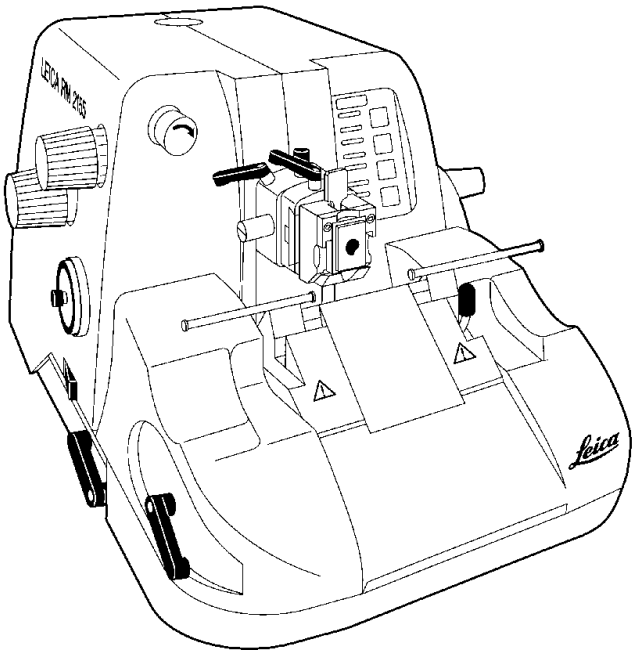

Leica RM 2155

Rotary Microtome

Instruction Manual

Leica RM 2155 V1.1 English – 11/2000

Always keep this manual near the instrument!
Read carefully prior to operating the instrument!

Leica
MICROSYSTEMS

Serial No. .....

Year of manufacture: .....

Manufactured in: .... Federal Republic of Germany

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.

For erroneous statements, drawings, technical illustrations etc. contained in this manual we exclude liability as far as permissible according to the national legal system applicable in each individual case. In particular, no liability whatsoever is accepted for any financial loss or consequential damage caused by or related to compliance with statements or other information in this manual.

Statements, drawings, illustrations and other information as regards contents or technical details of the present manual are not to be considered as warranted characteristics of our products. These are determined only by the contract provisions agreed between ourselves and our customers.

Leica reserves the right to change technical specifications as well as manufacturing processes without prior notice. Only in this way is it possible to continuously improve the technology and manufacturing techniques used in our products.

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

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Homepage: http://www.histo-solutions.com
http://www.materials-sectioning.com

2. Table of contents

The safety devices on the instrument and accessory equipment must not be removed or modified!

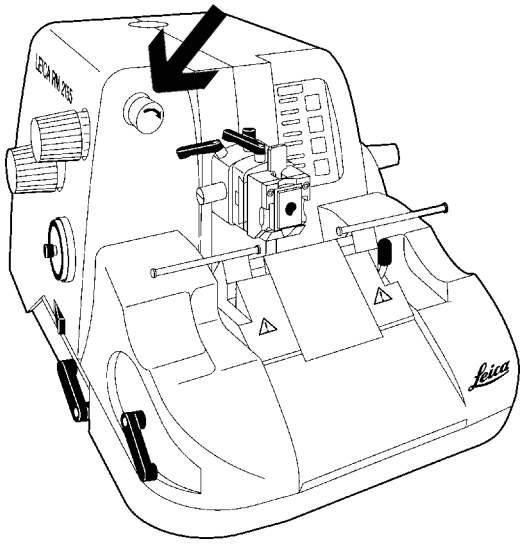


Fig. 5.1

3.1 Safety devices

The instrument incorporates the following safety devices: safety handwheel, emergency-stop switch, protective guard on the foot switch and knife guard on the knife holder.

The consistent use of these safety features and strict observation of the warnings and cautions in this manual, will safeguard the operator from accidents and/or personal injury to a great extent.

3.1.1 Emergency-stop switch

The instrument is provided with an emergency stop. The emergency-stop function is activated with the red emergency-stop switch on the front of the instrument **(Fig. 5.1)** or with the foot switch .

Performance check

- Push the emergency-stop switch.

The sectioning motor will stop immediately.

E-STOP (red) on the control panel illuminates indicating that the emergency-stop function is activated.

- To deactivate, turn the red emergency-stop switch in the direction of the arrow.

E-STOP

E-STOP (red) on the control panel extinguishes.

3.1.2 Foot switch with protective guard

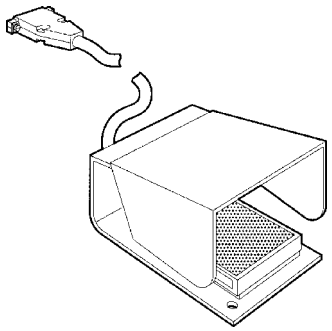


Fig. 5.2

The sectioning motor is started with the foot switch. The foot switch is provided with a protective guard to prevent unintended activation.
In addition, the foot switch incorporates a function similar to the emergency-stop function.

Performance check

- Firmly press the foot switch.

The sectioning motor stops immediately upon activation of the emergency-stop function.

E-STOP

E-STOP (red) on the control panel illuminates as long as the foot switch is held down.

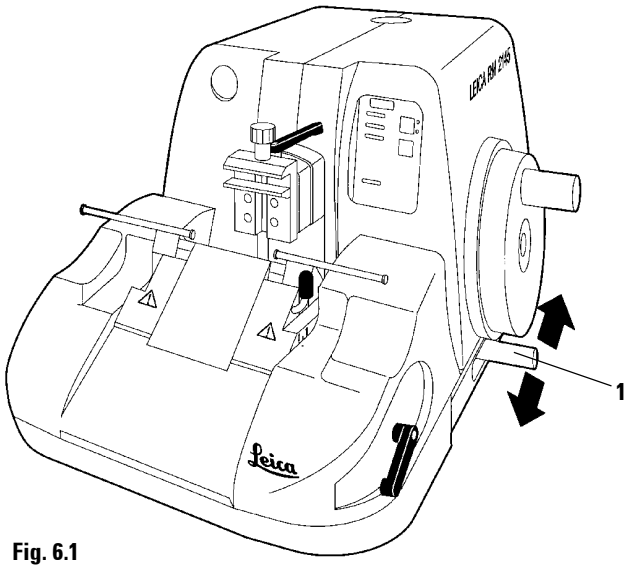


Fig. 6.1

LOCK

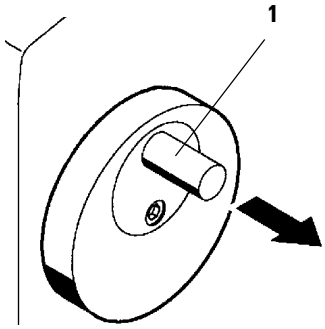


Fig.6.2

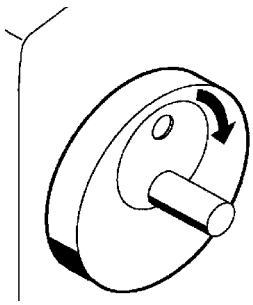


Fig. 6.3

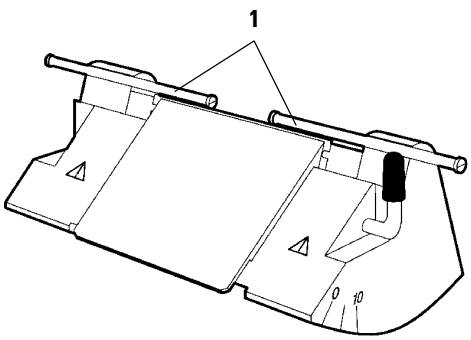


Fig. 6.4

3.1.4 Safety handwheel

Activation of the handwheel brake

Always lock the handwheel prior to manipulating the knife and specimen or before changing the specimen or knife!

The handwheel can be locked in any position using the locking lever **(1)** on the right side of the microtome base plate.

Performance check

- To activate the brake, pull the locking lever **(1) fully** to the front.

The sectioning motor is then electronically and mechanically blocked.

LOCK (yellow) on the control panel **(Fig. 19)** illuminates.

- To release the brake, push the locking lever **(1)** to the rear.

LOCK extinguishes.
The sectioning motor can then be activated again.

Centering the handle

The handle must always be centered in motorized operation to prevent injury by the revolving handle (Fig. 6.3).

- Activate the handwheel brake.
- To center, lightly pull the handle **(1)** out **(Fig. 6.2)** and rotate it to the center of the handwheel **(Fig. 6.3)**.
- The handle will lock when released.

Knife guard on the knife holder

Prior to manipulating the knife and specimen, or changing the specimen or knife, and during breaks, always lock cover the cutting edge with the knife guard (1)!

Transport and installation

- **Please refer to chapter 4 - 'Technical data'!**
- **The instrument must be transported in an upright position!**
- **Do not carry the instrument with the handle of the handwheel or the control knobs for sectioning speed and section thickness setting!**
- **Compare if the setting of the voltage selector at the rear of the instrument complies with the power rating on the name plate.**
  Before connecting to the mains power, check if the local voltage complies with these specifications!
- **Exposure to extreme temperature changes and high air humidity may cause condensation inside the instrument.**
  After transporting, please wait at least 2 hours to allow the instrument to adopt the ambient temperature before turning it on!
  Failure to comply with this may cause damage to the instrument.
- **Do not operate in rooms with explosion hazard!**
- **The safety devices on the instrument and accessory equipment must not be removed or modified!**

Operating the instrument

- **Take care when handling microtome knives and disposable blades. The cutting edge is extremely sharp and can cause severe injury!**
- **Never leave knives and knife holders with a mounted knife or blade lying around! Always put the knives back into the knife case when not in use!**
- **Do not place a knife on a table with the cutting edge facing upward!**
- **Never try to catch a falling knife!**
- **Always clamp the specimen before the knife!**
- **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!**
- **Do not attempt to clamp, approach or orient the specimen in the retraction phase (while RETRACT illuminates)!**
  Prior to the subsequent section, a specimen advance will take place by the retracted value plus the selected section thickness.
  This involves the risk that the specimen collides with the knife!
- **The handle must always be centered in motorized operation!**
- **Always wear protective glasses when sectioning brittle specimens!**
  Risk of splintering!!
- **Ensure that liquids do not enter the interior of the instrument during work!**

Cleaning

- **Before cleaning, activate the handwheel brake, turn the instrument off and pull the mains plug!**
- **Do not use solvents that contain acetone and 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.**
- **Do not turn the instrument on before it is completely dry!**

Maintenance

- **Only authorized and qualified service personnel may access the internal components of the instrument for service and repair!**
- **Turn the instrument off with the mains switch and pull the mains plug, before replacing the fuses!**
- **Only use fuses of the same specification! For the required values, please refer to chapter 4 - 'Technical data'.**
- **If the voltage selector is set to an incorrect voltage, this can cause severe damage to the instrument!**
- **Turn the instrument off with the mains switch and pull the mains plug, before changing the voltage setting!**

Type	RM 2155	RM 2155	RM 2155	RM 2155
Submitted for approval	-	C-UL	VDE	VDE
Nominal voltage	100 V AC ±10%	120 V AC ±10%	230 V AC ±10%	240 V AC ±10%
Nominal frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power draw	340 VA	340 VA	340 VA	340 VA
Protective class	I	I	I	I
Mains fuses	2 x T 3.2 A UL listed	2 x T 3.2 A UL listed	2 x T 3.2 A UL listed	2 x T 3.2 A UL listed
Pollution degree ①	2	2	2	2
Overvoltage installation category	II	II	II	II
Maximum heat emission	340 J/s	340 J/s	340 J/s	340 J/s

① **according to IEC-1010, UL 3101, EN 61010**

Microtome

Type	RM 2155 Rotary microtome
Section thickness setting	0.5 - 60 µm from 0.5 to 1 µm in 0.5 µm increment from 1 to 20 µm in 1 µm increments from 20 to 60 µm in 5 µm increments
Horizontal specimen feed	27 mm via step motor
Vertical specimen stroke	70 mm
Max. sectioning area without retraction	65 mm without specimen orientation
Max. sectioning area with retraction	60 mm
Specimen retraction	
in motorized operation	10, 30, 70 µm, dependent on sectioning speed can be deactivated
in manual operation	5, 10, 15, 20 µm can be deactivated
Repositioning of knife holder base	
North/south	±25 mm
East/west	±20 mm
Maximum specimen size (W x H x D)	50 x 60 x 40 mm
Specimen orientation	
horizontal	8°
vertical	8°
rotation	±90°
Trimming steps	5, 15, 30 µm
Electric coarse feed	900 µm/s

Sectioning motor:

Sectioning speed	0; 0.5 - 420 mm/s
Return speed	approx. 120 - 420 mm/s

4. Technical data

Dimensions and weight

Basic instrument

Width (including handwheel)	400 mm
Width (excluding handwheel)	300 mm
Depth	550 mm
Overall height	290 mm
Working height (knife edge)	100 mm
Net weight	44.2 kg

External control panel (optional accessory)

