insert for standard specimen clamp, silver

Order No. 14 0502 38000



Fig. 75

Foil clamp Type I

for standard specimen clamp, black

Maximum specimen size: 25 x 13 mm

Order No. 14 0402 09307



Fig. 76

Special wrench,

for EM specimen holder

Order No. 14 0356 10869



Fig. 77

EM specimen holder fixture,

for EM specimen holder, black

For samples with a 10 mm diameter

Order No. 14 0502 29968

6. Optional Accessories



Fig. 78

EM universal specimen holder,
For samples with a 8.5 mm diameter

Order No. 14 0356 10868



Fig. 79

EM flat specimen holder,
Opening width up to 4.5 mm

Order No. 14 0355 10405



Fig. 80

Super Mega cassette clamp,
with adapter, silver

Note:

Use only together with non-orientable specimen holder fixture 14 0502 38160, which has to be ordered separately.

Backlighting 14 0502 38719 cannot be used in connection with a Super Mega cassette clamp.

We recommend use with Surgipath Super Mega cassettes and covers, white (VSP 59060B-BX, VSP 59060-CS) and Super metal embedding molds (VSP58166)

(LxWxH) 75 x 52 x 35 mm

Order No. 14 0502 38967

Leica RM CoolClamp



Fig. 81

Electrically cooled universal cassette clamp with adapter for the Leica RM2200 series rotary microtomes. For use with standard cassettes with dimensions that are 39.8 x 28 mm at minimum and 40.9 x 28 mm at maximum.

Uniform microtome sections through electric cooling of the universal cassette clamp using the Leica RM CoolClamp. Energy-saving cooling through the heat dissipation system.

The patented force balance system of the Leica RM2200 series rotary microtomes enables the specimen clamps to be changed quickly and reliably without modifying the handwheel. Antistatic material makes cleaning easier. Can be retrofitted for all rotary microtomes from the Leica RM2200 series.



• **Please note:**

The RM CoolClamp cannot be used in connection with a microscope or magnifier.

Technical data:

Precooling time until work begins: 30 minutes

Temperature: 20 K below ambient temperature

Ambient temperature range: +10 °C to +35 °C

Relative humidity: max. 80 %, non-condensing

Weight: approx. 650 g

Measurements (W x D x H): 80 x 114 x 204 mm

Power Inlet: 100 - 240 V/ 50/ 60 Hz

Certifications: CE, c_CSA_US

Standard delivery:

RM CoolClamp

Power supply with cable and 3 adapters (UK, US, EU)

5 cable clamps

Instructions for Use and DVD

Order No. 14 0502 46573

6. Optional Accessories



Fig. 82

Magnifier,

For assembly on microscope carriers
(14 0502 40580), 2x magnification

Note:

Magnifier includes an adapter for holding the
optional fiber-optic light guide (14 0502 30028)

Order No. 14 0502 42790



Fig. 83

**Universal microscope carrier, universal
assembly**

Order No. 14 0502 40580



Fig. 84

**Light guide,
gooseneck**

Order No. 14 0386 31352

6. Optional Accessories



Fig. 85

Leica CLS 100, cold light source,
with power adapter – USA 100-120 V / 50-60 Hz
Order No. 14 0502 30214

with power adapter – Europe and the
United Kingdom 230-240 V / 50-60 Hz
Order No. 14 0502 30215

with power adapter – Australia 240V / 50-60 Hz
Order No. 14 0502 30216

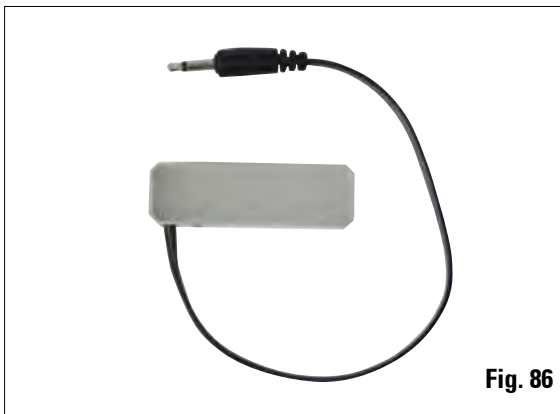


Fig. 86

Backlighting,
Note:

For RM2235 and RM2245 only together with
external power supply 14 0500 31244.
Backlighting cannot be used in connection with a
Super Mega cassette clamp 14 0502 38967.

