



# Leica CM1100

## Cryostat

CE

### Instructions for use

Leica CM1100 V1.3 RevB English – 09/2012

**Order-No.:** 14 0469 80101, RevB

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

**Leica**  
BIOSYSTEMS



**Serial No.** .....

**Year of manufacture:** .....

**Manufactured:** ..... Federal Republic of Germany

Until the ratification of the guideline for in-vitro diagnostic instruments this product is categorized according to the MedGV (National Regulations for Medical Appliances) as a Class 3 equipment.

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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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### 3.1 Safety features

The instrument design incorporates the following safety features: handwheel lock, glass anti-roll guide of the knife holder CE that has the protective function of a knife guard.

#### 3.1.1 Locking the handwheel



**Prior to manipulating the knife holder and specimen, or changing the specimen or knife, and during breaks, always lock the handwheel!**

The handwheel can be locked in the upper turning point.

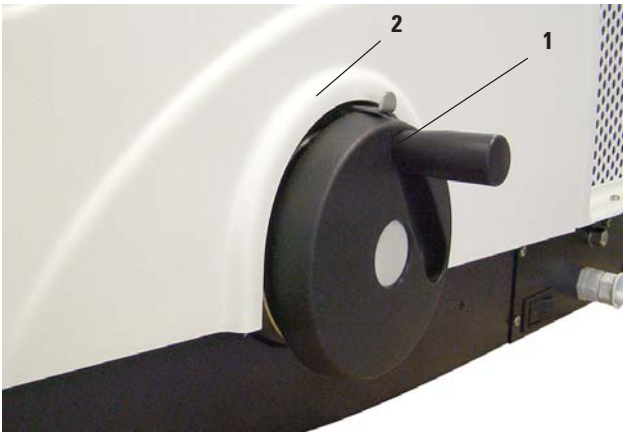


Fig. 5.1

- Rotate the handwheel until the handle (1) is positioned in the upper turning point.
- To lock, push the lever (2) towards the housing.
- To unlock, pull the lever (2) away from the housing.

#### 3.1.2 Knife guard



**Prior to manipulating the knife holder and specimen, or changing the specimen or knife, and during breaks, always cover the cutting edge with the anti-roll guide!**

The knife holder CE for disposable blades has a glass anti-roll guide which is positioned over the knife edge while sectioning to prevent injury thus acting as a knife guard.

### 3.2 General hazards

Despite the safety features provided for operator safety, the use of the instrument and the applications for which is designed involve certain risks that cannot be totally eliminated:

- The handling of disposable blades involves a considerable risk of injury.
- Extended skin contact with cold parts of the instrument can cause frostbite!
- Sectioning infectious and/or radioactive materials constitutes a hazard.

### 3. Safety instructions for handling the instrument

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#### Transport and installation



- The instrument must be transported in an upright position only, or at an angle of max. 30 °!
- Do not carry or reposition the instrument by holding it at parts of the housing or at the handwheels! Only use the carrying handles at the front and rear for carrying!
- Prior to transporting the instrument, pull out the retractable handles of the handwheel and coarse feed wheel and place them in the depression provided in the center of the wheel!
- Do not operate in rooms with explosion hazard!
- To ensure an adequate cooling capacity, the instrument must be set up with at least 10 cm distance from walls and furniture!
- Do not place anything next to the compressor ventilation grids to ensure adequate ventilation at all times!

#### Connection to mains power



- Please refer to the 'Technical data'!
- The instrument must be connected to a grounded mains power outlet socket.
- During the start-up of the compressor the nominal voltage must not drop below the values specified in the 'Technical data'.

Please note that the compressor requires a start-up current between 10 and 25 A.

Therefore, the electric circuit at the installation site must be inspected by an electrical engineer to ensure that it meets the requirements for a smooth operation of the instrument.

A constant adequate power supply to the instrument must be ensured at all times.

Failure to comply with the above will cause severe damage to the instrument.

- **Caution:**  
240 V units may be operated only with the step-up transformer supplied with the instrument!  
Failure to comply with this will cause severe damage to the instrument!
- After transporting, wait at least 4 hours before turning the instrument on.

This waiting period is necessary to allow the compressor oil, which may have been displaced during transport, to return to its original position.

Failure to comply with this can cause severe damage to the instrument.

#### Sectioning



- Take care when handling disposable blades. The cutting edge is extremely sharp and can cause severe injury!
- Never leave the knife holder with a blade mounted lying around!
- Dispose of used blades by inserting them into the receptacle provided at the bottom of the disposable blade dispenser!
- Always clamp the specimen before the blade!
- Take care when removing the section - the cutting edge is exposed!
- Prior to manipulating the knife holder and specimen, or changing the specimen or blade, and during breaks, always lock the handwheel and cover the cutting edge with the anti-roll guide!
- Avoid extended skin contact with cold parts of the instrument as this can cause frostbite!

#### Cleaning and disinfection



- Do not use organic solvents or any other aggressive substances for cleaning and disinfection! We strongly recommend the use of Leica Cryofect disinfectant spray!  
  
Only use alcohol or common disinfectants based on alcohol!
- For spray disinfection follow the instructions for use supplied with the disinfectant!
- Do not use external heaters for drying the cryochamber. This can cause damage to the slot cover!

#### Removal of the microtome



- Before removing the microtome, turn the instrument off with the mains switch!
- Wear appropriate protective gloves to remove the cold microtome from the cryochamber! Risk of frost bite!  
  
Or wait until the microtome has reached room temperature.
- The microtome must be completely dry before reinstallation. Humidity inside will condense and freeze in the cold cryostat and thus may cause malfunctions or damage.

#### Maintenance



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

#### Fuse replacement

- Only use a fuse of the same specification! For the required value, please refer to Chapter 4. 'Technical data' or to the fuse specification label at the rear of the instrument.

## 4. Technical data



**Operating temperature range: 18 °C to 35 °C.**

**All specifications related to temperature are valid only for an ambient temperature up to 22 °C and for an air humidity lower than 60%!**

Type	CM 1100-1	CM 1100-3	CM 1100-11
Nominal voltage	230 V AC ±10%	120 V AC ±10%	100 V AC ±10%
Nominal frequency	50 Hz	60 Hz	50/60 Hz
Power draw			
during refrigeration	170 VA	170 VA	170 VA
during defrosting for 10 min.	320 VA	400 VA	650 VA
Maximum start-up current for 5 sec.	10 A <sub>eff.</sub>	25 A <sub>eff.</sub>	25 A <sub>eff.</sub>
Protective class	I	I	I
Mains fuse	2-pole, T 10 A	2-pole, T 10 A	2-pole, T 10 A
Pollution degree	2	2	2
Overvoltage installation category	II	II	II
Heat output			
during refrigeration	170 J/s	170 J/s	170 J/s
during defrosting for 10 min.	320 J/s	400 J/s	650 J/s
Transformer fuse protection F3	T 4 A acc. to DIN-IEC 127-II	T 4 A UL-listed	T 4 A UL-listed

### Refrigeration

Temperature range	0 °C to -30 °C ±10% at an ambient temperature of 22 °C and air humidity ≤ 60% when lid is closed; adjustable in 1 K increments		
Defrosting	automatic hot gas defrosting, defrost time freely programmable; 1 defrost cycle/ 24 h, manual defrosting duration: 20 min.		
Power draw	226 W	204 W	235 W /269 W
Refrigerating output <sup>1)</sup>	193 W	185 W	190 W
Maximum nominal pressure	15 bar	15 bar	15 bar
Safety factor	3	3	3
Refrigerant	170 g ± 5 g R134a *	170 g ± 5 g R134a *	155 g ± 5 g R134a *
Compressor oil	0.4 l alpha 22, Kyodo *	0.4 l alpha 22, Kyodo *	0.4 l alpha 22, Kyodo *



**\* Refrigerant and compressor oil must be replaced by authorized service personnel!**

<sup>1)</sup> Rating acc. to ASHRAE:	Evaporating temperature	-23.3 °C
	Liquefier temperature	54.4 °C
	Ambient temperature	32.2 °C

### Microtome

Type	Rotary microtome
Section thickness setting range	0 - 20 µm, continuously adjustable
Division of the scale	2 µm
Horizontal specimen feed	15 mm ± 1 mm
Vertical stroke	46 mm ± 1 mm
Maximum specimen size	36 mm

### Cryocabinet

Dimensions (W x D x H)	570 x 780 x 380 mm
Weight (including microtome)	50 kg



5.1 Leica CM 1100 Overview



Fig. 9.1



Fig. 9.2

## 5. General description

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### 5.2 Product description

The Leica CM1100 is a portable compact cryostat for rapid freezing and manual sectioning of tissue specimens.