Width	130 mm
Depth	180 mm
Height	40 mm
Net weight	0.8 kg

5.1 Leica RM 2155 - Overview

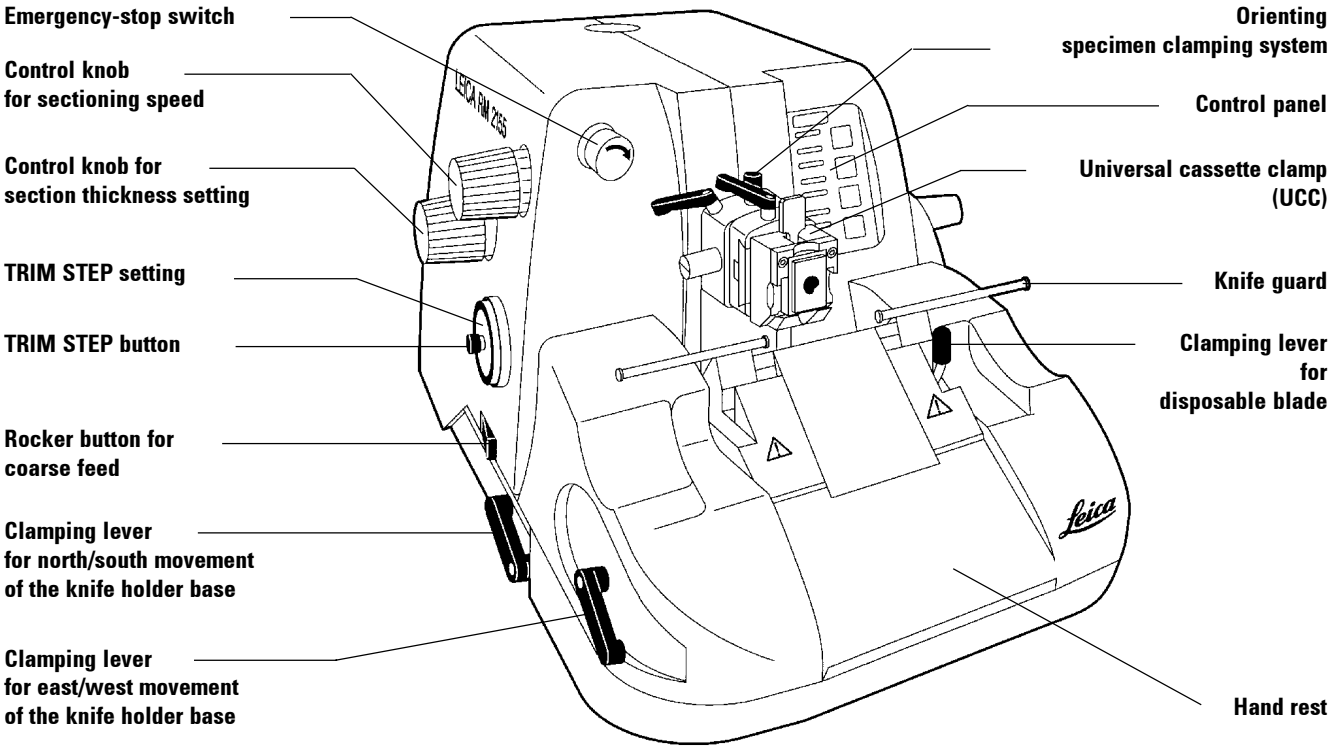


Fig. 11.1

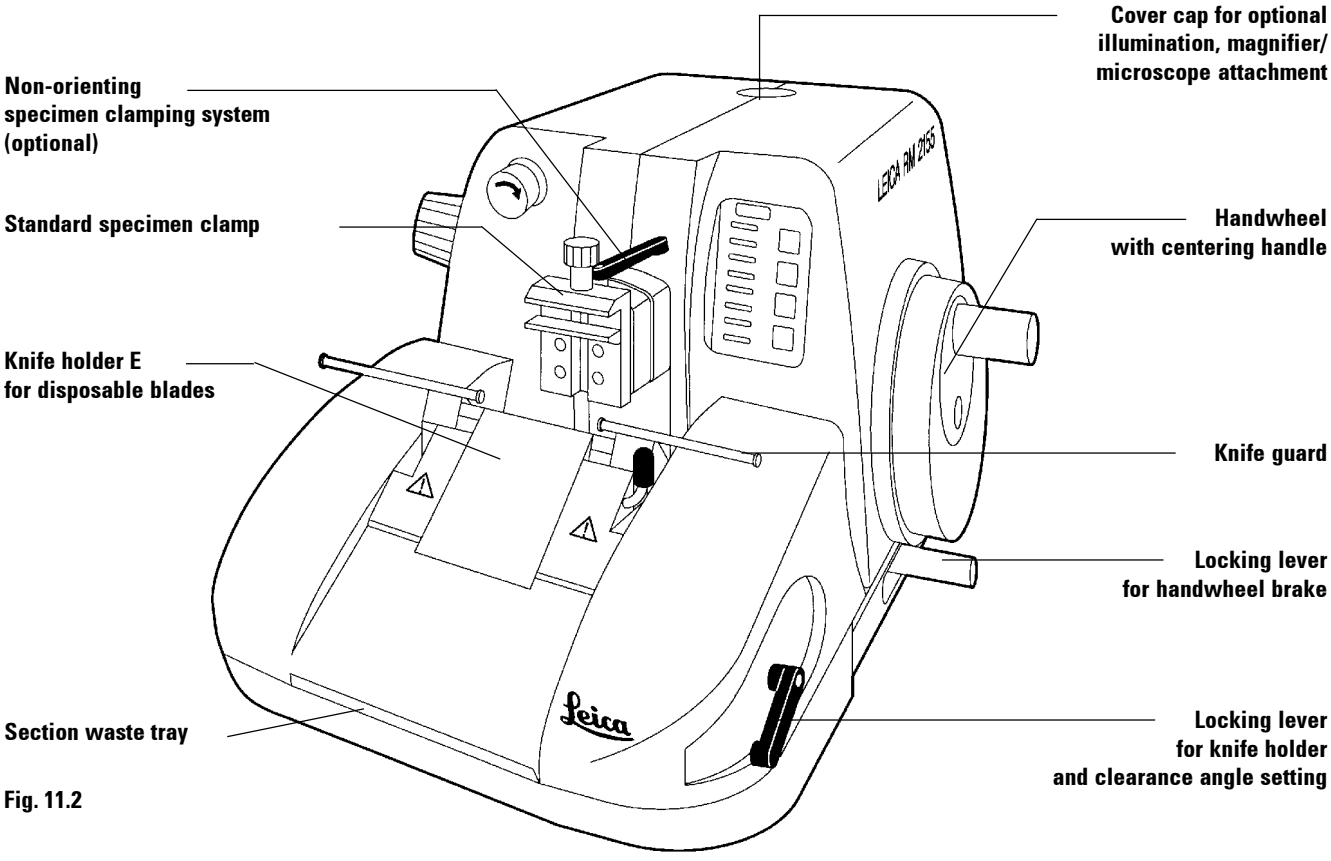


Fig. 11.2

5.2 General description

The Leica RM 2155 is a motorized rotary microtome.
The specimen feed system with zero-backlash and maintenance-free cross roller guides and the step motor operated coarse feed system are located in a dustproof plastic housing. The instrument has a safety handwheel with centering handle that can be locked in any position via an electromechanical brake.
Section thickness and sectioning speed are selected via control knobs. The controls include the TRIM STEP function with the TRIM STEP button.
The coarse feed is operated with a rocker button. Specimen retraction is visually indicated and can be turned off if required. The retraction amount varies with the sectioning speed.
The control panel is integrated in the front of the microtome with display, LEDs and function keys for all important controls is ergonomically positioned at eye level. All indications are visible at a glance.
Two motorized and one manual sectioning modes are available. Motorized sectioning is started and stopped via the foot switch.

The instrument is designed and manufactured to conform with the strict UL and VDE safety standards.

5.3 Standard delivery

The RM 2155 basic instrument is delivered with the following accessories:

- 1 Orienting specimen clamping system,
- 1 Universal knife holder base with lateral displacement,
- 1 Section waste tray,
- 1 Foot switch with protective guard,
- 1 Maintenance kit consisting of,
  1 Allen key size 8,
  1 Allen key size 4,
  1 Allen key size 4,
  2 Screw drivers,
  1 Bottle of oil No. 405, 50 ml,
  1 Dust cover,
- 1 Hand rest,
- 1 Set of fuses,
- 1 Mains cable,
- 1 Foot switch adapter,
- 1 Instruction Manual.

You will find these accessories as well as any further accessories that you may have ordered, in the cardboard box on top of the instrument.

Compare the delivered components with the parts list and your order. Should you find any discrepancies, please contact your Leica sales office without delay.

6.1 Unpacking

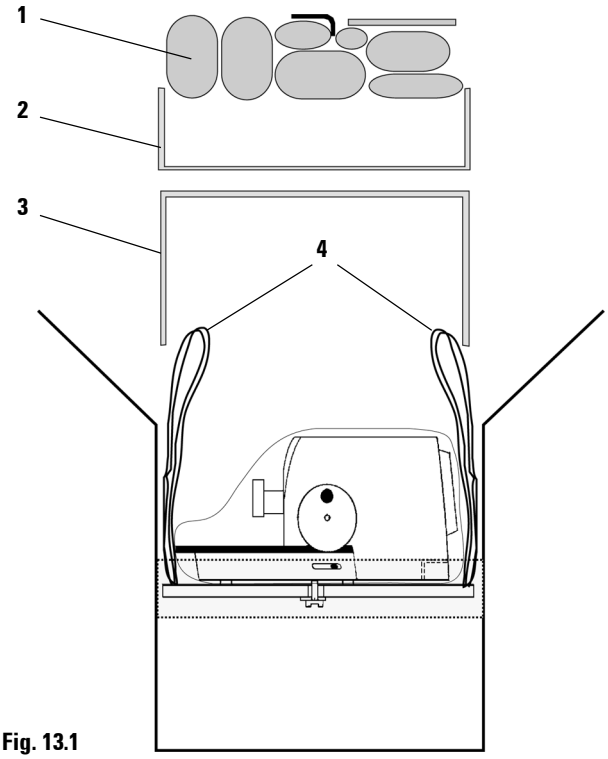


Fig. 13.1

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

- Cut off the steel bands on the outside of the cardboard box.
- Open the cardboard box.
- Remove all foam material.
- Take out all the accessories **(1)** and the instruction manual.
- Keep the Allen key size 8 within reach.
- Remove the cardboard tray **(2)**.
- Remove the cardboard bridge **(3)**.
- Take out the instrument by using the carrying handles **(4)** which are attached at the front and rear of the transport platform.

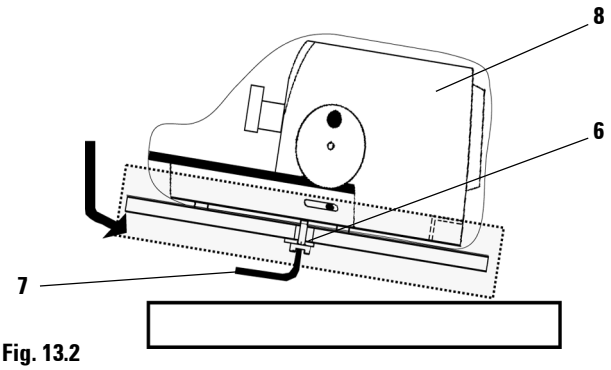


Fig. 13.2

- Place the transport platform with the instrument on a stable table.
- Lightly lift the transport platform at the front.
- Loosen the screw **(6)** on the underside of the transport platform with the Allen key size 8 **(7)** provided and remove the washer.
- Cut off the plastic cover **(8)** and remove.

Do not carry the instrument with the handle of the handwheel or the control knobs for sectioning speed and section thickness setting!

- To lift the instrument from the transport platform, hold it at the front of the base plate and at the recessed grip below the heat sink at the rear.
- Place the instrument on a stable laboratory table.

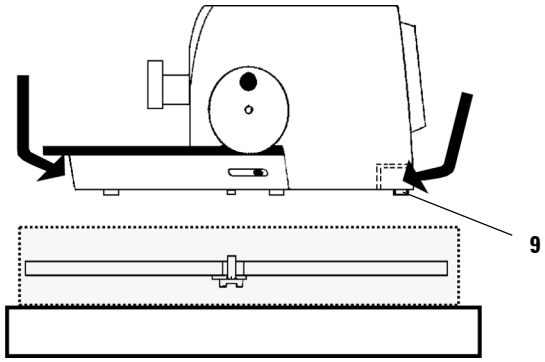


Fig. 13.3

Two slide faces **(9)** located at the rear of the base plate facilitate to reposition the instrument on the table.

- To relocate, lightly lift the instrument at the front of the base plate and slide it on the slide faces.

6.2 Site requirements

Do not operate in rooms with explosion hazard!

To ensure a smooth operation, the instrument must be set up with at least 10 cm distance from walls and furniture.

The installation site must meet the following requirements:

- stable, vibration-free laboratory table,
- vibration-free floor,
- obstruction-free access to the handwheel,
- Room temperature always between +10 °C and + 35 °C,
- relative air humidity must not exceed 80%.

7.1 Mounting the accessories

7.1.1 Mounting the section waste tray

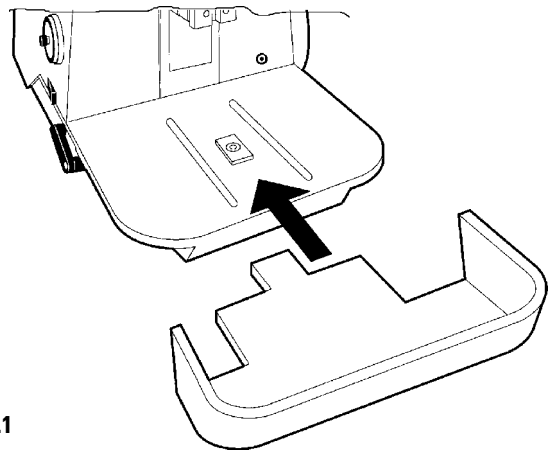


Fig. 15.1

- Insert the section waste tray under the microtome base plate at front.

The plastic grips of all clamping levers can be repositioned as preferred by the individual user.
Pull the grip out of the lever, hold it in this position, and turn it to the desired position. It will then lock automatically when released.

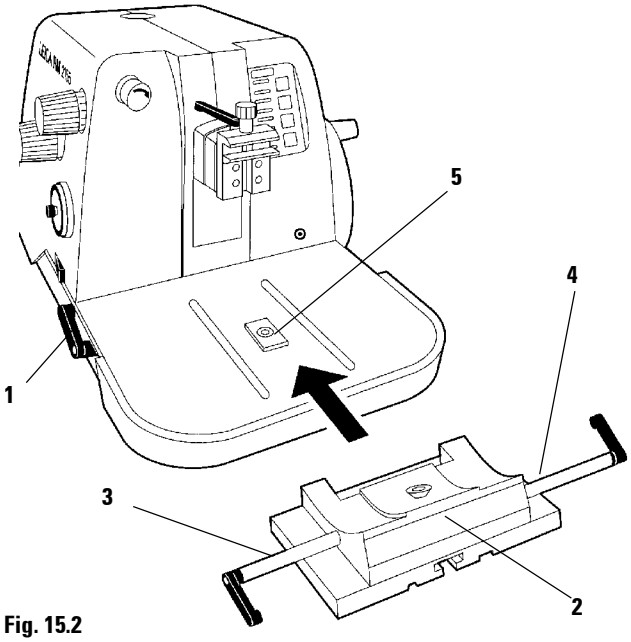


Fig. 15.2

7.1.2 Mounting the knife holder base

- To release, turn the lever **(1)** counterclockwise.
- Place the knife holder base **(2)** with the two clamping levers **(3)** and **(4)** mounted in place onto the T piece **(5)** of the microtome base plate.
- To secure the knife holder base, turn the lever **(1)** clockwise.

7.1.3 Mounting the hand rest

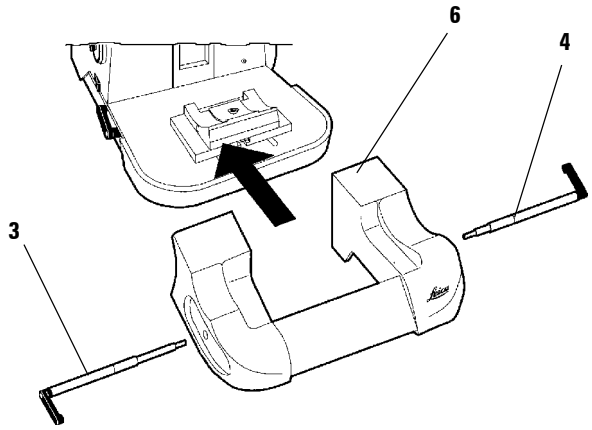


Fig. 15.3

- To release, turn the lever **(4)** counterclockwise and the lever **(3)** clockwise.
  Pull both levers out of the knife holder base.
- Mount the hand rest **(6)**.
- Insert the long lever **(3)** in the hole on the left and the short lever **(4)** in the hole on the right of the hand rest and lock both levers.