Order No. 14 0502 38719



Fig. 87

External power supply unit,
for use with backlighting 14 0502 38719, for rotary
microtome series
Leica RM2235 and RM2245

The following adapters are included:
UK, Europe, USA/Japan, Australia

Order No. 14 0386 31352

6. Optional Accessories



Fig. 88

Tray,
for rotary microtome series Leica RM2200

Order No. 14 0502 37932



Fig. 89

Cooling plate,
with one freezer pack

Order No. 14 0386 38325



Fig. 90

Section waste tray,
large, included in the standard scope of delivery
of RM2235, RM2245, and RM2255.

Order No. 14 0502 37931

Small, included in the standard scope of delivery
of 2265

Order No. 14 0503 39060



Fig. 91

Brush, "Leica"

with magnet for blade removal tool for knife holder E.

Order No. 14 0183 40426

6. Optional Accessories

6.11 Ordering information

Knife holder-base rigid, silver	14 0502 37962
Knife holder N RM22xx, silver	14 0502 37993
Knife holder NZ RM22xx, silver.....	14 0502 37994
Knife holder E low profile RM22xx, silver, with ejector	14 0502 40508
Knife holder E high profile RM22xx, silver, with ejector	14 0502 40509
Knife holder E with a water trough for low profile blades RM22xx	14 0502 38961
Knife holder E-TC RM22xx silver	14 0502 37997
Disposable blades – low-profile, 1 pack of 50 (80 x 8 x 0.25 mm)	14 0358 38925
Disposable blades – low-profile, 10 packs of 50	14 0358 38382
Disposable blades – high-profile, 1 pack of 50 (80 x 14 x 0.35 mm)	14 0358 38926
Disposable blades – high-profile, 10 packs of 50	14 0358 38383
Disposable blades Leica TC-65	14 0216 26379
Knife 16 cm - profile c - steel	14 0216 07100
Knife 16 cm - profile d - steel	14 0216 07132
Knife 16 cm - profile d - carbide metal	14 0216 04813
Knife 16 cm - profile c - carbide metal	14 0216 04206
Universal cassette clamp, with adapter RM2125 (silver)	14 0502 37999
Standard specimen clamp with adapter 50x60 (silver)	14 0502 38005
Standard specimen clamp with adapter 40x40 (silver)	14 0502 37998
Fixture for specimen clamps, directional, silver	14 0502 38949
Fixture for specimen clamps, rigid, silver	14 0502 38160
Fixture for specimen clamps, directional, with 2 zero point indicators, silver	14 0502 37717
Quick clamping system, complete	14 0502 37718
Round specimen holder with adapter and 3 clamping rings, silver	14 0502 38002
V-insert for Standard specimen clamp, silver	14 0502 38000
Foil clamp - type 1, black	14 0402 09307
Special wrench for EM specimen holder	14 0356 10869
EM specimen holder fixture	14 0502 29968
EM universal specimen holder	14 0356 10868
EM flat specimen holder	14 0355 10405
Megaclamp assembly RM22xx, silver	14 0502 38967
RM CoolClamp	14 0502 46573
Magnifying lens assembly	14 0502 42790
Universal microscope carrier	14 0502 40580
Fiber-optic light guide	14 0502 30028
Light guide, gooseneck	14 0386 31352

6. Optional Accessories

Cold light sources	
Leica CLS 100X, 100-120 V/50-60 Hz	14 0502 30214
Leica CLS 100X, 230 V/50-60 Hz	14 0502 30215
Leica CLS 100X, 240 V/50-60 Hz	14 0502 30216
Backlighting assembly	14 0502 38719
External power supply assembly	14 0500 31244
Tray	14 0502 37932
Cooling device assembly	14 0502 38325
Section waste tray, large	14 0502 37931
Section waste tray, small	14 0503 39060
"Leica" brush w/magnet	14 0183 40426
Demo Box RM22xx series	14 0502 38930

7. Troubleshooting



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
7.1 Possible faults		
1. Thick/thin sections		
The sections alternate between being thick and thin, or there is chattering in the sections, or the specimen is torn out of the embedding. In extreme cases, there are no sections whatsoever.	<ul style="list-style-type: none">• The blade, knife holder or orientation is not clamped properly.• The specimen is not clamped properly.	<ul style="list-style-type: none">• Reclamp the blade, knife holders or orientation.• Check that the cassette is securely clamped in the universal cassette clamp.• If the universal cassette clamp is soiled by wax, clean the universal cassette clamp (refer to Chapter 8.1 – "Cleaning and maintenance – Universal Cassette Clamp").• When using cassettes whose lid is molded on, check that the broken edge allows the cassette to be clamped securely; if necessary, remove burrs or clamp the cassette into the universal cassette clamp horizontally instead of vertically.• If the cassette dimensions are within the specified tolerances and the cassette still cannot be securely clamped into place, it may be that the universal cassette clamp is configured incorrectly or is defective. In this case, have Technical Service inspect and reconfigure the universal cassette clamp.