Two carrying handles on the front and rear of the housing make it easy for two persons to transport the instrument. The counterbalanced handwheel is lockable in the top position of the handle.

The corrosion-proof cryochamber is easy to clean and easily accessible after removing the lid. The cryochamber temperature is selectable between 0 °C and -30 °C.

The stainless steel rotary microtome is virtually maintenance-free in operation. It is designed for sections in a range of 3 µm or 4 µm up to 20 µm.

All push button controls and the display are integrated in the control unit.

Important parameters such as set temperature and defrost time can be programmed.

Cryochamber defrosting takes 20 minutes. It is possible to program an automatic defrost cycle for a certain time of the day and to activate a manual defrost cycle when required.

### 5.3 Standard delivery range

Standard delivery includes:

1 Basic instrument	
1 Accessory-kit consisting off:	
1 Brush, fine .....	14 0183 28642
1 Leica-brush .....	14 0183 30751
1 Bottle of OCT-compound, mounting medium for cryosectioning, 125 ml .....	14 0201 08926
1 Allen key, size 4 .....	14 0222 04139
1 Bottle of cryostat oil, type 407, 50 ml .....	14 0336 06098
1 Replacement glass anti roll guide for CE-holder, 70 mm wide .....	14 0419 33813
2 Specimen discs, 20 mm .....	14 0370 08636
1 Section waste tray, large .....	14 0469 31779
1 Section waste tray, smal .....	14 0469 31780
1 Freezing shelf .....	14 0469 31782
1 Knife holder CE for low profile blades .....	14 0504 33996
1 Pressure plate for high profile blades, 22° .....	14 0504 32199
2 Fuses 5x 20 T 4.0A .....	14 6943 04000
1 Pair of cut resistant gloves, size S .....	14 0340 40859
1 Instructions for use "Leica CM1100" -G/E/F/S .....	14 0469 80101

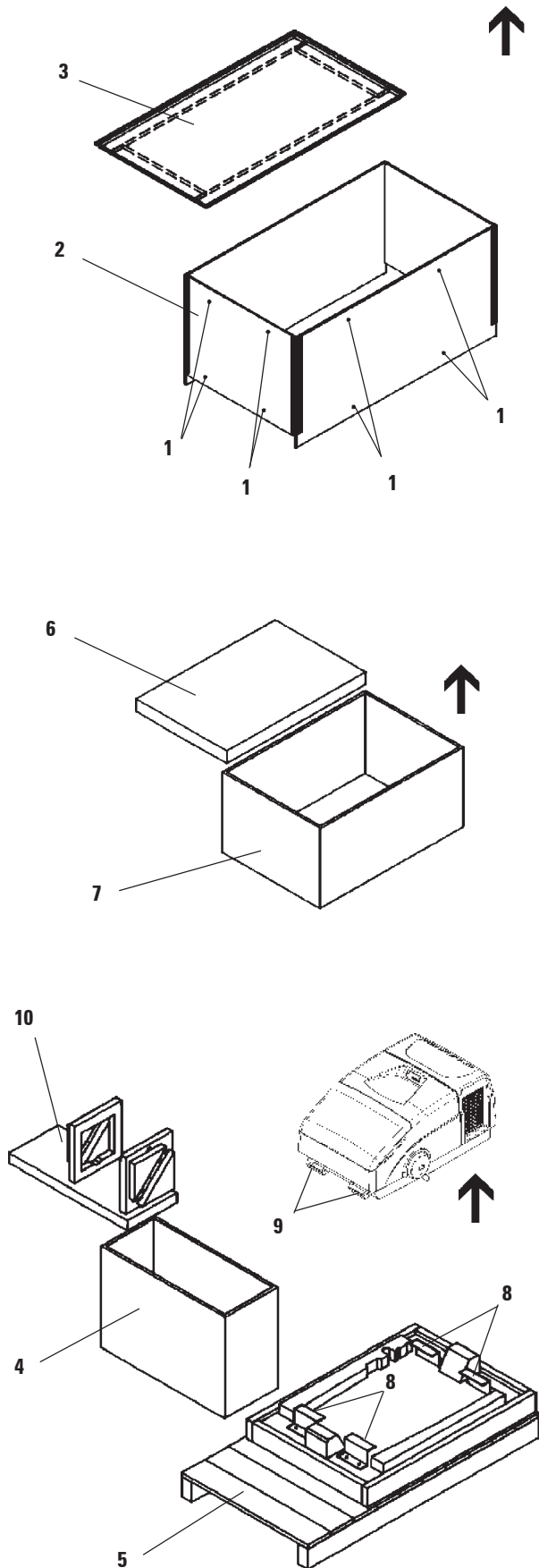


Fig. 11

### 6.1 Unpacking



**Check the transport crate for external damage on arrival of the shipment. If damages are obvious, please make a complaint to your carrier.**

- Remove 2 screws (1) at the top and bottom on all of the four sides of the crate (2).
- Remove the lid (3).
- Lift the body of the crate (2) straight up.
- Take the accessory box (4) from the pallet (5).
- Remove the foam plate (6).
- Remove the inner cardboard box (7) by lifting it upwards.
- Unscrew the 4 angle brackets (8) by loosening 2 screws each.



**Do not carry or reposition the instrument by holding it at parts of the housing or at the handwheels! Only use the carrying handles at the front and rear for carrying!**

- Hold the instrument at the carrying handles (9) at the front and rear and lift it from the pallet.
- Take the insert (10) out of the accessory box (4) and remove all accessories.

## 6. Unpacking and installation

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### 6.2 Site requirements



**Do not operate in rooms with explosion hazard!**

**To ensure an adequate cooling capacity, the instrument has to be set up with at least 10 cm distance from walls and furniture.**

**Do not place anything next to the compressor ventilation grids to ensure adequate ventilation at all times!**

The place of installation must meet the following requirements:

- No direct sunlight,
- Mains power socket at a distance no greater than the length of the power cord (length approximately 4 meters) - do not use an extension cord,
- No drafts (air condition outlets, etc.) directly over the instrument,
- Even surface,
- Mainly vibration-free floor,
- Obstruction-free access to the handwheels,
- Room temperature always below 22 °C,
- Air humidity must not exceed 60%.



**High room temperatures and excessive air humidity affect the cooling capacity of the cryostat.**

### 6.3 Transport to the installation site



**The instrument must be transported in an upright position only, or at an angle of max. 30 °!**

**Do not carry or reposition the instrument by holding it at parts of the housing or at the handwheels!**

**Only use the carrying handles at the front and rear for carrying!**

**Prior to transporting the instrument, pull out the retractable handles of the handwheel and coarse feed wheel and place them in the depression provided in the center of the wheel!**

7.1 Connection to mains power



Please refer to chapter 4 'Technical data'!

During the start-up of the compressor the nominal voltage must not drop below the values specified in the 'Technical data'. Please note that the compressor requires a start-up current between 10 and 25 A. Therefore, the electric circuit at the installation site must be inspected by an electrical engineer to ensure that it meets the requirements for a smooth operation of the instrument.

A constant adequate power supply to the instrument must be ensured at all times. Failure to comply with the above will cause severe damage to the instrument.

The instrument must be connected to a grounded mains power outlet socket.

- The electric circuit at the place of installation has to be protected separately.
- Do not connect any other consumers to this electric circuit.



**Caution:**  
240 V units may be operated only with the step-up transformer supplied with the instrument! Failure to comply with this will cause severe damage to the instrument!

7.2 Installing the accessories

- Remove the lid.