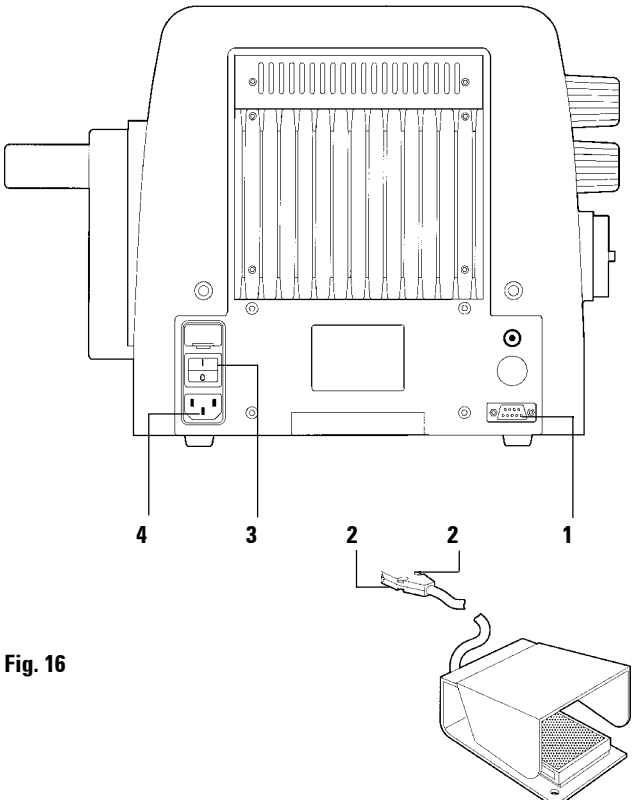


Fig. 16

7.2 Connection of foot switch and mains cable

Connecting the foot switch

- Check if the foot switch adapter **(1)** is present and if it is properly connected.
- Connect the plug of the foot switch to the foot switch adapter **(1)** at the rear of the instrument.
- Fix the plug by tightening the two screws **(2)**.

The external control panel (optional accessory) can be connected to this socket instead of the foot switch.
If neither the foot switch nor the external control panel is connected the instrument will be inoperational!

Connecting the mains cable

- Before connecting the mains cable, check if the mains switch **(3)** at the rear of the instrument is in the OFF position ('O').
- Check if the supplied mains cable has the appropriate plug.
- Connect the mains cable to the socket **(4)**.

Exposure to extreme temperature changes and high air humidity may cause condensation inside the instrument.
After transporting, please wait at least 2 hours to allow the instrument to adopt the ambient temperature before turning it on!
Failure to comply with this may cause damage to the instrument.

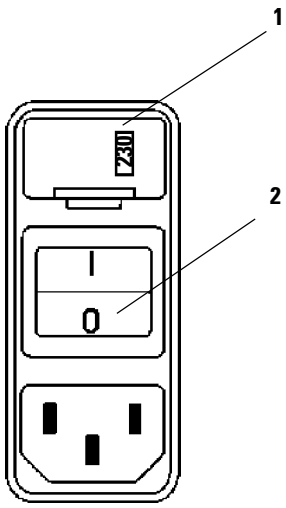


Fig. 17

7.3 Connection to mains power

Please refer to the technical data!

- Before connecting the instrument to the mains, please check if the local mains voltage complies with the power rating on the name plate of the instrument.
  The setting of the voltage selector is visible in the small window **(1)** of the voltage selector.

The voltage selector is set to the voltage by the factory as indicated on the order form. The name plate reads the power rating of the voltage selector setting.
A change in the setting is generally not required.

Should a change be required, however, the voltage selector has to be set to the voltage available in your laboratory. Make sure to use the correct fuses for the setting (see chapter 4 - 'Technical data').

For changing the setting of the voltage selector, please refer to chapter 14 - 'Maintenance'.

- Connect the mains plug to the power outlet at the wall.

7.4 Power on

When turning the instrument on with the mains switch, do not press any of the buttons of control panel, external control panel or the foot switch!

- Turn the instrument on with the mains switch at the rear.

This is followed by a beep.
The instrument initializes.

The software version is displayed for approx. two seconds.

The display reads the section thickness previously selected (e.g. 0.5 µm).

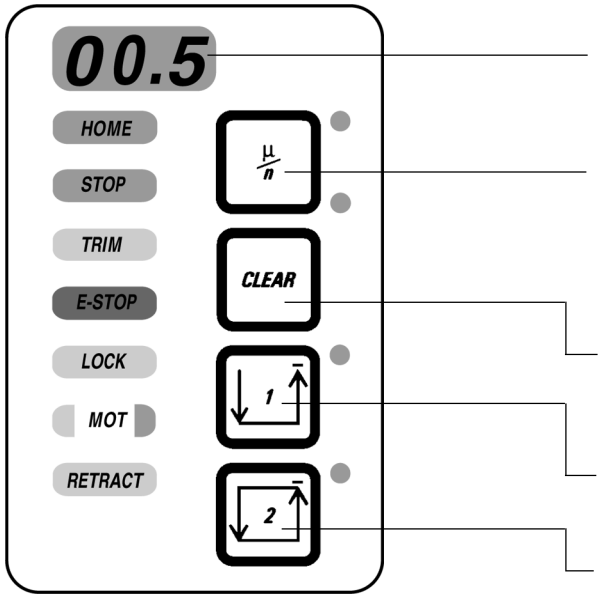
If the TRIM function is activated the display reads the TRIM STEP setting previously selected (e.g. 5 µm).

After turning on the LEDs of all activated functions illuminate.

- If 'LOCK' (yellow) illuminates, release the handwheel brake if activated.

8.1 Control panel

LED for section thickness, trimming thickness, section count, software version, retraction menu (see 'Specimen retraction'), operator errors and error messages.



μ / n key:
Upper LED -> **Section thickness indication (μ)**
Lower LED -> **Section count indication (n)**
Viewing retraction menu and indication of the adjusted value

CLEAR key
Section counter reset
Viewing/quit the retraction menu

Sectioning mode 1: Single stroke
LED illuminates when activated.

Sectioning mode 2: Continuous stroke
LED illuminates when activated.

Fig. 19

LEDs

HOME

- HOME (green) flashes while the coarse feed button is held down to move the specimen away from the knife.
  HOME illuminates on reaching the rear limit (HOME position).

STOP

- STOP (green) flashes while the coarse feed button is held down to move the specimen towards the knife.
  STOP illuminates when reaching the remaining feed point (approx. 1 mm before the actual front limit).

TRIM

- TRIM (yellow) illuminates when the TRIM function is activated.

E-STOP

- E-STOP (red) illuminates when the emergency-stop is activated.

LOCK

- LOCK (yellow) illuminates when the handwheel is locked.

MOT

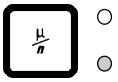
- MOT (yellow) illuminates while the sectioning motor is active.
  MOT (yellow and green) illuminate during sectioning before the motor stops in the upper limit.
  MOT (green) illuminates when the motor is active.

RETRACT

- RETRACT (yellow) illuminates while the specimen is in the retracted position if the specimen retraction is activated.

Section counter

The display indication can be converted from the section or trimming thickness indication to section count.



Push the µ/n button.

The display reading changes from section thickness to section count and the lower LED illuminates.
Whenever the section thickness setting is changed, the section count reading will shortly change over to the section thickness indication.

Section counter reset

Push CLEAR to reset the section counter.

The section count reading is set to 000.

Note:
The section count will be reset by activation of CLEAR even if the display indicates the section or trimming thickness.

Selecting the sectioning mode

Two motorized sectioning modes are available: single stroke and continuous stroke.
Once the required sectioning mode is selected, the LED next to the button illuminates.

Sectioning mode 1 - Single stroke
To select, push the button.
When sectioning is started with the foot switch, the specimen head completes a section and stops in the upper limit automatically.

Sectioning mode 2 - Continuous stroke
To select, push the button.
When sectioning is started with the foot switch, the specimen head moves until the process is stopped by activation of the foot switch.
The specimen head will then stop upon reaching the next upper limit of the stroke.

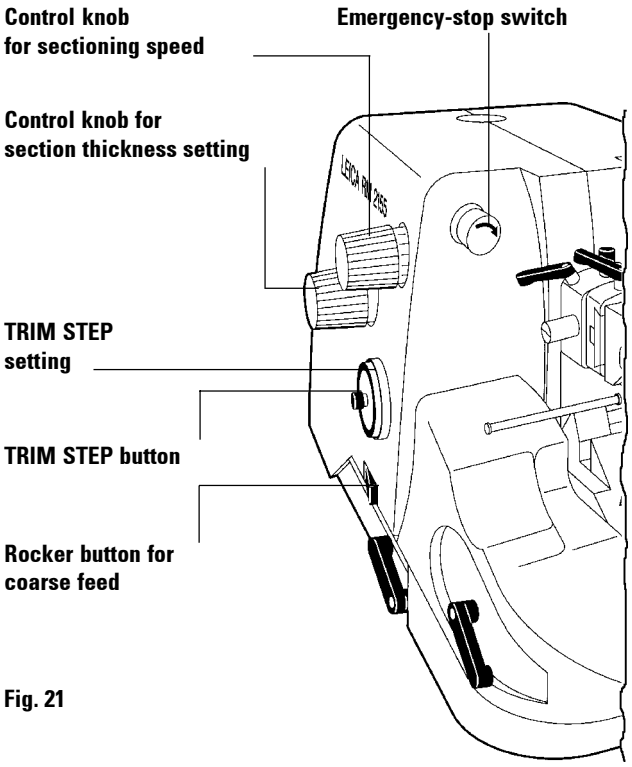


Fig. 21

8.2 Switches and controls

8.2.1 Section thickness setting

The section thickness is selected with the control knob on the left side of the microtome.

The control knob has a lock-in position for each increment.

Setting range: 0.5 - 60 µm
from 0.5 - 1 µm in a 0.5 µm increment,
from 1 - 20 µm in 1 µm increments,
from 20 - 60 µm in 5 µm increments.

The selected section thickness is indicated in the display of the control panel on the microtome.

To increase the value, turn the control knob clockwise.

8.2.2 Sectioning speed selection

The sectioning speed is adjusted continuously with the control knob on the left side of the microtome.
The control knob has a graduated collar.
Speed range: 0; 0,5 to 420 mm/s.
Scale range: 0 - 10

8.2.3 Emergency-stop switch

The red emergency-stop switch is located on the front.

- Push the switch to activate the emergency-stop condition.

The movement of the specimen will stop immediately.

E-STOP (red) illuminates to indicate that the emergency-stop condition is activated.

- To deactivate, turn the red emergency-stop switch in the direction of arrow.
  To continue sectioning, select one of the sectioning modes.

The sectioning motor will operate only after activation by the foot switch or the buttons of the external control panel (optional accessory).

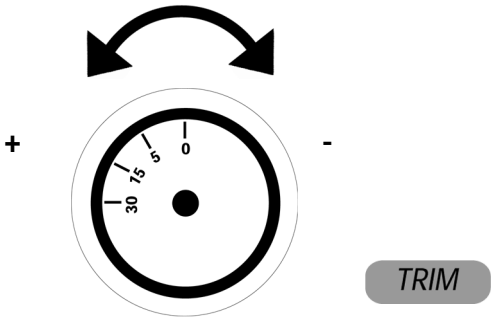


Fig. 22

8.2.4 Activating the TRIM function

The TRIM STEP knob has a scale and 4 lock-in positions: 0 (=OFF), 5, 15 and 30 µm. The TRIM-function is deactivated when set to 0.

To activate, turn the knob clockwise to the next lock-in position.

TRIM (yellow) on the control panel illuminates.
The display reads the first TRIM step (= 5 µm).

To deactivate, turn the knob back to the 0 position.

TRIM extinguishes.
The display reads the selected section thickness.

Selecting the TRIM STEP

To select the next TRIM STEP increment, turn the knob clockwise to the next lock-in position. The selected value is indicated in the display.

Activating the TRIM STEP advance

1. **By turning the handwheel**
   A full rotation of the handwheel causes a specimen advance by the value indicated in the display.

2. **Via the TRIM STEP button**
   A single short activation causes a specimen advance by the value indicated in the display.
   A long-term activation causes several advances in succession.

When trimming by turning the handwheel and using the TRIM STEP button at the same time, the values of the advances will be added.

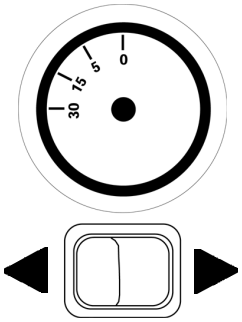


Fig. 23.1

8.2.5 Coarse feed button

The coarse feed button controls the rapid horizontal specimen movement forward - towards the knife - and backward - away from the knife.
To move the specimen towards the knife, hold the rocker button down at the front. To move it away from the knife hold the button down at the rear.
The specimen will move as long as the button is held down.

- Push the button at the rear.

The specimen moves away from the knife.
HOME (green) flashes, as long as the button is activated.
HOME illuminates when the specimen reaches the rear limit (HOME position).

HOME

- Push the button at the front.

The specimen moves towards the knife.
STOP (green) flashes as long as the button is activated.
STOP illuminates when the specimen reaches the front limit (STOP position). In addition, an audible signal will be heard.

STOP

8.2.6 Indication of remaining horizontal feed

STOP (green) illuminates approx. 1 mm before the specimen reaches the front limit.
A beep sounds for approx. 2 seconds.

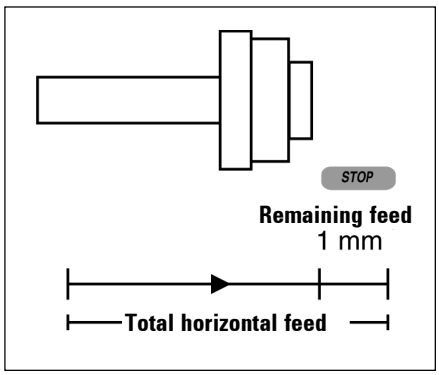


Fig. 23.2

Sectioning is interrupted and the specimen stops in the upper limit of the stroke.
At this point, a horizontal feed of approx. 1 mm is still available. No coarse advance will take place by pushing the coarse feed button at the front.

- Restart motorized sectioning.
  STOP (green) illuminates.