Problem	Possible cause	Corrective action
		<ul style="list-style-type: none"> When using cassettes, particularly thin-walled cassettes, from a company other than Leica or Surgipath, the cassette may become deformed or other clamping problems may arise. If while trying to clamp the cassette you realize that it is not securely clamped into place, an alternative tensioning clamp must be used.
	<ul style="list-style-type: none"> The blade is dull. 	<ul style="list-style-type: none"> Laterally displace the knife holder or insert a new blade.
	<ul style="list-style-type: none"> The pressure plate is damaged or incorrectly adjusted. 	<ul style="list-style-type: none"> Insert a new pressure plate or use a new knife holder.
	<ul style="list-style-type: none"> Clearance angle of the knife/blade too small. 	<ul style="list-style-type: none"> Readjust the pressure plate. Systematically try several clearance angle adjustments, until the optimum angle is found.
2. Section compression The sections are very compressed, show folds or are squeezed together.	<ul style="list-style-type: none"> The blade is dull. 	<ul style="list-style-type: none"> Use another area of the blade or a new blade.
	<ul style="list-style-type: none"> The specimen is too warm. 	<ul style="list-style-type: none"> Cool the specimen before sectioning.
	<ul style="list-style-type: none"> The sectioning speed is too fast. 	<ul style="list-style-type: none"> Reduce the sectioning speed.
3. "Stripes" in sections For knife holder E	<ul style="list-style-type: none"> There is an accumulation of paraffin on the rear pressure plate of the knife holder. 	<ul style="list-style-type: none"> Remove paraffin from this area on a regular basis.

7. Troubleshooting

Problem	Possible cause	Corrective action
4. Noises during sectioning The knife "sings" when sectioning hard specimens. The sections show scratches or chatter marks.	<ul style="list-style-type: none">• The sectioning speed is too fast.• The clearance angle is too wide.• Insufficient clamping of specimen and/or knife holder.	<ul style="list-style-type: none">• Turn the handwheel at a slower speed.• Systematically decrease the clearance angle until the optimum adjustment is obtained.• Check all screw and clamp connections on the specimen holder system and the knife holder. If necessary, tighten the levers and screws.
7.2 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 back by turning the coarse driving 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, rotate the handwheel more slowly.

8.1 Cleaning the instrument



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!
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:

- Raise the specimen clamp to the upper end position and activate the handwheel lock.
- Switch the unit off and unplug it.
- 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.
- Remove section waste with a dry brush.
- Remove specimen clamp and clean separately.

Instrument and outside surfaces

If necessary, the varnished outside surfaces of the control panels can be cleaned with a mild commercial household cleaner or soap water and then be wiped with a moist cloth.

To remove paraffin residue, xylene substitutes, paraffin oil, or paraffin removers such as "Para Gard" (Polysciences) can be used.

The instrument must be completely dry before it can be used again.



Always wipe the knife from the back of the knife to the cutting edge. NEVER wipe in the opposite direction - risk of injury!

Clean using an alcohol-based solution or acetone.