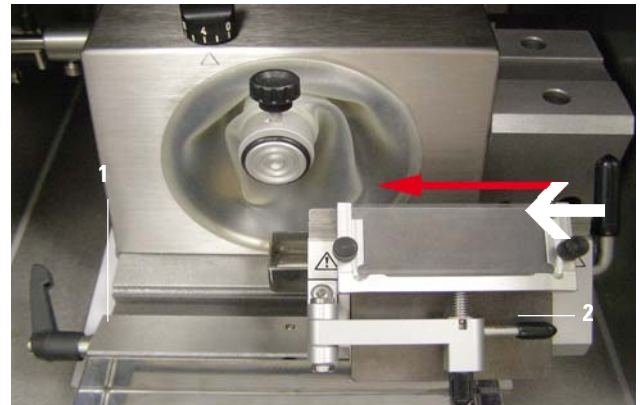


Fig. 13.1

- To release, turn the clamping lever (1) of the microtome base plate counterclockwise, fully insert the knife holder (2) on the base plate from the right and clamp by relocating the lever (1).

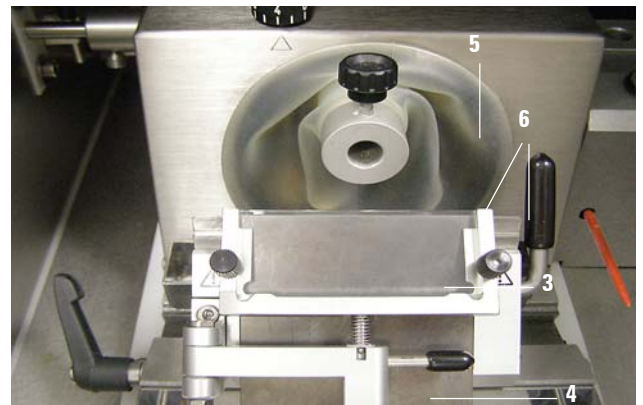


Fig. 13.2

- Place the section waste tray (3) between the microtome and knife holder from the side.
- Place the section waste tray (4) between the microtome base plate and chamber wall at front.
- Place the quick-freeze shelf (5) over the handwheel shaft between the microtome and right-hand chamber wall.
- Place the brushes in the location holes (6) of the quick-freeze shelf.
- Place all tools needed for specimen preparation in the cryochamber for precooling.
- Replace the lid.

## 7. First use of the instrument

### 7.3 Switching on



After transporting, wait at least 4 hours before turning the instrument on. This waiting period is necessary to allow the compressor oil, which may have been displaced during transport, to return to its original position. Failure to comply with this can cause severe damage to the instrument.

If transported correctly in a horizontal position, the instrument can be switched on immediately!

- Before connecting the instrument to the mains power, please check if the local mains voltage complies with the power rating indicated on the nameplate.



Fig. 14.1

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

The mains switch is located on the right side of the cryocabinet. In the OFF position it is on 'O'; in the ON position it is on 'I'.

The mains switch also has the function of an automatic mains fuse.

- Turn the instrument on with the mains switch.

The display of the temperature control unit will read the actual temperature of the cryochamber.



After turning on, it will take approximately 10 seconds until the compressor starts operating.

### 7.4 Functions of the control unit



Fig. 14.2

The control unit has a 3-digit display for actual and set temperature and defrost time, with additional LEDs for instrument status, and three function keys.

In normal operation, the display indicates the actual temperature of the cryochamber.

#### 7.4.1 LEDs

LED 1 Illuminates in the cooling mode.

LED 2 Illuminates for 10 minutes before defrosting actually begins.

LED 3 Illuminates while defrosting takes place

#### 7.4.2 Function keys



To program parameters



To increase the indicated value



To decrease the indicated value

### 7.4.3 Setting user definable parameters

- To **access parameter programming**, press the P-button.

Any programming field can be accessed for 30 seconds. After that time the display automatically resets to actual temperature indication. Parameters can be modified via the arrow keys.

- To **adjust the set temperature**, press 'P' and modify the value via arrow key.
- To **set the defrost time**, press 'P' again and modify the value via arrow key.



Fig. 15

The first two digits are used for hour indication, the last digit is used for minute indication. Since there is just one digit for the minute indication, the shown value has to be multiplied by ten. The defrost time can be adjusted in 10 minute steps. **Fig. 15** shows defrosting time set at 23:50 hours.

- To **set the real time**, press 'P' for hour indication and modify the value via arrow key. Press 'P' again for minute indication and modify the value via arrow key.
- When pressing 'P' once more the display shows '00'. In this mode the entry of a code number is required. Since coded parameters are reserved for service personnel only, press 'P' again to return to set temperature indication, or wait 30 seconds until the display resets to actual temperature indication.

### 7.4.4 Starting and terminating a manual defrost cycle

- To **activate manual defrosting**, press 'P' and the 'Arrow-up' key simultaneously. Indication switches from LED 1 to LED 3.



**LED 3 illuminates for 10 minutes until the actual defrost cycle begins. LED 2 goes on in addition when defrosting starts.**

**The overall duration of the defrost cycles is set to 20 minutes in the factory.**

- To **deactivate manual defrosting** before completion of a defrost cycle, press 'P' and the 'Arrow-up' key simultaneously. LED 2 and LED 3 extinguish, LED 1 is illuminated.

## 7. First use of the instrument

### 7.5 Temperature selection chart (in minus °C)

Tissue	10 - 15	15 - 25	25 - 30
Adrenals	✱	✱	
Bone marrow		✱	
Brain	✱		
Bladder		✱	
Breast- fatty			✱
Breast - little fat		✱	
Cartilage	✱	✱	
Cervix		✱	
Fat			✱
Heart and vessel		✱	
Intestine		✱	
Kidney		✱	
Laryngeal		✱	
Lip	✱	✱	
Liver		✱	
Lung		✱	
Lymphoid		✱	
Muscular		✱	
Nose		✱	
Pancreas		✱	
Prostate		✱	
Ovary		✱	
Rectal		✱	
Skin with fat			✱
Skin without fat		✱	
Spleen or bloody tissue	✱	✱	
Testicular	✱	✱	
Thyroid		✱	
Tongue		✱	
Uterus curettings	✱		

- Above temperature values are based on long-term experience but are only approximate values.



## 8.1 Specimen discs

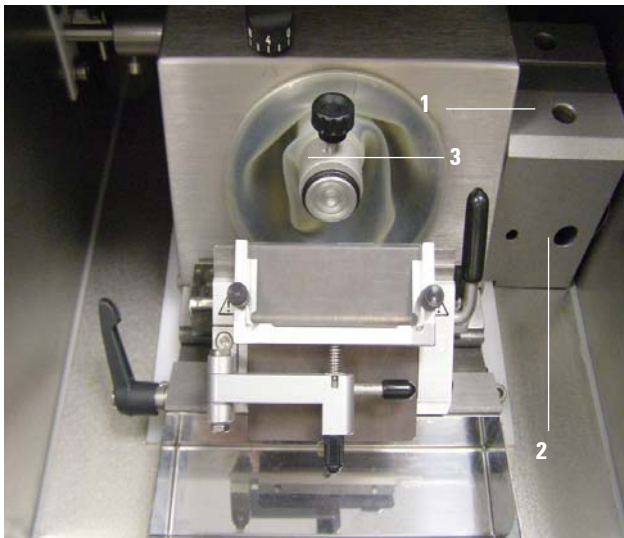


Fig. 17

Specimen discs (1) are available in different sizes of 20 and 25 mm in diameter. The design of the surface ensures firm contact with the specimen.

### 8.1.1 Specimen freezing

- Cut the sample to size. The specimen should be no greater than 2 cm x 2 cm x 2 cm.
- Apply enough cryocompound to a specimen disc at **room temperature**.
- Place the specimen on the disc and orient.
- Place the specimen disc with the specimen in one of the two holes of the quick-freeze shelf (2) and freeze the specimen.



Specimen freezing can be accelerated by additionally using a mobile heat extractor, which is available as an optional accessory (see Chapter 12. 'Optional accessories').

- Once the specimen is frozen, fix the specimen disc in the specimen head and start sectioning.