On reaching the front limit sectioning will stop automatically.
No further specimen advance will take place when trying to restart sectioning.

- Push the coarse feed button at the rear to move the specimen backward to the rear limit (HOME position) and continue sectioning.

If the specimen is in the remaining feed area when turning the instrument on, an additional beep will be heard after the indication of the software version.
To continue sectioning, move the specimen to the rear by pressing the coarse feed button.

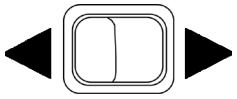
8.2.7 Specimen retraction

The specimen retraction protects the knife and specimen from damage. In motorized operation the retraction value varies with the selected sectioning speed. When retraction is activated, the retraction value for manual sectioning can be selected via the retraction menu. The specimen retraction can be deactivated if required via the retraction menu.

Specimen retraction on/off
(Default setting = 'on')

- Push the µ/n and CLEAR buttons **simultaneously** to access the retraction menu.

When retraction is deactivated, the display reads 'oFF' and RETRACT (yellow) no longer illuminates.
When retraction is activated the display reads 'on'.



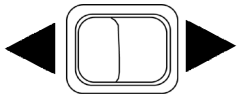
- To deactivate, push the coarse feed button at the rear.
  To activate, push the coarse feed button at the front.

- Push the CLEAR button to exit the menu.

Selecting the retraction value for manual sectioning
(Default setting = 10 µm)

- Enter the menu and activate the specimen retraction as described above.

- To view the currently selected value (e.g. 15 µm) push the µ/n button.



- To decrease the value, push the coarse feed button at the rear.
  To increase the value, push the coarse feed button at the front.
  Setting range: 5 µm, 10 µm, 15 µm, 20 µm.

The selected value is maintained even if the instrument is turned off.

- Push the CLEAR button to exit the menu.

The display will return to the selected section or trimming thickness indication.

8.2.8 Foot switch

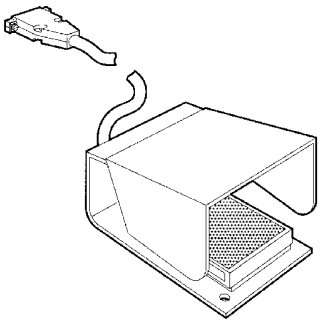


Fig. 25

The foot switch is operational only if the foot switch adapter is connected to the microtome.

Sectioning is started and stopped with the foot switch. In addition, the foot switch incorporates a function which is similar to the emergency-stop function.

- Select the desired sectioning mode 1 or 2 on the control panel **(Fig. 18)**.

Sectioning mode 1 - Single stroke

- Press the foot switch once to start sectioning.
  The specimen will stop automatically after each section in the **upper limit**.

Sectioning mode 2 - Continuous stroke

- Press the foot switch once to start sectioning.

If the foot switch is held down for more than half a second the specimen will stop in the next upper limit of stroke.

- To stop, press the foot switch again.
  The specimen will stop in the next **upper limit**.

How to activate the emergency-stop function

- Press the foot switch strongly to activate the **emergency-stop function**.

Sectioning will be stopped immediately.

E-STOP

E-STOP (red) on the control panel **(Fig. 19)** illuminates while the foot switch is depressed.

- To continue, reselect a sectioning mode and start sectioning with the foot switch.

9. Orienting specimen clamping system

The specimen clamps and specimen holders are not part of standard delivery of the basic instrument and have to be ordered separately. All accessories are described in chapter 15.

The orienting specimen clamping system accommodates all specimen clamps which are available as accessories.
The specimen orientation allows for a simple correction of the position of the specimen surface when the specimen is fixed in the clamp.
The orienting specimen clamping system can be replaced by a non-orienting version which is available as an optional accessory.

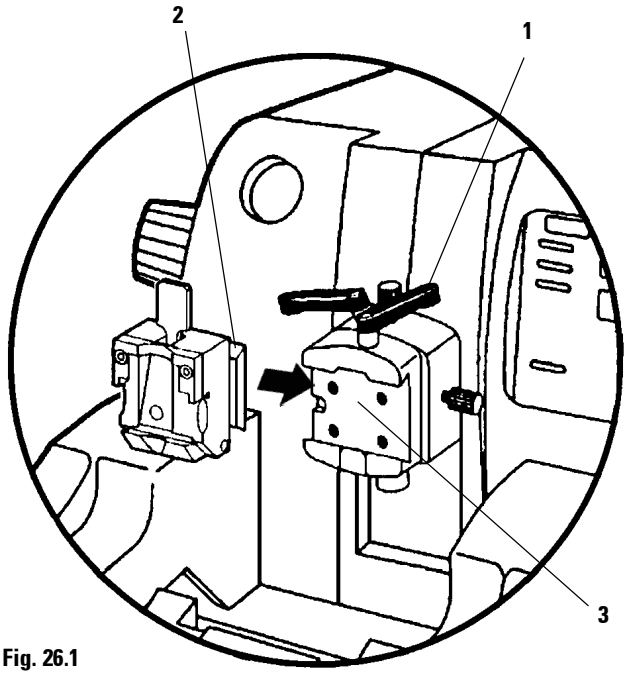


Fig. 26.1

9.1 Mounting the specimen clamp

- Rotate the handwheel to position the specimen clamping system at the top of the stroke and activate the handwheel brake.
- To release, turn the clamping lever **(1)** counterclockwise.
- Insert the dovetail guide **(2)** of the specimen clamp into the mount **(3)** from the left.
- To clamp, turn the clamping lever **(1)** clockwise to the limit stop.

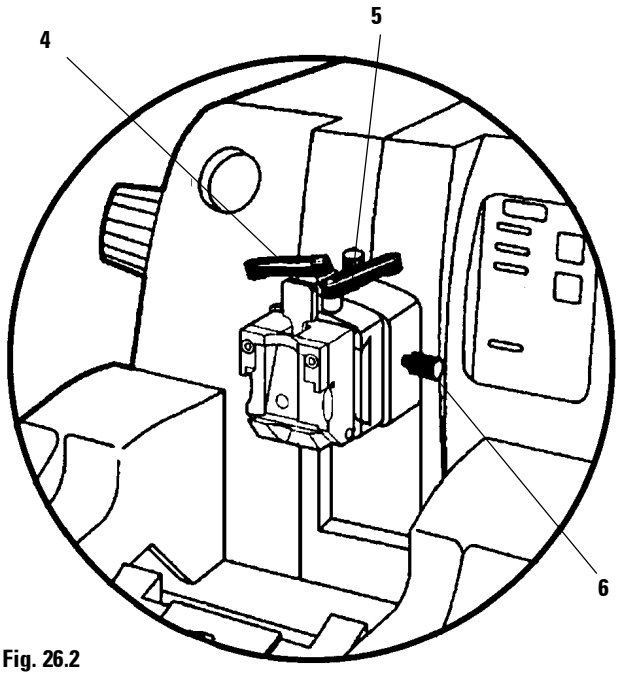


Fig. 26.2

9.2 Orienting the specimen

- Rotate the handwheel to position the specimen clamping system at the top of the stroke and activate the handwheel brake.
- To release, turn the eccentric bolt **(4)** counterclockwise.
- To orient the sample in north/south direction, turn the adjusting screw **(5)** . To orient it in east/west direction use the adjusting screw **(6)** .
- To fix the orientation, turn the eccentric bolt **(4)** clockwise.

When using the large standard specimen clamp (50 x 55 mm) the specimen orientation of 8° in north/south direction is limited to approximately 4°.

The plastic grips of all clamping levers can be repositioned as preferred by the individual user.
Pull the grip out of the lever, hold it in this position, and turn it to the desired position. It will then lock automatically when released.

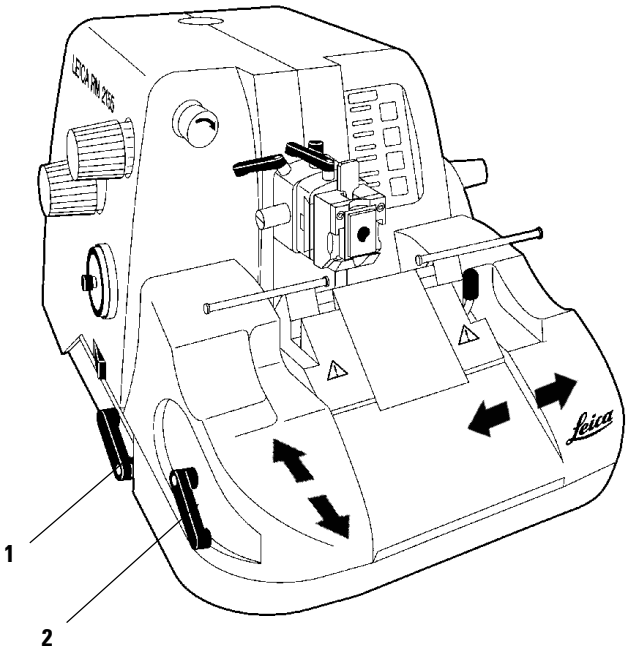


Fig. 27

10.1 Repositioning the knife holder base

The knife holder base consists of two parts and therefore allows for both North/South and East/west displacement.

The hand rest and knife holder do not need to be removed as they are repositioned in both directions together with the knife holder base.

North/South

North/South displacement enables the approach of the knife holder to the sample as close as possible.

- To release, turn the clamping lever **(1)** on the left side of the microtome base plate counterclockwise.
- Reposition the knife holder together with the knife holder base and hand rest forward or backward as appropriate.
- To clamp, turn the clamping lever **(1)** clockwise.

East/West

The lateral displacement 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 release, turn the clamping lever **(2)** on the left of the hand rest clockwise.
- Reposition the knife holder together with the hand rest and knife holder base sideways as required.
- To secure, turn the clamping lever **(2)** counterclockwise.

The handling of the various knife holders is described in chapter 15.

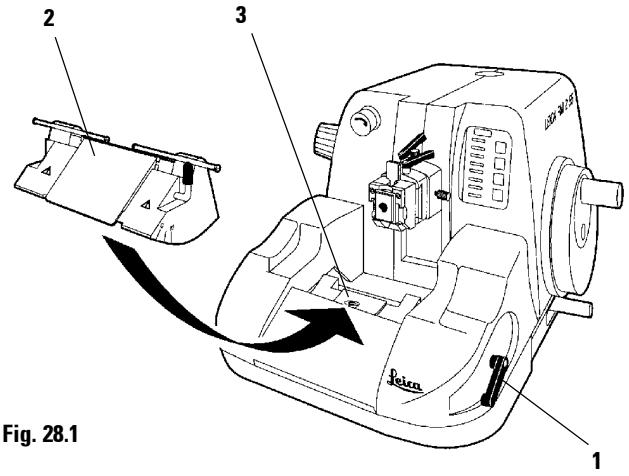


Fig. 28.1

10.2 Mounting the knife holder

- To release, turn the clamping lever **(1)** counterclockwise.
- Slide the guide of the knife holder **(2)** onto the T piece **(3)** of the knife holder base.
- To lock, turn the clamping lever **(1)** clockwise.

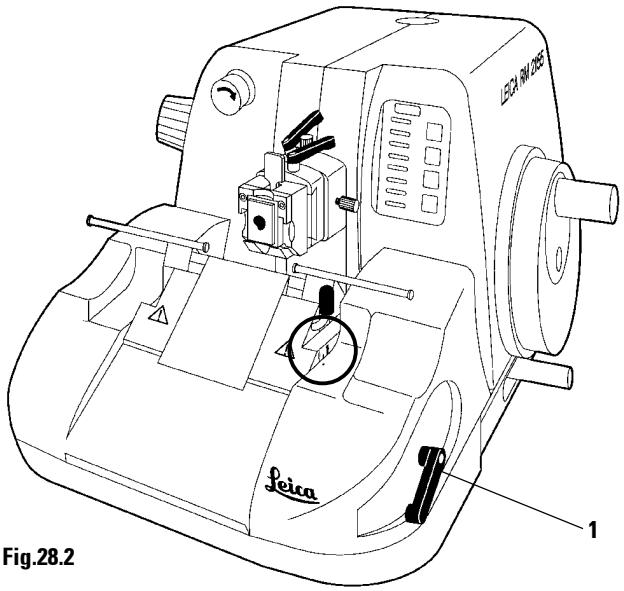


Fig.28.2

10.3 Adjusting the clearance angle

The scale for the clearance angle adjustment (0°, 5° and 10°) is located on the right side of the knife holder. A reference point is provided on the hand rest.
Moreover, a reference line is provided on the right side of the knife holder base to adjust the angle when the hand rest is removed.

- To release, turn the clamping lever **(1)** counterclockwise.
- To adjust the clearance angle, slide the knife holder on the base until the reference point on the hand rest or line is located next to the scale line for the required adjustment.
  When adjusting the angle without the hand rest, slide the knife holder on the base until the reference line on the knife holder base is located below the scale line for the required adjustment.
- Hold the knife holder in this position and fix the adjustment by turning the lever **(1)** clockwise.

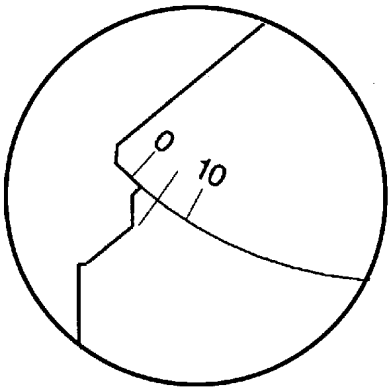


Fig. 28.3

Description of the individual steps using the paraffin sectioning technique

- Turn the instrument on with the mains switch.

Always lock the handwheel prior to manipulating the knife and specimen or before changing the specimen or knife!

- Lock the handwheel brake.

Always clamp the specimen before the knife!

- Mount the precooled paraffin block in the universal cassette clamp.

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

- Push the knife guard to the middle of the knife holder.
- Insert the blade into the knife holder and clamp.
- Adjust the appropriate clearance angle (try an angle between 0 and 3°).
- Move the specimen to the rear limit (HOME position) using the coarse feed button.

Do not attempt to clamp, approach or orient the specimen in the retraction phase (while the RETRACT illuminates)!
Prior to the subsequent section a specimen advance will be effected by the retracted value plus the selected section thickness.
This involves the risk that the specimen collides with the knife!

- Approach the knife holder with the knife holder base and hand rest to the specimen as close as possible.
- Orient the specimen surface towards the knife.

The handle of the handwheel must always be centered in motorized operation!

- Center the handle of the handwheel.
- Activate the TRIM function.
- Select the appropriate TRIM STEP setting.

Select a sectioning speed that corresponds to the hardness of the specimen!
Always select a slow speed when sectioning hard samples.