8. Cleaning and Maintenance

Knife holder E

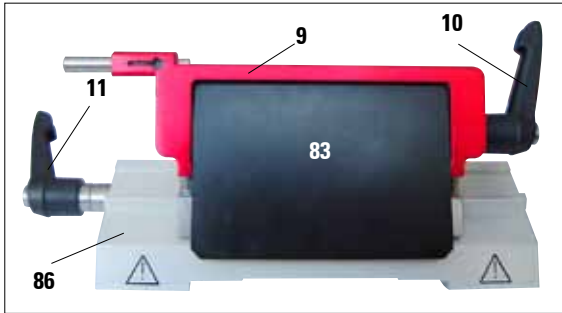


Fig. 92

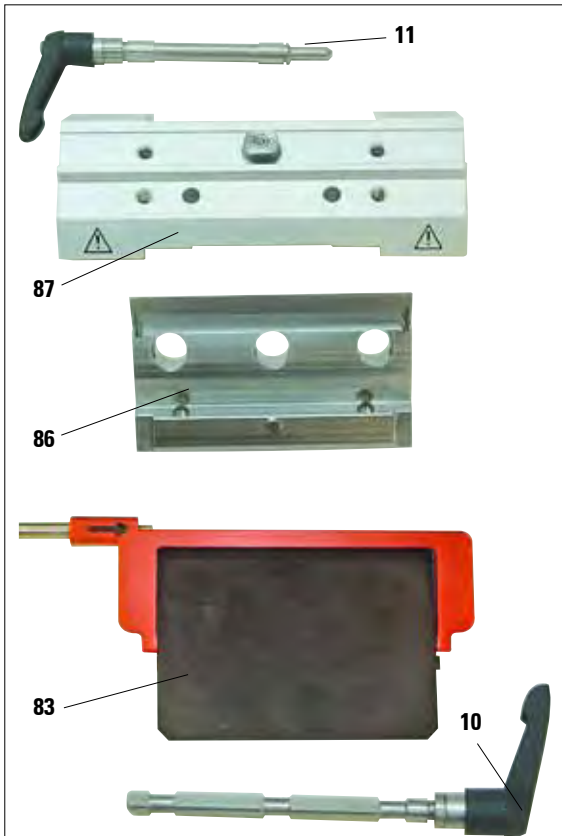


Fig. 93

Take the knife holder apart for cleaning. To do so, proceed as follows:

- Fold knife guard (9) downward.
- Rotate the clamping lever (11) of the lateral displacement forwards and pull it out sideways.
- Push the knife holder base plate (86) with the pressure plate (83) until it can be removed from the segment arch (87).
- Rotate the blade clamping lever (10) downward and pull it out sideways.
- Remove pressure plate (83).
- Clean all parts of the knife holder.



If several knife holders are cleaned at the same time, the parts must NOT be mixed up! Failure to adhere to this may result in sectioning problems!



For cleaning and removal of paraffin, do not use xylene or cleaning fluids containing alcohol (e.g. glass cleaner).

- Lay the removed parts on an absorbent cloth into the drying chamber (up to a max. of 65°C) and let the paraffin contamination run off.



There is a burn hazard when removing the parts from the drying chamber (65°C). Wearing safety gloves is recommended!

- Dry knife holder and reassemble.
- After cleaning the moving parts, apply a thin coat of drive part oil to them ([refer also to Chapter 8.3](#)).
- When installing the pressure plate (83) make sure that the upper edge is parallel and level with the rear edge of the knife holder base plate (86).

Universal cassette clamp

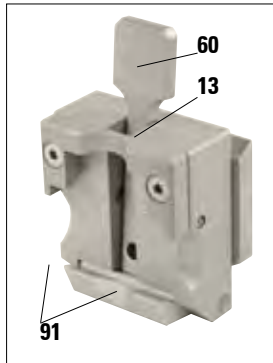


Fig. 94

- Detach cassette clamp **(13)** for a thorough cleaning, removing all paraffin residues.
- For cleaning, do not use xylene. Use xylene substitutes or paraffin removers such as "Para Gard."
- The cassette clamp **(13)** can also be placed in an oven heated to a maximum of 65 °C, until the liquid wax escapes.
- Remove paraffin residues with a dry cloth.
- After such a cleaning procedure in an oven, always be sure to lubricate the spiral springs **(91)** of the tension lever **(60)** (refer also to Chap. 8.3) and move it back and forth several times.

8.2 Maintenance instructions



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

The instrument is basically maintenance-free.