### 8.1.2 Fixing the specimen disc in the specimen head



**Always clamp the specimen before the blade!**

**Prior to manipulating the knife holder and specimen, or changing the specimen or blade, and during breaks, always lock the handwheel and cover the cutting edge with the anti-roll guide!**

- Lock the handwheel.
- Loosen the screw (3) on the specimen head.
- Insert the shaft of the specimen disc (1) with the frozen specimen in the location hole of the specimen head and tighten the screw (3).

Make sure that the shaft of the specimen disc is fully inserted. The entire rear surface must have a good contact with the specimen head.

## 8. Daily operation

### 8.2 Knife holder CE



The knife holder CE is equipped with a pressure plate for low profile blades on delivery. A pressure plate for high profile blades is supplied separately.

If you wish to use high profile disposable blades, it is necessary to change the rear pressure plate (see 8.2.1).

After changing, the rear and front pressure plates need to be readjusted (see 8.2.2 and 8.2.3).

#### 8.2.1 Changing the rear pressure plate

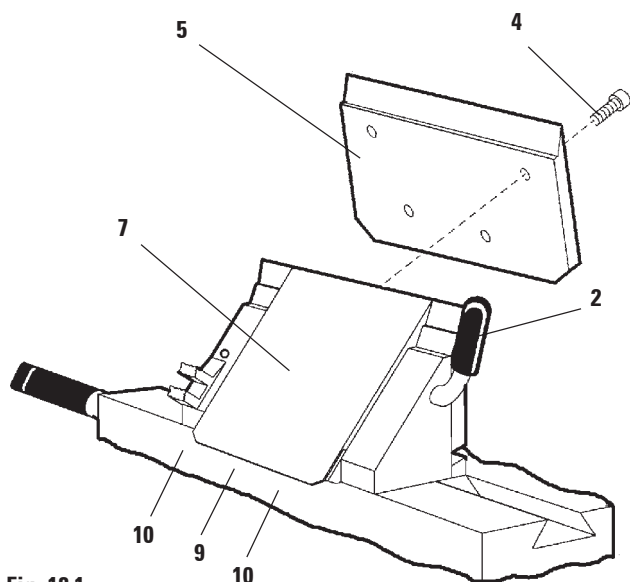


Fig. 18.1

- Loosen the 4 screws (4) on the back of the knife holder by using an Allen key size 4.
- Remove the pressure plate (5).
- Fix the new pressure plate with the 4 screws (4). Tighten the screws only lightly, since the next step will be to adjust the plate in height and parallelism.

#### 8.2.2 Adjusting the rear pressure plate

The rear pressure plate (5) sits on two screws which permit height and parallel adjustment of the pressure plate. The two screws can be accessed through corresponding openings on the underside of the knife holder and can be adjusted with an Allen key, size 2.

- To remove the blade, rotate the clamping lever (2) forward.
- Carefully remove the blade.
- Remove the clamping lever (2).

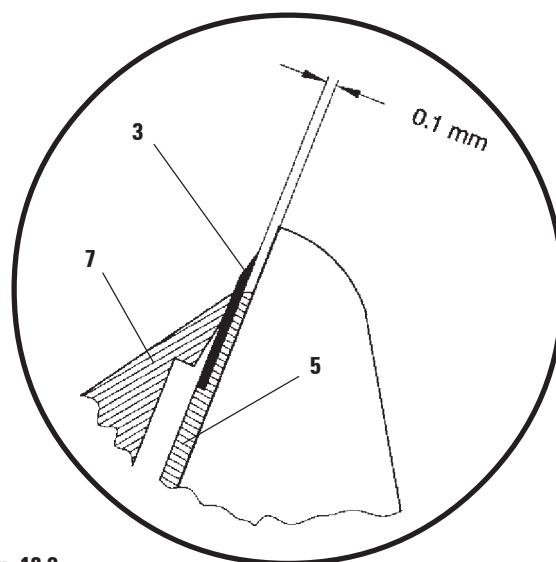


Fig. 18.2

- Adjust height and parallelism of the pressure plate (5) such that the bearing surface for the blade is at a level approximately 0.1 mm higher than the base of the cheeks of the knife holder.
- Tighten the screws (4).

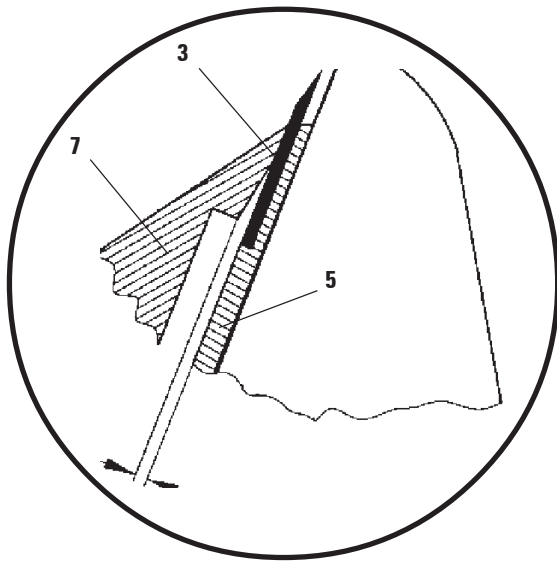


Fig. 19.1

### 8.2.3 Adjusting the front pressure plate

- Place the pressure plate (7) in its correct position, insert the clamping lever (2) and slightly fasten the pressure plate by tightening the clamping lever just a bit.

The screws (10) on the underside of the knife holder are used to adjust the height of the pressure plate.

- Adjust the height of the pressure plate (7) with screws (10). The upper edges of both pressure plates (5) and (7) have to be at the same height and parallel to each other.

The clearance angle of the pressure plate (7) is adjusted with screw (9) which can be accessed at a slant angle from behind, through an opening in the underside of the knife holder.

- Insert the blade with the cutting edge facing downwards in order to minimize the risk of injury and fasten it slightly with clamping lever (2).
- Adjust the pressure plate (7) with screw (9) in such a way that only the upper edge of the pressure plate actually exerts pressure on the blade. A visible gap must remain. When the pressure plate is clamped tightly, this gap will disappear.

### 8.2.4 Inserting the blade



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

Never leave the knife holder with a blade mounted lying around!

Avoid extended skin contact with cold parts of the instrument as this can cause frostbite!



All components of the cryostat as well as the knife or blade and the tools for specimen preparation should be precooled in the cryostat before starting sectioning!



Fig. 19.2

- Release the lever (3) by turning it counterclockwise.
- Turn the anti-roll guide (2) to the left.
- Insert the blade (4) carefully either from above or from the side, so that it fits in between the pressure plate and the knife support. Make sure that the blade is in central position.
- Tighten the lever (3) by turning it clockwise.
- Reposition the anti-roll guide on the blade.

## 8. Daily operation

### 8.2.5 Lateral displacement

If the sectioning results start lacking quality, the knife holder can be displaced laterally to use another blade position.

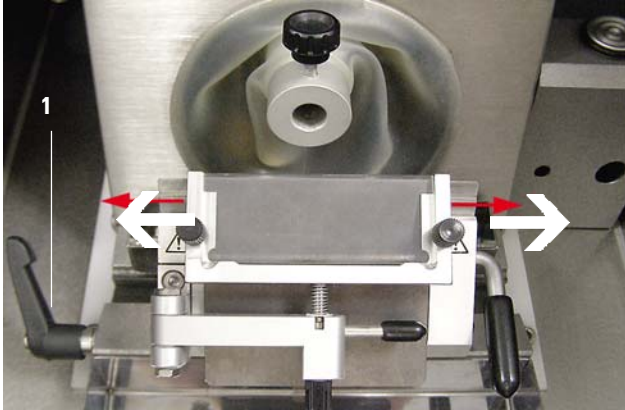


Fig. 20.1

Proceed as follows:

- Release the clamping lever (1) by turning it counterclockwise and move the knife holder including the blade laterally to the desired position.
- Retighten the clamping lever (1) by turning it clockwise

### 8.2.6 Adjusting the anti-roll plate

#### Parallel adjustment of the anti-roll plate and blade

It may be necessary to align the front edge of the anti-roll plate parallel to cutting edge of the blade.