- Select the appropriate sectioning speed.
- Select sectioning mode 2 - continuous stroke - on the control panel.
- Pull the section waste tray out.
- Remove the knife guard.
- Release the handwheel brake.
- Start trimming with the foot switch.
- Stop trimming with the foot switch upon reaching the desired sectioning plane.
- Deactivate the TRIM function.
- Select the appropriate section thickness or verify the value previously selected.
- Select the sectioning mode as appropriate.
- Check if the selected sectioning speed is appropriate.
- Start sectioning with the foot switch.
- Prepare the sections.

Changing the specimen or interrupting sectioning

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!

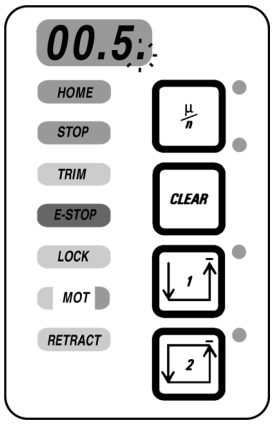
- Lock the handwheel brake.
- Position the knife guard over the cutting edge.
- Remove the specimen from the specimen clamp and mount a new specimen to continue.

Terminating sectioning

- Lock the handwheel brake.
- Remove the blade from the knife holder and put it in the receptacle at the bottom of the dispenser.
- Remove the specimen from the specimen clamp.
- Transfer all section waste to the section waste tray.
- Empty the section waste tray.
- Clean the instrument (see chapter 13 - 'Cleaning').

12.1 Operator and instrument errors

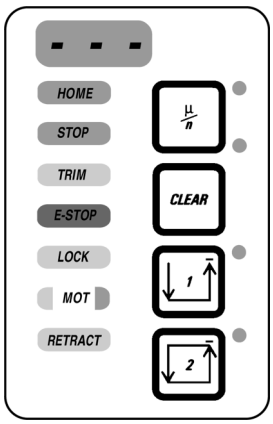
Certain operating and instrument errors are indicated in the display or by illuminating LEDs of the control panel.



12.1.1 Error message 'XX.X.'

An additional decimal point appears in the display at the right. Please contact your technical service center.

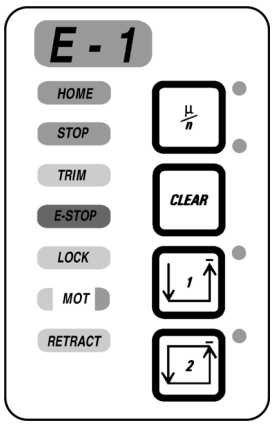
They will provide information on how to access and carry out the TEACH-IN program.



12.1.2 Error message '- - -'

The section thickness reading '00.5' is followed by '- - -' for all the other section thickness settings except the 0,5 µm setting. This is caused by an operating error.
All functions of the instrument are inoperational.

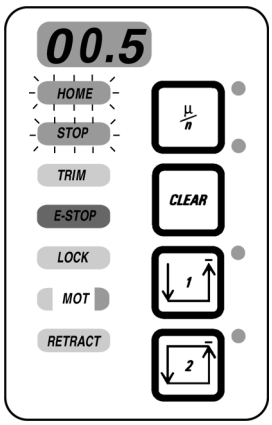
- Do not press any button.
- Turn the instrument off.
- Turn the instrument on again following the instructions given under 7.4 'Power on'.



12.1.3 Error message 'E-1'

This message follows the indication of the software version after turning the instrument on.
The retraction parameters are lost.

- Press any key to continue.
  This will set all retraction parameters totheir default settings.
  Sectioning can be continued without problems.
- Before continuing, please check if the values that may have been entered previously are still correct and change them if required.



12.1.4 HOME and STOP illuminate simultaneously

If these LEDs illuminate simultaneously the rear (HOME) and font limits (STOP) are no longer detected.

This problem can only be corrected by the technical service.

12.1.5 Sectioning motor cannot be restarted

The sectioning motor is blocked and cannot be re-started.

The sectioning motor was subject to a short-term overload and was cut off by the overload cutout.

- Turn the instrument off with the mains switch.
- Wait approximately 30 seconds.
- Push the safety cutout button **(1)** at the rear of the instrument.
- Turn the instrument on again.

The motor can then be restarted.

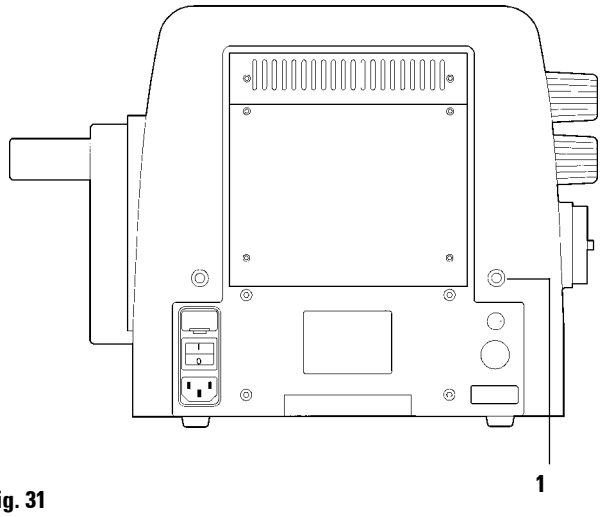


Fig. 31

12.2 Problems, possible causes and corrective action

Problem	Cause	Corrective action
Thick/thin sections The section thickness varies from one section to another. In extreme cases, sections are skipped meaning that a section is not obtained.	- Insufficient knife inclination; consequently the clearance angle is too small.	- Systematically try several clearance angle adjustments, until the optimum angle is found.
	- Insufficient clamping of specimen and/or knife.	- Check if all levers are locked and screws are tightened on the specimen and knife holder systems. Retighten the levers and screws if necessary.
Compressed sections The sections are extremely compressed, wrinkled or jammed together.	- Blunt knife.	- Use a different part of the knife edge or use a new knife.
	- Blunt knife.	- Use a different part of the knife edge or use a new knife.
	- Specimen too warm.	- Precool the specimen on a cold plate. - Cool the specimen in iced water immediately before sectioning.
	- Clearance angle too big.	- Clearance angle adjustment; systematically decrease the clearance angle until the optimum adjustment is obtained.
	- Sectioning speed too high.	- Select lower sectioning speed.
The knife "rings" on the cutting stroke when sectioning hard specimens. Sections exhibit scratches and chatter marks.	- Sectioning speed too high.	- Select lower sectioning speed.
	- Clearance angle too big.	- Clearance angle adjustment; systematically decrease the clearance angle until the optimum adjustment is obtained.
	- Insufficient clamping of specimen and/or knife.	- Check if all levers are locked and screws are tightened on the specimen and knife holder systems. Retighten the levers and screws if necessary.

12.3 Instrument errors, possible causes and corrective action

Problem	Possible Cause	Corrective action
No display indication, no response to push button activation after turning on	1. Mains cable not properly connected. 2. Mains fuses defective.	1. Check if mains cable properly connected. 2. Replace the fuses (see chapter 14).
LED reads 'E-1' after turning on	1. Loss of the retraction parameter due to a strong peak in the mains power supply.	1. Press any key to continue. Check if the reaction para–meters are still correct and change if required.
LED repeatedly reads 'E-1' after turning on.	1. Battery exhausted. (Expected life time approx. 7 years!)	1. Call technical service.
LED reads '- - -'	1. The TEACH IN routine was started as a result of an operator error.	1. Do not press any key now. Turn the instrument off. Turn the instrument on again following the instructions under 7.4.
Sectioning motor cannot be restarted.	1. The EMERGENCY-STOP switch is activated. 2. Handwheel brake is activated. 3. Sectioning motor was turned off by the safety cutout due to a short-term overload condition. 4. No foot switch or external control panel connected. 5. Foot switch or external control panel not properly connected.	1. Unlock the EMERGENCY-STOP switch and select a sectioning mode. 2. Release the handwheel brake. 3. Turn the instrument off and wait 30 seconds; turn on again and push the safety cutout switch at the rear of the instrument 4. Connect foot switch or external control panel. 5. Connect foot switch or external control panel properly.
No more specimen advance. Sectioning motor cannot be restarted.	1. Specimen reached the front feed limit. 2. The specimen already was close to the front limit when turning on.	1. Push the coarse feed button at the rear to move the specimen towards the rear limit. 2. Push the coarse feed button at the rear to move the specimen towards the rear limit.

12. Trouble shooting

Problem	Possible Cause	Corrective action
The coarse feed button allows only for a specimen movement away from the knife.	1. Motorized sectioning is still continuing.	1. Stop motorized sectioning by pressing the foot switch or the RUN/STOP or RUN/ENABLE buttons of the control panel.
Sectioning motor stops in sectioning mode 2 (continuous stroke) before completing the stroke.	1. Foot switch was held down to start sectioning. 2. Foot switch connected without the foot switch adapter. 3. The RUN/STOP and RUN/ ENABLE buttons of the external control panel were not release simultaneously when starting sectioning.	1. Press the foot switch shortly. 2. Remove foot switch. Connect the foot switch adapter. Reconnect the foot switch. 3. Release both buttons simultaneously if possible.
LED reading changes from one value to another. This may be accompanied by an additional decimal point appearing at the right-hand digit.	1. Section thickness potentiometer is maladjusted.	1. Please call the technical service and ask for instructions to carry out the TEACH IN routine.
HOME and STOP illuminate simultaneously.	1. Rear and front limits not detected.	1. Call for technical service.
LEDs of the external control panel inoperational.	1. External control panel not properly connected. 2. Foot switch adapter was not removed before connecting the control panel.	1. Connect properly and fix with the screws provided. 2. Remove foot switch adapter and connect control panel directly to the socket of the microtome.

Before cleaning, activate the handwheel brake, turn the instrument off and pull the mains plug!

- Remove all debris with a dry brush.
- Remove the section waste tray for emptying.
- Remove the hand rest for cleaning.
- Remove the knife holder and knife holder base for cleaning.

Only use mild commercial detergents or soap solution for cleaning!
Do not use solvents that contain acetone and xylene!

Ensure that no liquids enter the interior of the instrument when cleaning!

- Clean the instrument and accessory components with a damp not a wet cloth.

Do not turn the instrument on before it is completely dry!

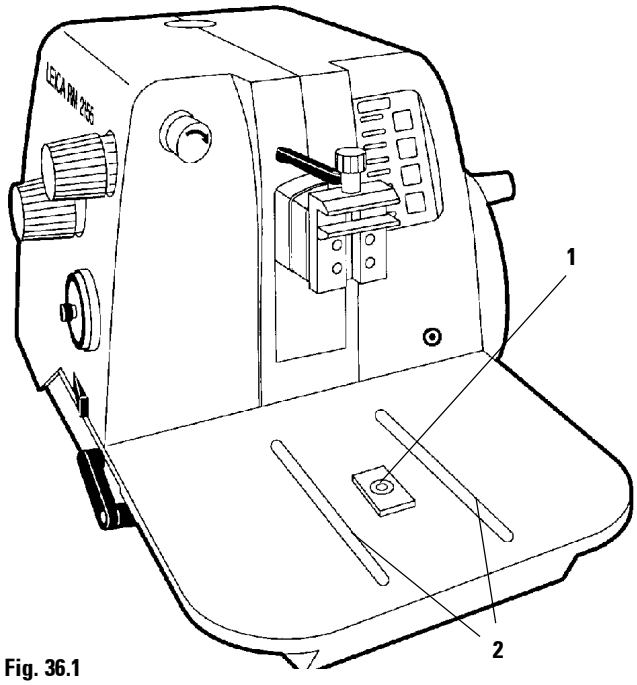


Fig. 36.1

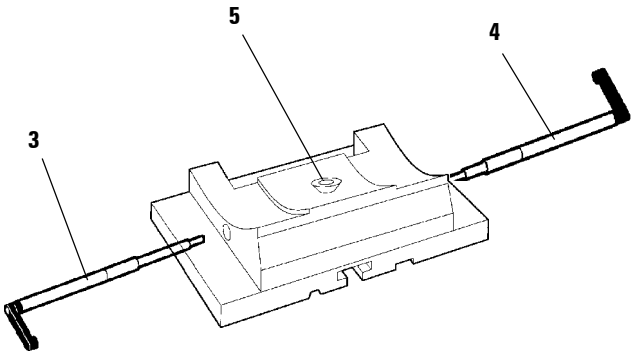


Fig. 36.2

14.1 General maintenance

The microtome is virtually maintenance-free. To ensure a smooth operation of the instrument over several years we recommend the following:

- Have the instrument inspected **once a year** by a qualified service engineer authorized by Leica.
- Enter into a service contract at the end of the warranty period.
  For further information, please contact your local Leica service center.
- Clean the instrument every day.
- Lubricate the following parts with the oil No. 405 once a month (1- 2 drops will be sufficient):
  - T piece **(1)** on the microtome base plate.
  - Guides **(2)** of the knife holder base on the microtome base plate.
  - Clamping levers **(3)** and **(4)** on the right and left of the knife holder base.
  - T piece **(5)** on the knife holder base.
- Clean the ventilation slits at the rear of the instrument with a brush or vacuum cleaner from dust and dirt.
- Do not carry out any repairs on your own as this will invalidate the warranty.
  Repairs may only be carried out by qualified service engineers authorized by Leica.

14.2 Changing the setting of the voltage selector

If the voltage selector is set to an incorrect voltage, this can cause severe damage to the instrument!

The voltage selector is set to the voltage that was indicated on the order form in the factory. The name plate reads the power rating of the voltage selector setting.
A change will only be required if the setting does not correspond to the voltage available in your laboratory.
If the setting is changed, please make sure to change the fuses as well!

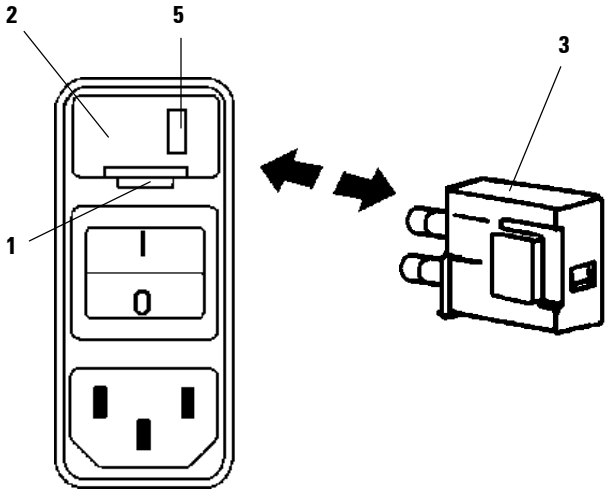


Fig. 37.1

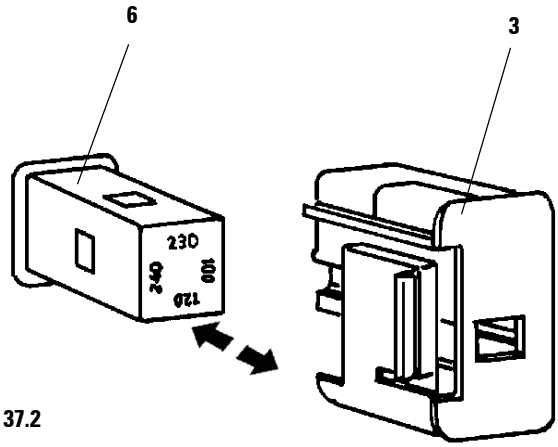


Fig. 37.2

The actual voltage setting can be seen in the small window **(5)** of the voltage selector housing **(3)**.