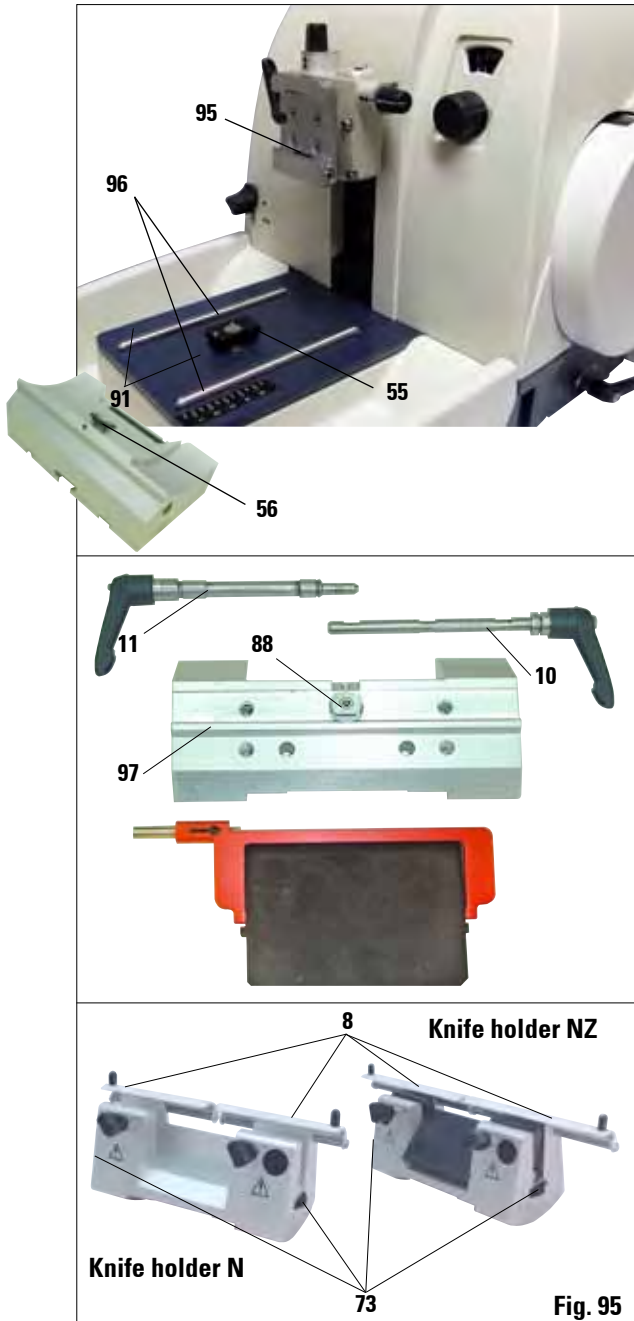
To ensure trouble-free operation of the instrument over a long period of time, the following is recommended by Leica:

1. Thoroughly clean the instrument on a daily basis.
2. 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.
3. Have the instrument inspected on a regular basis by a qualified service technician authorized by Leica.
The intervals depend on how heavily the instrument is used.

We recommend the following inspection intervals depending on the general workload of the instrument as defined in the two categories listed in the table:

	Category I	Category II
Number of sections per day:	> 8,000 sections per day	< 8,000 sections per day
Workload (hours per day):	> 5 hours per day	≤ 5 hours per day
Sectioning speed:	Predominantly high sectioning speed	Slow to medium sectioning speed
Specimen material:	Working with soft and hard specimens	Predominantly soft specimen material
Maintenance:	Every 12 months	Every 24 months

8. Cleaning and Maintenance



8.3 Lubricating the instrument

Once a month, lubricate the following parts with the included drive parts oil No. 405 (1 - 2 drops are enough).

Instrument and specimen holder:

- The clamping key (95) of the quick clamping system.
- The T-piece (55) on the microtome base plate.
- Guide rails (96) for the knife holder base on the microtome base plate.
- The T-piece on the knife holder base (56).

Knife holder E:

- Clamping lever (11) for the lateral displacement.
- T-piece (88) and guide (97) of the knife holder for the lateral displacement.
- Clamping lever (10) for the blade.

Knife holders N and NZ:

- Sliding surfaces of the finger guard (8).
- Knurled nuts (73) for measuring height adjustment.

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 support or spare parts, please contact your Leica representative or the Leica dealer where you purchased the instrument.

Please provide the following information:

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

Decommissioning and Disposal

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

10. Decontamination Certificate (Master)

Dear Customer,

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

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

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

Nameplate information

Model (see nameplate)*

REF (see nameplate)*

SN (see nameplate)*

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

A

Yes

☐

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

B

Yes

No

☐

☐

☐

☐

☐

☐

☐

☐

☐

☐

1

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

Blood, body fluids, pathological samples

Other biohazards

Chemicals/substances hazardous to health

Other hazards

Radioactivity

Please provide further detail here:

Beam value:

Yes

No

☐

☐

2

This equipment has been cleaned and decontaminated:

If yes, give details of the method:

If no**, please indicate why not:

Please provide further detail here:

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

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10. Decontamination Certificate (Master)

Yes

☐

No

☐

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

Important - to avoid refusal of shipment:

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

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

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

Job Sheet No.: _____ BU Return Authorization Number: _____ SU Return Goods Authorization: _____

Signature/Date*

Name*

Position*

eMail

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