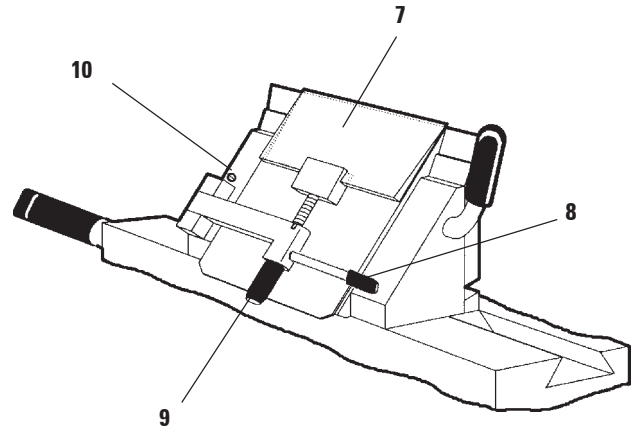


Fig. 20.2

Proceed as follows:

- Loosen screw (10), hold the anti-roll guide at the grip (8) and align the front edge of glass plate parallel with the cutting edge of the blade.
- Retighten screw (10) after alignment.

- To raise the anti-roll plate (to move it towards the blade), turn the knurled knob (9, Fig. 20.2) counter-clockwise.
- To lower the anti-roll plate (to retract it from the blade), turn the knurled knob (9, Fig. 20.2) clockwise.

If the anti-roll plate is positioned incorrectly to the blade edge, problems I and II will occur. Position III shows the correct position of the anti-roll plate.

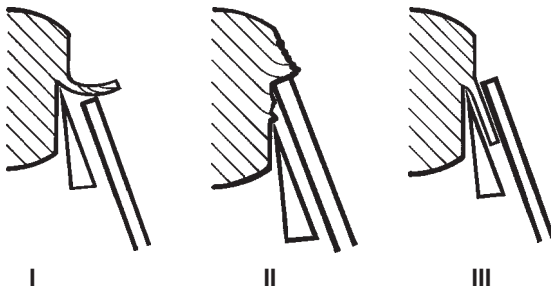


Fig. 21.1

- I wrong: anti-roll guide positioned too low
- II wrong: anti-roll guide positioned too high
- III right: anti-roll guide correctly positioned

In position III the anti-roll plate is correctly adjusted.

It is recommended to first preadjust it at a great section thickness (e.g. 10  $\mu\text{m}$ ) and then approach the required section thickness reducing the value in 5  $\mu\text{m}$  increments and slightly readjust the anti-roll plate in height with the knurled knob (9, Fig. 20.2).



The glass anti-roll guide is resistant to acetone.  
For cleaning the knife holder, domestic detergents can be used.

### 8.2.7 Replacing the glass anti-roll plate

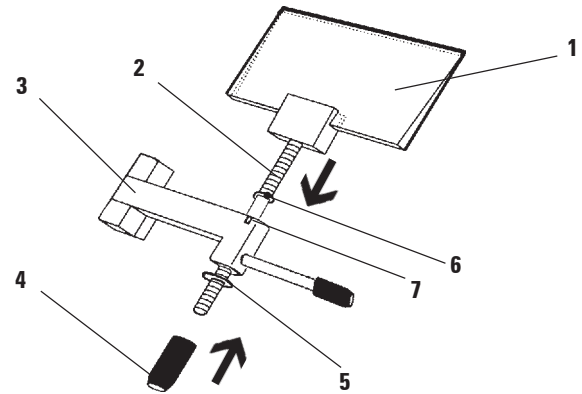


Fig. 21.2

- Remove the anti-roll guide from the blade by turning it to the left.
- Unscrew the knurled knob (4).
- Remove the white plastic washer (6) and pull the anti-roll plate with the shaft up out of the swivel arm.

Install the new anti-roll plate:

- Insert the shaft (2) of the glass anti-roll plate (1) in the hole of the swivel arm (3) from above ensuring the pin (6) is located in the notch (7).
- Place the white plastic washer (5) on the shaft (2) from below.
- Screw the grip (4) on to the shaft (2) from below.

After installation, the anti-roll guide needs to be readjusted as described at 8.2.6.

## 8. Daily operation

### 8.3 Coarse feed wheel

The coarse feed wheel is located on the left side of the housing. It has a retractable countersunk handle. The coarse feed wheel always rotates during sectioning and may therefore not be obstructed.

The coarse feed is used for rapid horizontal movement of the specimen, both forward and backward.

Clockwise turning moves the sample forward towards the knife. Counterclockwise turning moves the sample backward away from the knife.

After having reached the rear or front limit stop respectively, the coarse feed wheel cannot be rotated any more. Once the front limit stop is reached, no more specimen advance takes place.



Fig. 22

### 8.4 Trimming

- Remove the anti-roll guide from the cutting edge.
- Unlock the handwheel.



**Always observe the specimen while approaching the sample to the blade, to avoid that the specimen collides with the cutting edge.  
A collision can cause severe damage to both the blade and specimen!**

- Turn the coarse feed wheel clockwise to approach the specimen to the cutting edge.
- Rotate the handwheel cautiously and check if the specimen comes in contact with the cutting edge.
- Trim the sample to the desired sectioning plane by continuously turning the coarse feed wheel and handwheel.
- Place the anti-roll guide on the blade during trimming and check if it is correctly adjusted.



**The anti-roll guide is correctly adjusted when the section smoothly slides down between the anti-roll plate and the blade (see Fig. 21.1)!**

- Readjust the anti-roll guide if necessary (see 8.2.6).

## 8.5 Sectioning



Fig. 23

- Select a section thickness with the section thickness control knob (1) at the top of the microtome.
- Decrease the section thickness continually to the required value.



**After changing from one section thickness to another, the first two or three sections should be rejected!**

- Make sure the section smoothly slides down between the anti-roll plate and blade.
- Remove the anti-roll guide from the knife for removing and applying a section to a microscope slide.

The section can be transferred either to a precooled microscope slide or to a microscope slide at room temperature.

## 8.6 Section transfer



**Take care when removing the section - the cutting edge is exposed!**

**Section transfer to a slide at room temperature**

- Carefully approach a slide at room temperature to the cut section.

The frozen section 'flies' to the slide, rapidly thaws and thus adheres to the slide surface making subsequent orientation impossible.

**Section transfer to a precooled slide**

- Carefully apply the section to the slide by gentle brushing with a soft brush.
- Orient and flatten the section on the slide surface with a brush.
- To ensure the section tightly adheres to the slide surface, warm the cold slide by placing a finger against the underside of the slide directly underneath the section.

## 8. Daily operation

### 8.7 Defrosting

The Leica CM 1100 provides both programmable automatic and manual defrosting.

During a defrost cycle, whether automatic or manual, the evaporator is flushed with hot gas to remove frost that inevitably builds up during routine operation of a cryostat. Such frost formation on the evaporator can result in reduced cooling output.

Therefore, the **automatic defrost cycle** should be programmed to take place during the night hours to ensure that the operator has the required low temperature and thus good working conditions in the morning.

At installation sites with high air humidity increased frost formation may occur, and it may become necessary to start a **manual defrost cycle** in addition, which can be operated any time when required.



**The duration of the defrost cycles is set to 20 minutes in the factory.**

**The automatic defrost cycle is programmed for 24.00 hrs in the factory.**

**A manual defrost cycle can be terminated earlier.**

After defrosting, cooling is resumed automatically. The cryochamber will then be cooled to the previously selected set temperature.



**During defrosting, the actual chamber temperature is displayed.**

**When activating a manual defrost cycle the indication changes from LED 1 to LED 3. LED 3 illuminates for 10 minutes indicating the lead-up of the defrost cycle.**

**When actual defrosting begins LED 2 illuminates in addition.**

**At the end of the defrost cycle LED 2 and LED 3 extinguish, LED 1 is illuminated.**

#### 8.7.1 Programming an automatic defrost cycle

An automatic defrost cycle is programmed by entering the defrost time via the control unit (see 7.4.3).