Turn the instrument off with the mains switch and pull the mains plug before changing the voltage setting!

- Turn the instrument off with the mains switch.
- Disconnect the mains plug from the mains power outlet.
- Place the tip of a small screw driver into the small recess **(1)** of the cover **(2)** and push carefully to remove.
- Pull out the voltage selector housing **(3)**.
- Pull the voltage selector **(6)** out of the housing **(3)** and insert it again so that desired value can be seen through the small window **(5)**.
- Check if the fuses correspond to the new setting of the voltage selector.
- If necessary, replace the fuses by fuses of the required specification (see 14.3 'Replacement of the fuses').
- Insert the voltage selector housing with the fuses into the instrument, lightly push until it locks in place.
- Check if the correct voltage is indicated in window **(5)**.

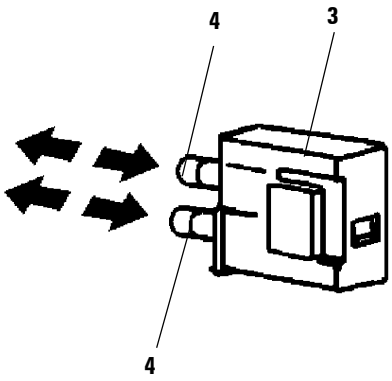


Fig. 38

14.3 Replacement of the fuses

Turn the instrument off with the mains switch and pull the mains plug, before replacing the fuses.

Only use fuses of the same specification! For the required values, please refer to chapter 4 - 'Technical data'.

The mains fuses are located in the voltage selector housing (3) above the mains switch at the rear of the instrument.

- Remove the voltage selector housing (3) as described under 14.2 .
- Remove the fuses (4).
- Mount new fuses of the same technical specification.

The actual voltage setting can be seen in the small window (5) of the voltage selector housing (3).

- Insert the voltage selector housing with the fuses into the instrument, lightly push until it locks in place.
- Check if the correct voltage is indicated in window (5).

15.1 Non-orienting specimen clamping system

The orienting specimen clamping system can be replaced by a non-orienting system.

Dismounting the orienting specimen clamping system

- Release the handwheel brake.
- Remove the knife holder.
- Remove the specimen clamp.

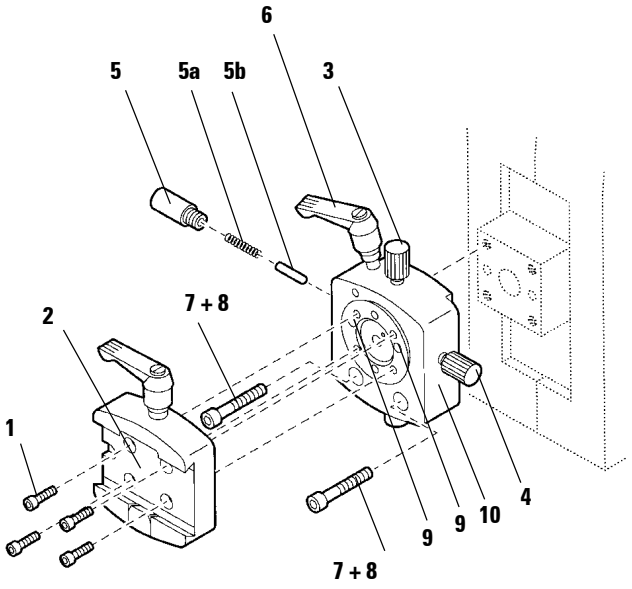


Fig. 39.1

- Loosen the 4 screws **(1)** with an Allen key size 3 and remove the dovetail adapter **(2)**.
- Unscrew the orienting screws **(3)** and **(4)** and remove.
- Unscrew the thrust piece **(5)** with a screw driver and pull it out together with the spring **(5a)** and the pin **(5b)**.
- To remove, turn the eccentric bolt **(6)** counterclockwise.
- Loosen the 2 screws **(7)** and 2 screws **(8)**, which are accessible through the holes **(9)** and remove the orienting specimen clamping system **(10)**.

To mount, proceed in reverse order.

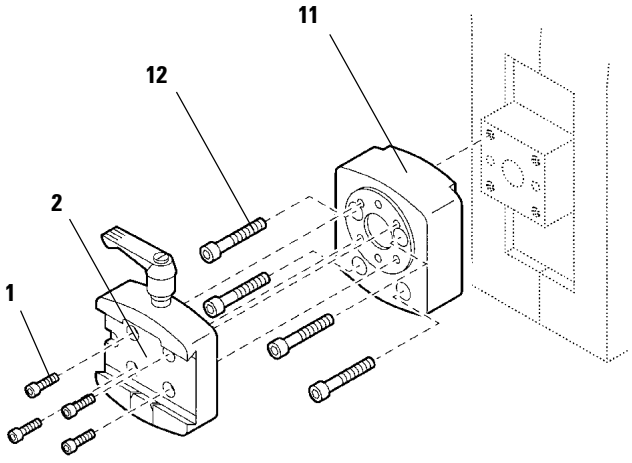


Fig. 39.2

Mounting the non-orienting specimen clamping system

- Place the non-orienting specimen clamping system **(11)** on the microtome cylinder as shown and fix with the 4 screws **(12)** by using an Allen key size 4.
- Place the dovetail adapter **(2)** on the specimen clamping system **(11)** and tighten the 4 screws **(1)** with an Allen key size 3.

To dismount, proceed in reverse order.

15.2 Specimen clamps

All specimen clamps can be used in combination with both the orienting and non-orienting specimen clamping system.

15.2.1 Standard specimen clamp

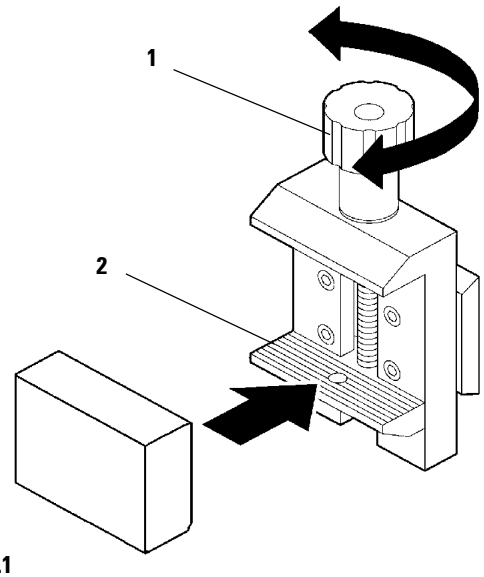


Fig. 40.1

The standard specimen clamp is available in two sizes: 40 x 40 mm and 50 x 55 mm.
It is designed for direct clamping of rectangular blocks. In addition, it accommodates the foil clamps.

- Turn the knurled knob **(1)** counterclockwise to move the movable jaw **(2)** downward.
- Mount the sample as required.
- Turn the knurled knob **(1)** clockwise to move the movable jaw **(2)** upward against the fixed jaw to securely clamp the sample.

15.2.2 Universal cassette clamp

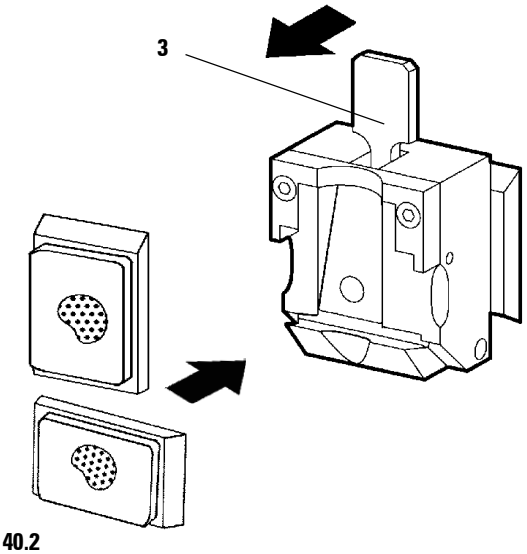


Fig. 40.2

The universal cassette clamp (UCC) is designed to for horizontal or vertical clamping of all kinds of commercial cassettes.

- Pull the lever **(3)** to the front.
- Mount the cassette horizontally or vertically as required.
- Release the lever **(3)** to secure the cassette in position.

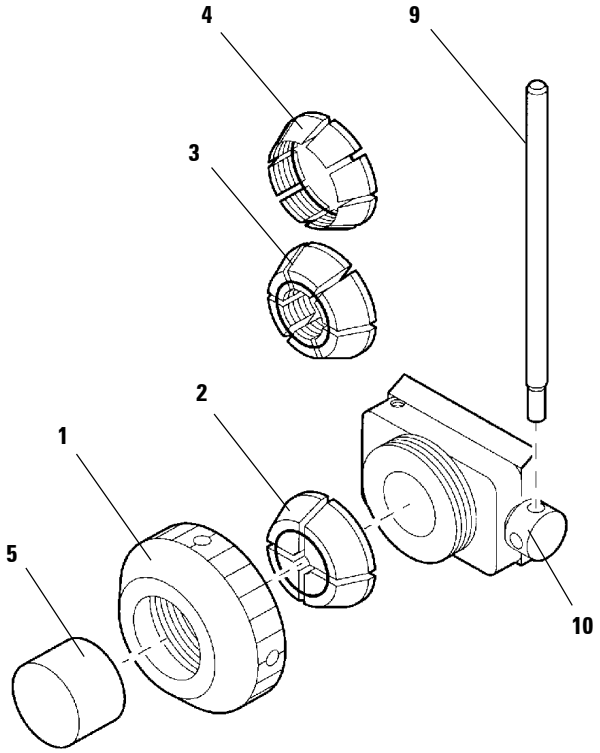


Fig. 41.1

15.2.3 Holder for round specimens

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

- To mount the required insert **(2, 3, 4)** turn the clamping ring (1) counterclockwise and remove.
- Place the insert **(2)**, **(3)** or **(4)** in the clamping ring **(1)** and fix the clamping ring **(1)** by turning it clockwise.
- To mount the specimen, turn the clamping ring **(1)** counterclockwise, mount the sample **(5)** and fix by turning the clamping ring clockwise.
- To orient the sample, introduce the pin **(9)** in one of the holes **(10)** and turn counterclockwise.
- To fix the orientation, introduce the pin **(9)** again in one of the holes **(10)** and turn clockwise.

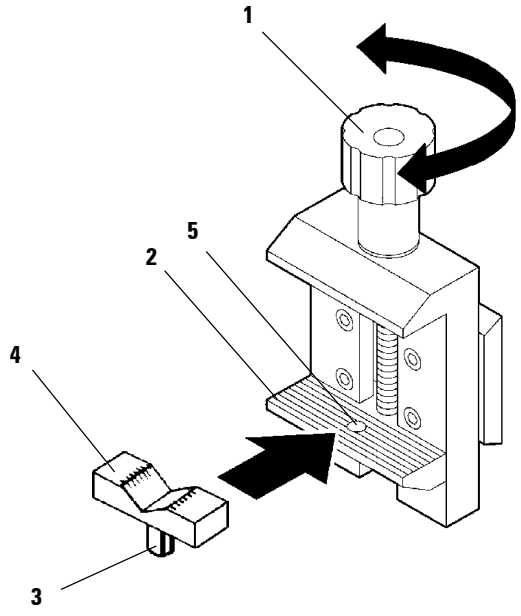


Fig. 41.2

15.2.4 Vee insert

The vee insert is mounted in the hole provided in the lower movable jaw of the standard specimen clamp. This enables to clamp round specimens in the standard specimen clamp.

- Turn the knurled knob **(1)** counterclockwise to move the movable jaw **(2)** downward.
- Insert the pin **(3)** of the vee insert **(4)** in the hole **(5)** of the lower jaw **(2)**.
- Mount the sample as required.
- Turn the knurled knob **(1)** clockwise to move the movable jaw **(2)** with the vee insert **(4)** upward against the fixed jaw to securely clamp the sample.

15.2.5 Foil clamp - Type 1

This foil clamp is appropriate both for clamping very small foil pieces and flat, angular samples. It is mounted in the standard specimen clamp.

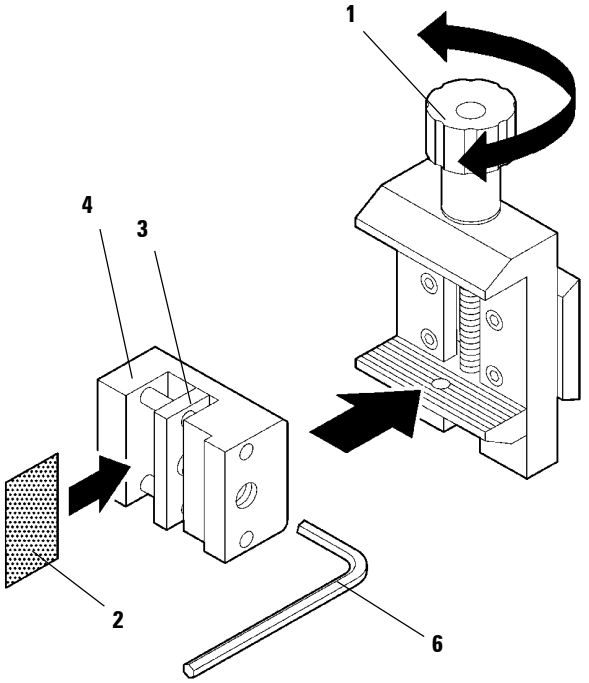


Fig. 42.1

Clamping of foil pieces

- Move the movable jaw **(3)** to the right or left as required by turning the set screw with an Allen key size 4 **(6)**.
- Place the foil **(2)** between the movable jaw **(3)** and the fixed jaw **(4)**.
- To clamp the foil, screw the movable jaw **(3)** against the fixed jaw **(4)** by using the Allen key **(6)**.
- Insert the foil clamp in the standard specimen clamp as shown.
- Turn the knurled knob **(1)** clockwise to securely clamp the foil clamp in the standard specimen clamp.

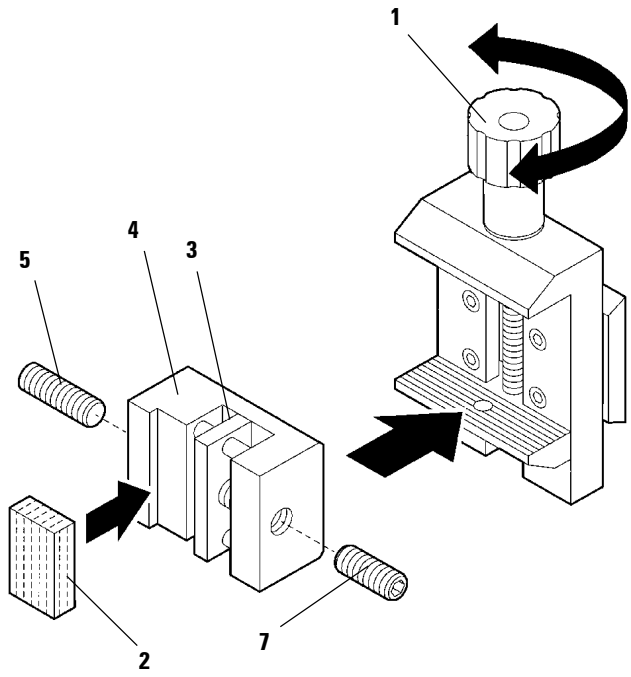


Fig. 42.2

Clamping of flat samples

To clamp flat samples, replace the long set screw **(5)** with the short set screw **(7)** provided with the foil clamp.

- Unscrew the long set screw **(5)** on the left with an Allen key size 4.
- Screw the short set screw **(7)** in the hole on the right.
- Place the sample **(2)** between the movable jaw **(3)** and the fixed jaw **(4)**.
- To clamp the sample, screw the movable jaw **(3)** against the fixed jaw **(4)**.
- Insert the foil clamp in the standard specimen clamp as shown.
- Turn the knurled knob **(1)** clockwise to securely clamp the foil clamp in the standard specimen clamp.

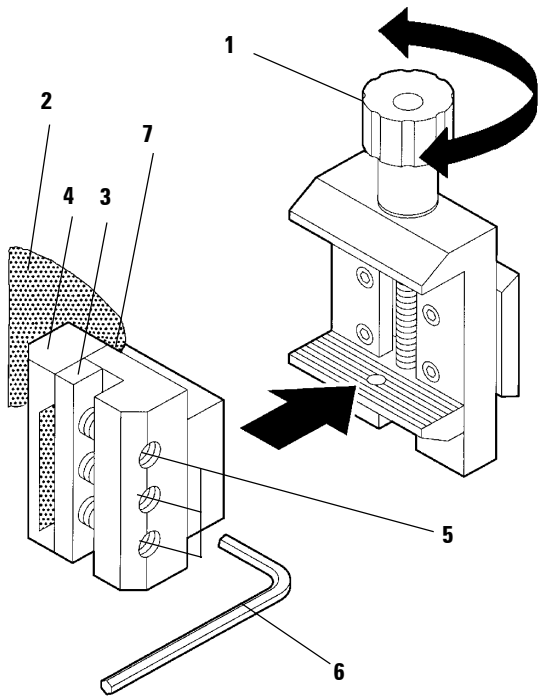


Fig. 43.1

15.2.6 Foil clamp - Type 2

This foil clamp is appropriate for large foil ribbons and is mounted in the standard specimen clamp.

- To open the jaws **(3)** and **(4)** lightly loosen the 3 screws **(5)** with an Allen key size 4 **(6)**.
- Insert the foil **(2)** from behind to position it between the movable jaw **(3)** and the fixed jaw **(4)**.
- To clamp the foil, first tighten the screw **(5)** in the middle and then the other two screws with the Allen key.
- Place the foil clamp in the standard specimen clamp so that the bevelled surface **(7)** on the back of the foil clamp points to the right or left.
- Turn the knurled knob **(1)** clockwise to securely clamp the foil clamp in the standard specimen clamp.

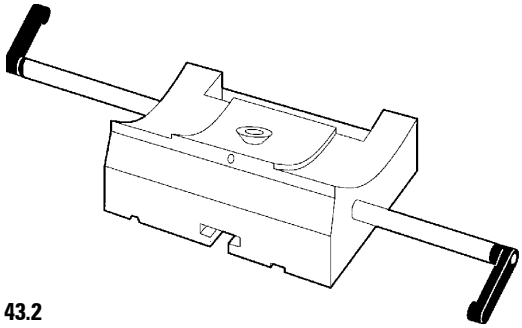


Fig. 43.2

15.3 Knife holder base without lateral displacement

This knife holder base is mounted on the microtome base plate like the knife holder base with lateral displacement function and can be repositioned in north/south direction together with the hand rest and knife holder.

Mounting the knife holder base and hand rest

See 7.1 Mounting the accessories.

North/south displacement

See 10.1 Repositioning the knife holder base.

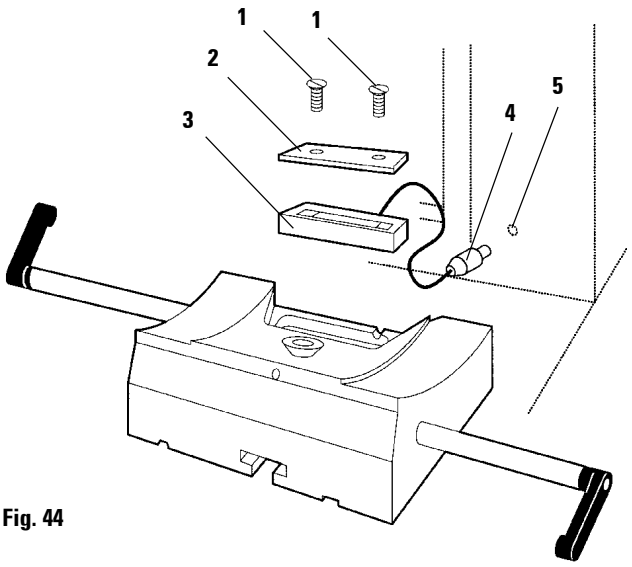


Fig. 44

15.4 Mounting the backlighting

The backlighting can be used only in combination with the knife holder base without lateral displacement function described above.

- Loosen the 2 screws **(1)** with the provided screw driver and remove the cover plate **(2)**.
- Insert the backlighting **(3)** in the recess at the rear of the knife holder base.
- Connect the plug **(4)** to the socket **(5)** on the microtome.

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

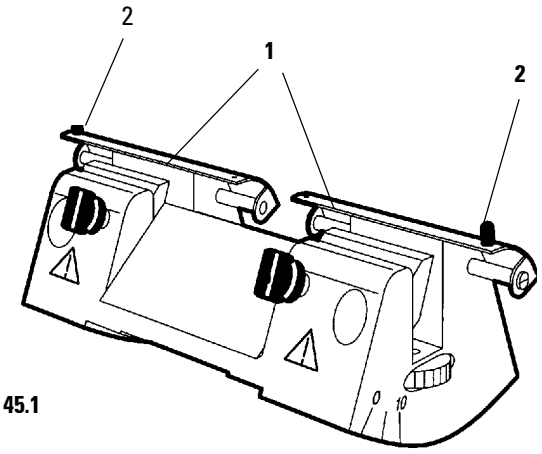


Fig. 45.1

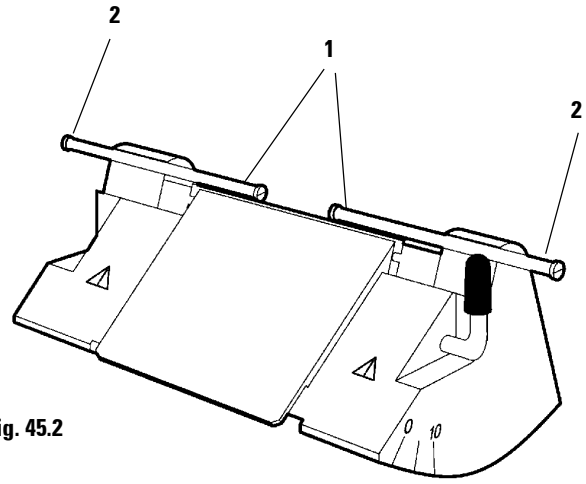


Fig. 45.2

15.5 Knife holders

Knife guard

The safety devices on the instrument and accessory equipment must not be removed or modified!

Every knife holder has a permanent, movable knife guard (1) that allows to cover the cutting edge completely in any position of the knife.
Grips (2) are provided to conveniently move the knife guard. Push both parts of the knife guard to the middle to cover the knife edge.

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!

Microtome knives and disposable blades

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

Never leave knives and knife holders with a mounted knife or blade lying around!
Always put the knives back into the knife case when not in use!

Do not place a knife on a table with the cutting edge facing upward!

Never try to catch a falling knife!

Cleaning

Only use mild commercial detergents or soap solution for cleaning!
Do not use solvents that contain acetone and xylene!

- Clean the knife holders with a damp not a wet cloth.

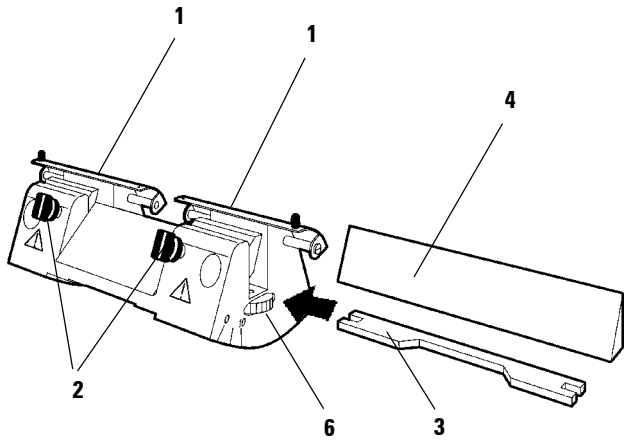


Fig. 46.1

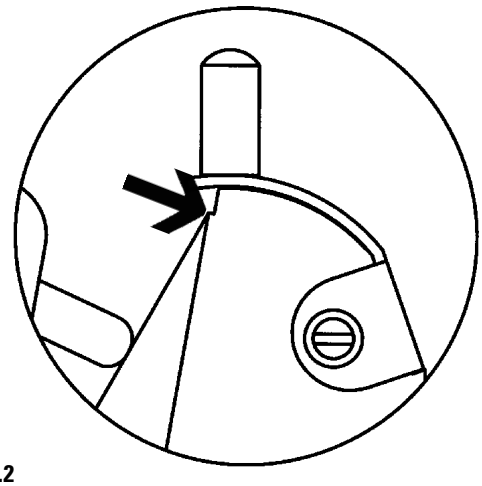


Fig. 46.2

15.5.1 Knife holder N

This knife holder is designed for standard steel and tungsten carbide knives, profile c and d, up to 16 cm long. In addition, it is appropriate for various blade rails for disposable blades, which are inserted in the holder like a knife.
The knife can be repositioned in height. This enables the use even of frequently resharpened knives.

Mounting the knife support bar

- Push the knife guard **(1)** to the middle.
- Place the knife support bar **(3)** as shown on the height adjustment screws (not visible), ensuring that the flat top ends of the height adjustment screws are seated in the slots at both ends of the knife support bar.

Inserting the knife

- Turn the knurled wheels **(6)** on the right and left of the knife holder in opposite directions to the front to move the knife support bar via the height adjustment screws to the lowest position, to prevent damage to the cutting edge while inserting the knife.
- Unscrew the knife clamping screws **(2)** counterclockwise as far out as possible.
- Hold the knife **(4)** at the knife back and carefully insert it in the holder from the side as shown with the cutting edge facing upward.

Adjusting the knife height

When adjusting the clearance angle, the cutting edge of the knife should be positioned in the center of rotation of the knife holder. The knife is correctly positioned in height when the cutting edge is at the level of the locating edge of the rear clamping jaws. The knife edge should be parallel with the locating edges.

- Turn the knurled wheels **(6)** in opposite directions to the rear to position the knife edge parallel and at the level der of the locating edge **(Fig. 45.2)** of the rear clamping jaws.
- To clamp the knife **(4)**, tighten the two clamping screws **(2)** uniformly by turning them clockwise.

Inserting blade rails

The blade rails are inserted in the knife holder and clamped like a knife.

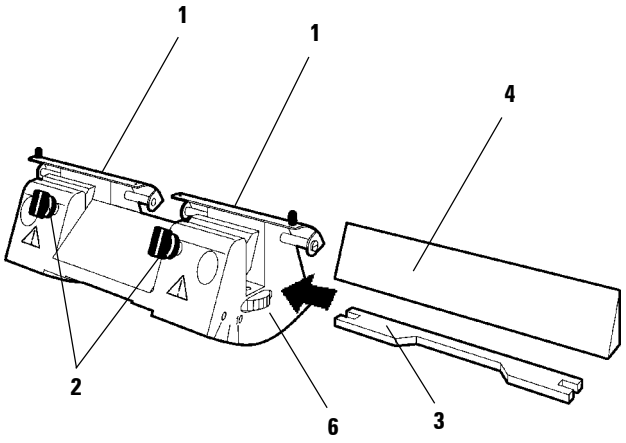


Fig. 47

15.5.2 Knife holder NZ

The knife holder NZ is appropriate for standard steel and tungsten carbide knives, profile c and d, up to 16 cm long. With its central clamping feature, the knife can be laterally repositioned and enables the use of the full length of the cutting edge. The knife can be repositioned in height. This enables the use even of frequently resharpened knives.

Mounting the knife support bar

- Push the knife guard **(1)** to the middle.
- Place the knife support bar **(3)** as shown on the height adjustment screws (not visible), ensuring that the flat top ends of the height adjustment screws are seated in the slots at both ends of the knife support bar.

Inserting the knife

- Turn the knurled wheels **(6)** on the right and left of the knife holder in opposite directions to the front to move the knife support bar via the height adjustment screws to the lowest position, to prevent damage to the cutting edge while inserting the knife.
- Unscrew the knife clamping screws **(2)** counterclockwise as far out as possible.
- Hold the knife **(4)** at the knife back and carefully insert it in the holder from the side as shown with the cutting edge facing upward.

Adjusting the knife height

Please refer to 15.5.1 Knife holder N **(Fig. 46.2)**.

Lateral repositioning of the knife

- Push the knife guard **(1)** to the middle.
- Loosen the clamping screws **(2)** by turning them counterclockwise.
- Push the knife **(4)** to the left or right as required.
- To clamp the knife **(4)**, always tighten the clamping screw **(2)** first which is located on the side to which the knife has been repositioned by turning it clockwise.