#### 8.7.2 Starting a manual defrost cycle

A manual defrost cycle is started and terminated via the control unit (see 7.4.4).



**Ambient temperatures above 35 °C may cause defrosting problems.**

**In this case, a defrost cycle should not be operated as this may cause severe damage to the instrument.**

**When switching the instrument off overnight, the lid should be removed from the cryochamber to prevent condensation water inside.**

**When the instrument was switched off overnight, a defrost cycle should be started before resuming normal operation to prevent a loss in refrigeration output.**



Problem	Possible causes	Remedies
Frost on chamber walls and microtome while cryochamber lid <b>not in place</b>	<ul style="list-style-type: none"> <li>- Cryostat is exposed to air currents (open windows and doors, air conditioning).</li> <li>- Cryochamber was open. This causes frost formation on the microtome which is much colder than the evaporator.</li> <li>- Frost built up by breathing into the cryochamber.</li> </ul>	<ul style="list-style-type: none"> <li>- Change place of installation for the cryostat.</li> <li>- Replace the lid after terminating work.</li> <li>- Select higher set temperature (e.g. -20 °C instead of -30 °C)</li> <li>- Inevitable during working.</li> </ul>
Frost on chamber walls and microtome while cryochamber lid <b>in place</b>	<ul style="list-style-type: none"> <li>- Seal of lid defective.</li> <li>- Seal of coarse feed shaft defective.</li> <li>- Seal of handwheel shaft defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Call technical service</li> <li>- Call technical service</li> <li>- Call technical service</li> </ul>
Sections smear	<ul style="list-style-type: none"> <li>- Specimen not cold enough.</li> <li>- Blade and/or anti-roll plate not yet cold enough and thus cause sections to thaw.</li> </ul>	<ul style="list-style-type: none"> <li>- Select lower temperature.</li> <li>- Wait until blade and/or anti-roll plate have reached chamber temperature.</li> </ul>
Sections splinter	<ul style="list-style-type: none"> <li>- Specimen too cold</li> </ul>	<ul style="list-style-type: none"> <li>- Select higher temperature.</li> </ul>
Sections not properly flattened	<ul style="list-style-type: none"> <li>- Static electricity/air currents.</li> <li>- Specimen not cold enough.</li> <li>- Large area specimen.</li> <li>- Anti-roll plate poorly aligned with cutting edge.</li> <li>- Cutting edge blunt or damaged.</li> </ul>	<ul style="list-style-type: none"> <li>- Remove cause.</li> <li>- Select lower temperature.</li> <li>- Trim specimen parallel, increase section thickness.</li> <li>- Readjust anti-roll plate.</li> <li>- Use different part of cutting edge or replace blade.</li> </ul>
Sections not properly flattened despite correct temperature and correctly aligned anti-roll plate	<ul style="list-style-type: none"> <li>- Blade and/or anti-roll plate dirty.</li> <li>- Edge of anti-roll plate damaged.</li> <li>- Blunt cutting edge.</li> </ul>	<ul style="list-style-type: none"> <li>- Clean with dry cloth or brush.</li> <li>- Replace plate.</li> <li>- Use different part of cutting edge, or replace blade.</li> </ul>
Sections curl on anti-roll plate	<ul style="list-style-type: none"> <li>- Anti-roll plate does not protrude far enough beyond the cutting edge.</li> </ul>	<ul style="list-style-type: none"> <li>- Readjust correctly.</li> </ul>
Scraping noise during sectioning and specimen return movement	<ul style="list-style-type: none"> <li>- Anti-roll plate projects too far beyond the cutting edge and scrapes on the specimen surface.</li> </ul>	<ul style="list-style-type: none"> <li>- Readjust correctly.</li> </ul>
Ridged sections	<ul style="list-style-type: none"> <li>- Cutting edge damaged.</li> <li>- Edge of anti-roll plate damaged.</li> </ul>	<ul style="list-style-type: none"> <li>- Use different part of cutting edge, or replace blade.</li> <li>- Replace anti-roll plate.</li> </ul>

## 9. Trouble shooting

Problem	Possible causes	Remedies
Chatter during sectioning	<ul style="list-style-type: none"> <li>- Specimen insufficiently frozen onto the specimen disc.</li> <li>- Specimen disc not clamped tightly.</li> <li>- Blade not clamped tightly enough.</li> <li>- Specimen has been sectioned too thickly and has detached from the disc.</li> <li>- Very hard, inhomogeneous specimen.</li> <li>- Blunt cutting edge.</li> </ul>	<ul style="list-style-type: none"> <li>- Refreeze specimen onto the disc.</li> <li>- Check disc clamping.</li> <li>- Check clamping.</li> <li>- Refreeze specimen onto the disc.</li> <li>- Increase section thickness; reduce specimen surface area if necessary.</li> <li>- Use different part of cutting edge, or replace blade.</li> </ul>
Condensation on anti-roll plate and blade during cleaning	<ul style="list-style-type: none"> <li>- Brush, forceps and/or cloth too warm.</li> </ul>	<ul style="list-style-type: none"> <li>- Store all tools in the cryochamber.</li> </ul>
Anti-roll plate damaged after adjustment	<ul style="list-style-type: none"> <li>- Plate too high above the cutting edge. Adjustment was carried out in direction of the cutting edge.</li> </ul>	<ul style="list-style-type: none"> <li>- Raise plate when aligning. Be more careful next time.</li> </ul>
Thick-thin sections	<ul style="list-style-type: none"> <li>- Temperature incorrect for the tissue to be cut.</li> <li>- Ice buildup on blade back.</li> <li>- Handwheel speed not uniform.</li> <li>- Blade not clamped tightly enough.</li> <li>- Specimen disc not clamped tightly.</li> <li>- Cryocompound applied to cold specimen disc; specimen detached from the disc after freezing.</li> <li>- Blunt cutting edge.</li> <li>- Microtome not properly dried before reinstallation.</li> </ul>	<ul style="list-style-type: none"> <li>- Select correct temperature. Wait until the correct temperature has been reached.</li> <li>- Remove ice.</li> <li>- Adapt speed.</li> <li>- Check clamping.</li> <li>- Check clamping.</li> <li>- Apply cryocompound on warm disc; mount specimen and freeze.</li> <li>- Use different part of cutting edge, or replace blade.</li> <li>- Dry microtome thoroughly.</li> </ul>
Tissue sticks or crumbles on the anti-roll plate	<ul style="list-style-type: none"> <li>- Anti-roll plate is too warm or incorrectly positioned.</li> <li>- Static electricity.</li> <li>- Fat on the corner or edge of the anti-roll plate.</li> <li>- Rusty blade.</li> </ul>	<ul style="list-style-type: none"> <li>- Cool down anti-roll plate or reposition plate.</li> <li>- Remove static electricity.</li> <li>- Remove fat with alcohol/acetone.</li> <li>- Remove rust.</li> </ul>