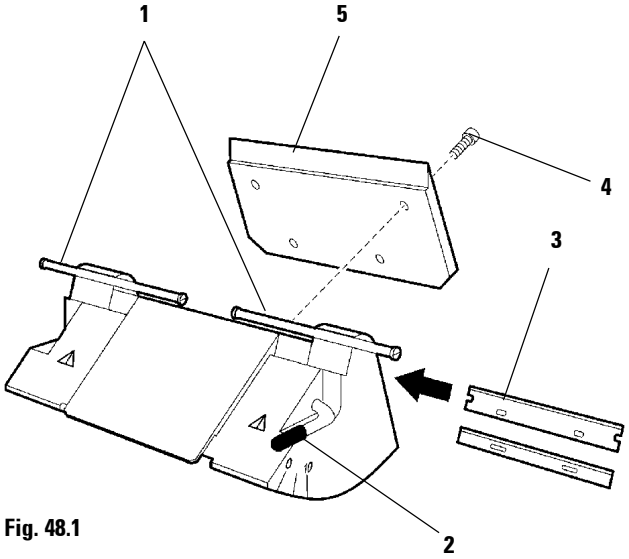


Fig. 48.1

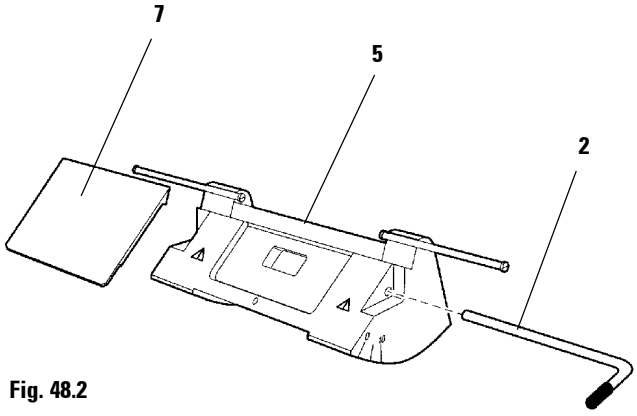


Fig. 48.2

Convenient for left-handers:
The clamping lever (2) can also be inserted in the hole on the left side of the knife holder. This will however change the locking position of the lever!
To unlock, relocate the lever upward; to clamp, relocate the lever downwards.

15.5.3 Knife holder E

The knife holder E is designed for conventional disposable blades from different manufacturers.
It is available in two versions:
With pressure plate for low profile blades and with pressure plate for high profile blades.
Both pressure plates also are available as accessories. If you would like to change from one blade type to another, just order the required type of pressure plate.
The pressure plate can be exchanged easily.

Inserting the blade

- Push the knife guard **(1)** to the middle.
- To insert the blade, relocate the clamping lever **(2)** down.
- Carefully insert the blade **(3)** from the side.
- To clamp the blade, relocate the clamping lever **(2)** up.

Changing the pressure plate

- Loosen the 4 screws **(4)** on the back of the knife holder by using an Allen key size 4.
- Remove the pressure plate **(5)**.
- Attach the new pressure plate by tighten the 4 screws **(4)**.

Cleaning

The clamping plate **(7)** can be removed for cleaning.

- To remove the blade, relocate the clamping lever **(2)** down.
- Carefully remove the blade.
- Pull out the clamping lever **(2)**.
- Remove the clamping plate **(7)**.

Only use mild commercial detergents or soap solution for cleaning!
Do not use solvents that contain acetone and xylene!

- Clean the knife holder with a damp not a wet cloth.
- Place the clamping plate **(7)** on the holder ensuring that the upper edge of the clamping plate and of the pressure plate **(5)** are parallel and at the same height.
- Insert the clamping lever **(2)** in the hole and relocate it up.

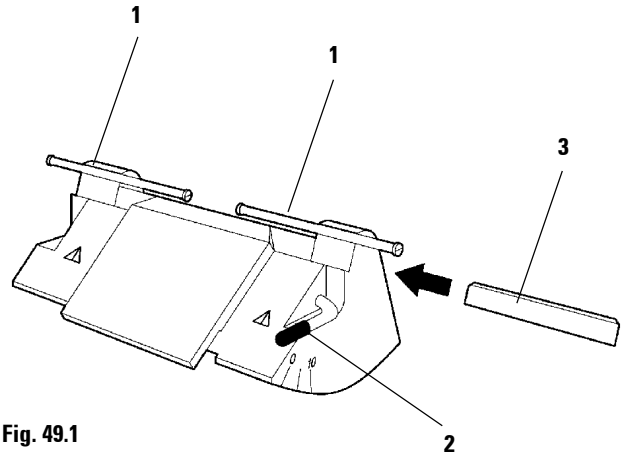


Fig. 49.1

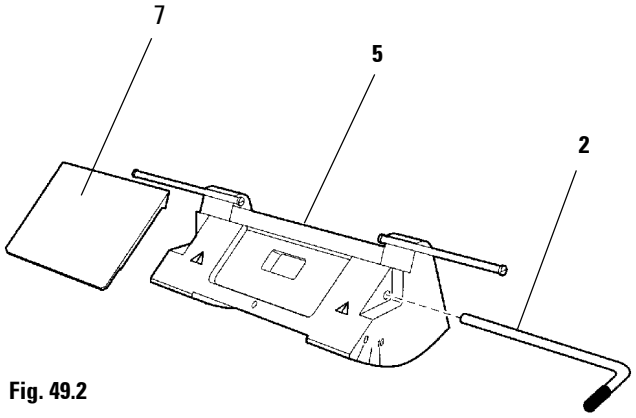


Fig. 49.2

15.5.4 Knife holder E-TC

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

Inserting the blade

- Push the knife guard **(1)** to the middle.
- To insert the blade, relocate the clamping lever **(2)** down.
- Carefully insert the tungsten carbide blade **(3)** from the side with the shining facet to the front.
- To clamp the blade, relocate the clamping lever **(2)** up.

Cleaning

The clamping plate **(7)** can be removed for cleaning.

- To remove the blade, relocate the clamping lever **(2)** down.
- Carefully remove the blade.
- Pull out the clamping lever **(2)**.
- Remove the clamping plate **(7)**.

Only use mild commercial detergents or soap solution for cleaning!
Do not use solvents that contain acetone and xylene!

- Clean all components with a damp not a wet cloth.
- Place the clamping plate **(7)** on the holder ensuring that the upper edge of the clamping plate and of the pressure plate **(5)** are parallel and at the same height.
- Insert the clamping lever **(2)** in the hole and relocate it up.

15.6 External control panel

The external control panel can be used instead of the foot switch and also is connected at the rear of the microtome. A socket wrench size 5 is provided to remove the foot switch adapter prior to connecting the control panel.

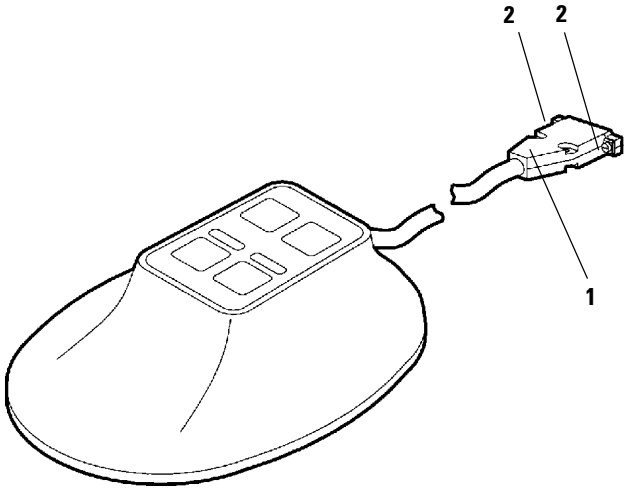


Fig. 50.1

Connecting the control panel

- Turn the instrument off with the mains switch.
- Loosen the 2 screws of the foot switch plug.
- Remove the foot switch plug.
- Loosen the 2 screws of the foot switch adapter with the socket wrench size 5 and remove.
- Put the plug **(1)** of the control panel into the socket on the microtome and fix with the 2 screws **(2)**.

Functions of the control panel

The control panel enables to select the two sectioning modes (single/continuous stroke) and to start and stop motorized sectioning.

Start motorized sectioning

- After selecting one of the two sectioning modes 1 or 2, press **RUN/STOP and RUN/ENABLE simultaneously**.

Once the sectioning motor is started, MOT (yellow) illuminates on the control panel of the microtome.

Stop motorized sectioning

- Press one of the two buttons again.

After pressing one of the buttons, sectioning will continue until the specimen reaches the upper limit of the stroke.

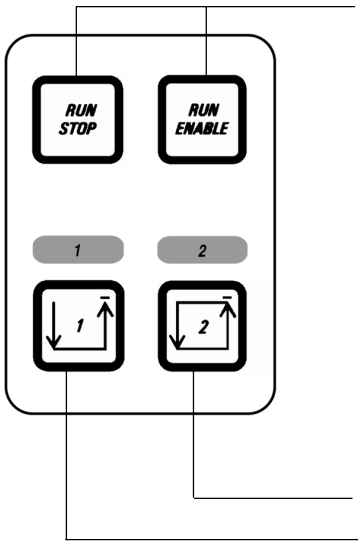


Fig. 50.2

Selecting the sectioning mode

Sectioning mode 1 - Single stroke
Sectioning mode 2 - Continuous stroke

After pushing the appropriate button, LED 1 or 2 will illuminate. At the same time, the LED next to the corresponding button on the control panel of the microtome illuminates.

RM 2155 Rotary Microtome - Basic instrument - 100 V, 50/60 Hz 0502 29950
RM 2155 Rotary Microtome - Basic instrument - 120 V, 50/60 Hz 0502 29951
RM 2155 Rotary Microtome - Basic instrument - 230 V, 50/60 Hz 0502 29952
RM 2155 Rotary Microtome - Basic instrument - 240 V, 50/60 Hz 0502 29953

Knife holders

Knife holder **N** 0502 29955
Knife holder **NZ** 0502 29956
Knife holder **E** for low profile blades 0502 29957
Pressure plate for high profile blades 0502 29553
Knife holder **E** for high profile blades 0502 29982
Pressure plate for low profile blades 0502 29551
Knife holder **E-TC** 0502 29958
Knife holder **GD** for glass and diamond knives 0502 29959

Specimen clamps

Standard specimen clamp with adapter (50 x 60 mm) 0502 29964
Standard specimen clamp with adapter (40 x 40 mm) 0502 29980
Universal cassette clamp with adapter 0502 29965
Vee insert for round specimens 0402 09299
Foil clamp, Type I 0402 09307
Foil clamp, Type II 0402 26922
Holder for round specimens with adapter with 3 inserts 0502 29979
Holder for round specimens with adapter without inserts 0502 29522
Insert for holder for round specimens, ø 6 mm 0356 08322
Insert for holder for round specimens, ø 15 mm 0356 09200
Insert for holder for round specimens, ø 25 mm 0402 08320
Holder for EM specimen holder 0502 29968
Segment arc with adapter for EM specimen holder 0502 29969
Specimen clamping system, non-orienting 0502 29963
Specimen clamping system, orienting 0502 29962

Accessories

External control panel for sectioning mode selection and START/STOP,
including socket wrench, size 5 ..... 0502 29976
Backlighting including screw driver for recessed-head screws 0502 29970
Combined carrier for "illumination & magnifier" - 100 V, 50/60 Hz 0502 29364
Combined carrier for "illumination & magnifier" - 120 V, 50/60 Hz 0502 29971
Combined carrier for "illumination & magnifier" - 230 V, 50/60 Hz 0502 29972
Combined carrier for "illumination & magnifier" - 240 V, 50/60 Hz 0502 29365
Magnifier attachment for combined carrier 0502 29973
Microscope carrier with illumination - 100 V, 50/60 Hz 0502 29366
Microscope carrier with illumination - 120 V, 50/60 Hz 0502 29974
Microscope carrier with illumination - 230 V, 50/60 Hz 0502 29975
Microscope carrier with illumination - 240 V, 50/60 Hz 0502 29367
Microscope attachment 0402 26906

Accessories for reordering

Foot switch with protective guard 0502 29977
Section waste tray 0502 29978
Hand rest 0502 29981
Universal knife holder base with lateral displacement 0502 29954
Universal knife holder base without lateral displacement 0502 29585
Maintenance kit 0502 29360
Cover cap 0502 29596
Dust cover 0212 04091
Foot switch adapter 0502 29413
Instruction manual V 1.1 – 11/2000 (German, English, French, Spanish) 0700 37099

Product changes

Due to a policy of continuous improvement of our products, Leica Microsystems Nussloch GmbH reserves the right to change specifications without notice.

Warranty

Leica Microsystems Nussloch GmbH guarantees that the delivered product has been subjected to a comprehensive quality control procedure based on our strict in-house testing standards in order to ensure that the product complies with its technical specification.
The warranty conditions depend on the contents of the individual contract concluded, supplemented by the warranty conditions of your local Leica sales agency.
Any repairs and/or exchange of parts of the product must be carried out by authorized Leica technical service engineers. Otherwise, any warranty becomes invalid and warranty claims can no longer be made.
The local Leica representative or the manufacturer in Nussloch must be consulted prior to any handling of or changes to the instrument beyond the scope of this instruction manual as well as prior to any modifications or any use of the instrument in combination with non-Leica components not expressly authorized by Leica.
Spare parts and accessories not supplied by Leica can under no circumstances be considered as inspected and/or approved by Leica.
Therefore, installation or use of any such parts may impair the technical design features and thus properties of the instrument.

Leica assumes no liability whatsoever for any damage caused by the use of non-original spare parts or non-original accessories.

The warranty is only valid and warranty claims can only be made as long as the instrument has been operated according to its designated use and according to the instructions given in this manual.
Improper use of the product and/or faulty operation invalidate the warranty and any claims based thereon, and likewise Leica will not assume liability for any consequential damage.

Disposal

The instrument or parts of the instrument must be disposed of in compliance with the local laws.
The RM 2155 contains a great number of recyclable components. For more information about our recycling program, please contact your local Leica Sales Representative or Dealer, or Leica Microsystems Nussloch GmbH in Germany.

We will be glad to provide you with details on the recycling concept for our microtomes meeting today's environmental requirements.

Technical service information

If you require technical service or replacement parts under warranty, please contact your Leica Sales Representative or Dealer from whom the instrument was purchased.

Be sure to state the model type, serial number and date of delivery. Leica Microsystems Nussloch GmbH (Germany) cannot accept goods returned without official authorization.

If an instrument or any part of it is to be returned to Leica, please note the following:

a. If the instrument or any part of it has been exposed to or been in contact with potentially pathogenic or radioactive materials, it is essential to decontaminate the instrument or part.
   Decontamination must explicitly be confirmed by the customer. Our service engineers have to enquire about this.

b. Ensure that there is no radioactivity or hazardous bacteria present and advise Leica of any decontamination procedure that may have been carried out.

Should the instrument or any part of it be received in a condition that Leica considers to be a potential biological hazard, the instrument or part will be returned unrepaired at the expense of the customer.

When requesting a service call, please provide the following information:

a. Model type and serial number of the instrument;

b. Location of the instrument and the person to contact;

c. The reason for the service call.