Problem	Possible causes	Remedies
Flattened sections curl up when anti-roll plate is picked up	<ul style="list-style-type: none"> <li>- Static electricity or air currents.</li> <li>- Anti-roll plate too warm.</li> </ul>	<ul style="list-style-type: none"> <li>- Remove static electricity.</li> <li>- Cool down the anti-roll plate.</li> </ul>
Sections tear	<ul style="list-style-type: none"> <li>- Temperature too low for the tissue to be cut.</li> <li>- Blunt part, dirt, dust, frost or rust on the blade.</li> <li>- Leading edge of anti-roll plate damaged.</li> <li>- Hard particles in the tissue.</li> <li>- Blade back dirty.</li> </ul>	<ul style="list-style-type: none"> <li>- Increase temperature and wait.</li> <li>- Remove cause.</li> <li>- Replace the plate.</li> <li>- Cannot be corrected.</li> <li>- Clean.</li> </ul>
Inconsistent or insufficient specimen feed	<ul style="list-style-type: none"> <li>- Microtome was not entirely dry when switching on refrigeration; consequently ice built up in the micrometer feed system.</li> <li>- Defective microtome.</li> </ul>	<ul style="list-style-type: none"> <li>- Remove the microtome and dry thoroughly before reinstallation.</li> <li>- Call technical service.</li> </ul>
Specimen disc cannot be removed	<ul style="list-style-type: none"> <li>- Moisture on the underside caused the disc to freeze to the quick-freeze shelf or specimen head.</li> </ul>	<ul style="list-style-type: none"> <li>- Apply concentrated alcohol to the contact point.</li> </ul>
Cryostat inoperational; no display indication	<ul style="list-style-type: none"> <li>- Mains plug not properly connected.</li> <li>- Overcurrent protection of the mains switch has responded.</li> <li>- Fuse defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Connect the mains plug is properly.</li> <li>- Switch on again with the mains switch after approx. 5 minutes.</li> <li>- Replace 12 V fuse on rear of instrument.</li> </ul>
No or insufficient refrigeration	<ul style="list-style-type: none"> <li>- Inappropriate installation site.</li> <li>- Required minimum distance of 10 cm on all sides not observed.</li> <li>- Compressor ventilation grids dirty or covered.</li> <li>- Instrument has regularly been switched off overnight; therefore an automatic defrost cycle did not take place.</li> <li>- Compressor defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Comply with installation site requirements.</li> <li>- Comply with installation site requirements.</li> <li>- Remove obstruction or remove dust with brush or vacuum cleaner.</li> <li>- Start a manual defrost cycle.</li> <li>- Call technical service.</li> </ul>

## 10. Cleaning and disinfection

### 10.1 Cleaning

- Remove frozen section waste from the cold cryostat.
- Remove the waste trays and empty.



**Do not use organic solvents or any other aggressive substances for cleaning and disinfection!**  
**We strongly recommend the use of Leica Cryofect disinfectant spray!**  
**Only use alcohol or common disinfectants based on alcohol!**

### 10.2 Spray disinfection with Leica Cryofect



**Keep only in original container and up to 25 °C!**

**Wear appropriate protective clothing when cleaning and disinfecting!**  
**Disinfect the instrument and accessories every day!**

**Effectiveness of the disinfectant down to -20 °C experimentally tested.**



**Highly flammable (VbF: B)!**  
**Flash-point: 18 °C (DIN 51755)**  
**Keep away from sources of ignition!**  
**Do not spray into flames!**  
**Attention with alcohol-sensitive surfaces!**

1. Select a cryochamber temperature value down to -20 °C.
2. Remove the knife or blade from the knife holder.
3. Remove all samples, microscope slides and tools from the cryochamber.
4. Remove debris from the cryochamber.

Allow the cryochamber to reach the previously selected temperature.

Once the selected temperature is reached, either

- 5a. spray the disinfectant evenly on the contaminated surfaces- the surfaces should be covered with an even layer - or
- 5b. soak a cloth with disinfectant and apply it on the contaminated surfaces.
6. Allow a reaction time of no less than 15 minutes.
7. Wipe it off with a tissue.
8. Dispose of tissue in compliance with the ruling waste disposal regulations of your institution.
9. Set the cryochamber temperature to the originally selected value.



If increased frost buildup occurs on the evaporator, start a manual defrost cycle.

If increased frost buildup occurs on the microtome, the microtome should be removed and thoroughly dried.

- Place an appropriate vessel under the drain tube at the rear of the housing.
- Collect any defrost water and waste or cleaning liquid, and dispose of according to the local waste disposal regulations.



All components removed from the cold environment will collect condensation. Therefore all components should be dried thoroughly before placing them back into the cryochamber.



Do not use external heaters for drying the cryochamber. This can cause damage to the slot cover!

### 10.3 Removal of the microtome



For extensive cleaning and disinfection, or for thorough drying of the microtome after a long mains power failure, it may be necessary to remove the microtome from the cryochamber.

Before removing the microtome, turn the instrument off with the mains switch!

- Take out the specimen discs, knife holder, waste trays and quick-freeze shelf.

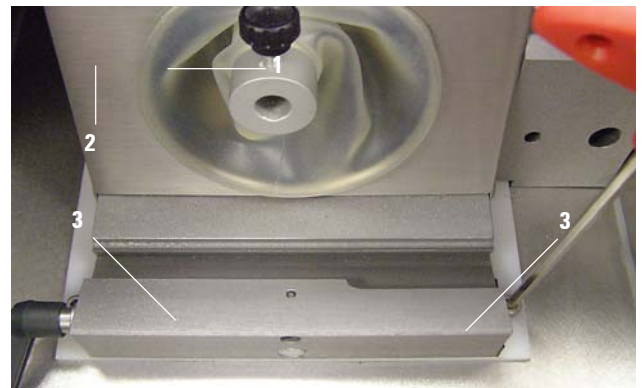


Fig. 29

- Place the handle of the handwheel in the lowest position so that the specimen clamping head is at its lowest position.
- Loosen the screw (1) by means of an Allen key size 4.
- Pull the shaft (2) of the coarse feed wheel out of the coupling on the microtome.
- Loosen the two screws (3) by means of an Allen key size 4.



Wear appropriate protective gloves to remove the cold microtome from the cryochamber! Risk of frost bite!  
Or wait until the microtome has reached room temperature.

- Pull the microtome to the front to disengage it from the plastic coupling (4) connecting the two shafts, and take it out of the cryochamber.

## 10. Cleaning and disinfection

### 10.4 Reassembly of the microtome



The microtome must be completely dry before reinstallation. Humidity inside will condense and freeze in the cold cryostat and thus may cause malfunctions or damage.

The handle of the handwheel should be placed in the lowest position so that the specimen clamping head is at its lowest position.

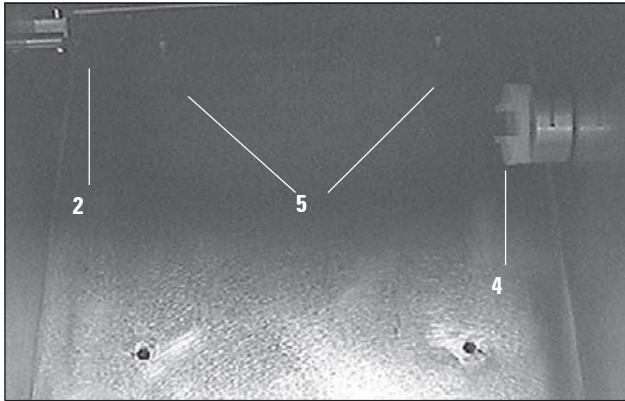


Fig. 30.1

- Mount the plastic coupling (4) on the handwheel shaft.
- Place the microtome into the cryochamber and push it to the rear so that the slits at the rear engage in the screws (5) at the bottom of the cryochamber and the handwheel shaft of the microtome engages in the plastic coupling (4).



Fig. 30.2

- Push the shaft (2) of the coarse feed wheel into the cryochamber from outside to engage it in the coupling on the left side of the microtome, aligning the flat surface of the shaft to the clamping screw (1).
- Fasten the shaft with the clamping screw (1).
- Fasten the microtome with the two screws (3).
- Replace all accessories.



The cryochamber and all accessories must be completely dry when turning on the instrument. Remaining humidity will cause frost formation during cooling.

### 11.1 General maintenance



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

The microtome is maintenance-free in operation to a great extent!

To ensure reliable and trouble-free operation over several years, we recommend the following:

- Have the instrument inspected by a qualified service engineer authorized by Leica at least once a year.
- Enter into a service contract after the warranty period; for further details, please contact your Leica sales office.
- Clean the instrument every day.
- From time to time, especially after repeated drying in a heating oven, apply a **drop of cryostat oil** - to the clamping lever of the knife holder and the clamping screw for fixing the specimen discs.

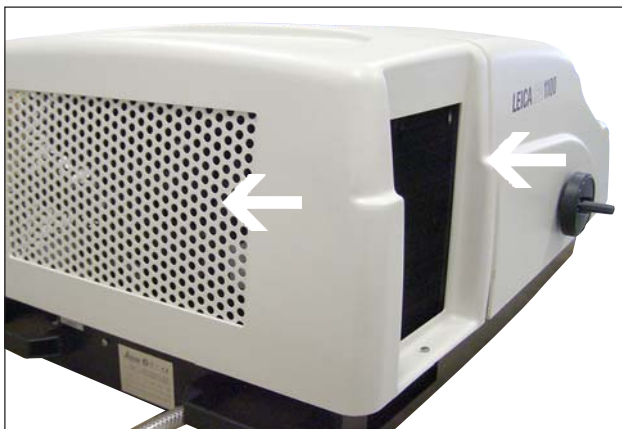


Fig. 31.1

- Clean the ventilation grids of the compressor at the rear and side walls of the housing with a brush or vacuum cleaner to remove dust and dirt.

### 11.2 Fuse replacement



Only use a fuse of the same specification! For the required value, please refer to *Chapter 4. 'Technical data'* or to the fuse specification label at the rear of the instrument.

The fuse is located at the rear of the instrument above

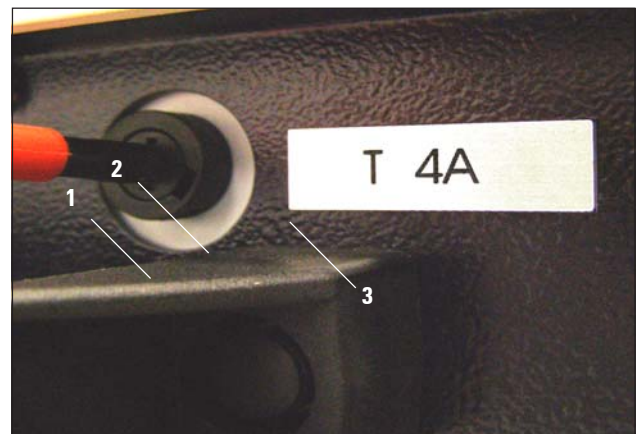


Fig. 31.2

the left carrying handle.

- Turn the fuse holder (1) a quarter turn counterclockwise with a screwdriver and remove.
- Replace the defective fuse (2) by a new one of the same specification.
- Insert the fuse holder (1) with the fuse inserted in the opening (3) and turn it a quarter turn clockwise with a screw driver.
- Reconnect the instrument to mains and turn it on.

## 12. Optional accessories

### 12.1 Mobile heat extractor

Specimen freezing on the quick-freeze shelf can be accelerated by the additional use of a heat extractor.

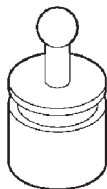


Fig. 32.1

- Store the heat extractor in the cryochamber.
- Place it on the specimen surface to accelerate freezing.
- Remove it once the specimen is entirely frozen.

### 12.2 Thermal block

The thermal block (8) facilitates the removal of the frozen specimen from the specimen disc.



Keep the thermal block outside the cryochamber at room temperature. Only place in the cryochamber for specimen removal.

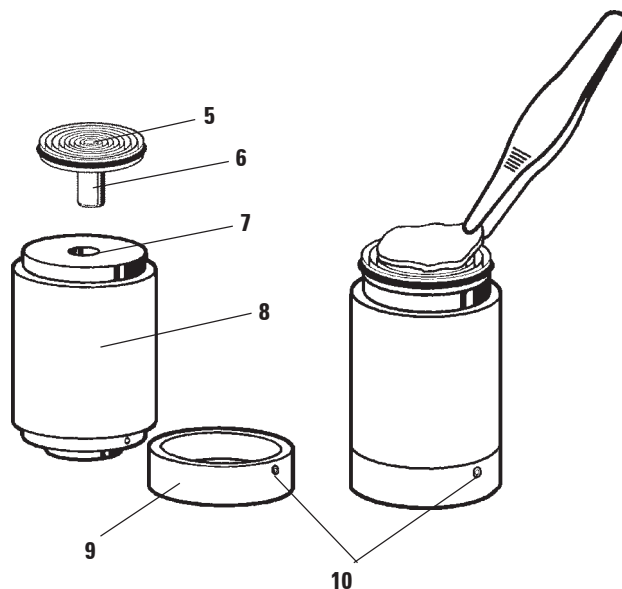


Fig. 32.2

- Place the cap (9) on the required side, so that the appropriate location hole for the specimen disc is visible.
- Insert the shaft (6) of the specimen disc (5) in the appropriate location hole (7) at the top or bottom of the thermal block.
- After about 20 seconds, the frozen specimen can be removed from the specimen disc with forceps.
- If the cap is too loose, readjust it with the small screw (10).  
Do not overtighten the screw.
- Once the specimen is removed, take the thermal block out of the cold cryochamber.



### 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.

### Technical service information

If you require technical service or replacement parts, please contact your Leica sales representative or dealer who sold the product.

Please provide the following information:

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

### Decommissioning and disposal

The instrument or parts of the instrument must be disposed of in compliance with the local laws.

**14. Decontamination Certificate** (master)

Dear Customer, any product that is to be returned to Leica Microsystems 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 Microsystems 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. This certificate, duly completed, must be placed in the instrument, attached to the outside of the shipping crate or handed directly to the service engineer. 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. NB: Microtome knives must be in boxes.

<b>Description</b>	
<b>Name/Model</b>	<b>Fabr. No.</b>
<b>KAT No.</b>	<b>Quantity</b>



**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**

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

<table border="0"> <tr> <td><b>Yes</b></td> <td><b>No</b></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<b>Yes</b>	<b>No</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Blood, body fluids, pathological samples</p> <p>Other biohazards</p> <p>Chemicals/substances hazardous to health</p> <p>Other hazards</p>	<p><b>Please provide further detail here:</b></p> <p>_____</p> <p>_____</p> <p>_____</p>
<b>Yes</b>	<b>No</b>											
<input type="checkbox"/>	<input type="checkbox"/>											
<input type="checkbox"/>	<input type="checkbox"/>											
<input type="checkbox"/>	<input type="checkbox"/>											
<input type="checkbox"/>	<input type="checkbox"/>											

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

<table border="0"> <tr> <td><b>Yes</b></td> <td><b>No</b></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<b>Yes</b>	<b>No</b>	<input type="checkbox"/>	<input type="checkbox"/>	<p>If yes, give details of the method:</p> <p>_____</p> <p>If no*, please indicate why not:</p> <p>_____</p>	<p><b>Please provide further detail here:</b></p> <p>_____</p> <p>_____</p>
<b>Yes</b>	<b>No</b>					
<input type="checkbox"/>	<input type="checkbox"/>					

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

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

<table border="0"> <tr> <td><b>Yes</b></td> <td><b>No</b></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<b>Yes</b>	<b>No</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Yes</b>	<b>No</b>			
<input type="checkbox"/>	<input type="checkbox"/>			

**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 question, please call your local Leica organisation.

**Leica Internal Use:** If applicable, note corresponding Job and RAN-/RGA-Number:  
 Job Sheet No.: \_\_\_\_\_  
 SU Return Goods Authorisation: \_\_\_\_\_      BU Return Authorisation Number: \_\_\_\_\_

<b>Signature/Date</b>	<b>Institute</b>	
_____	_____	
<b>Name</b>	<b>Department</b>	
_____	_____	
<b>Position</b>	<b>Address</b>	
_____	_____	
<b>eMail</b>	<b>Phone</b>	<b>Facsimile</b>
_____	_____	_____

**Leica**  
 BIOSYSTEMS

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**- Administrative Measures on the Control of Pollution  
Caused by Electronic Products -**

部件名称 Name of the part	有毒有害物质或元素 Hazardous substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr <sup>6+</sup> )	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 printed circuit boards	X	O	O	O	O	O
电子元器件 electronic components	X	O	O	O	O	O
机械部件 mechanical parts	X	O	O	X	O	O
光学元器件 optical components	X	O	X	O	O	O
电缆 cables	O	O	O	O	X	X
光源 light sources	O	X	O	O	O	O

- o : 表示该有毒有害物质在该部件中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。  
Indicates that the concentration of the hazardous substance in all materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.
- x : 表示该有毒有害物质至少在该部件的某一材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。  
Indicates that the concentration of the hazardous substance of at least one of all materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

**Note: The actual product may or may not include in all the part types listed above**

