

Leica CM3600 XP

Cryostat



Instructions for Use
English

Order No.: 14 0417 80101 - Revision J

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

CE

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



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Table of contents

1. Important Information	7
1.1 Symbols and their meaning	7
1.2 Instrument type	9
1.3 User group.....	10
1.4 Intended use.....	10
2. Characteristics of the Leica CM3600 XP	11
2.1 Layout of the Leica CM3600 XP	11
2.2 Technical data	12
2.3 Instrument parts	14
2.4 Function	15
3. Safety	16
3.1 Safety notes	16
3.2 Warnings	16
3.3 Safety features	18
3.3.1 Emergency stop switch	18
3.3.2 Knee lever	19
3.3.3 Window	20
3.3.4 Cabinet	20
4. Site requirements	21
4.1 Site requirements at place of installation	21
4.2 Electrical connections.....	22
4.3 Other connections.....	22
5. Installation	23
5.1 Unpacking and installation	23
5.2 Standard delivery	23
5.3 Port and switch panel	24
5.3.1 Port and switch functions.....	25
5.3.2 Fuses	26
5.4 PC.....	27
6. Software	28
6.1 Start and log-in procedure	28
6.2 Description of the window elements	29
6.3 Initialization.....	31
6.4 Main window	32
6.4.1 Chamber temperature	32
6.4.2 Time	33
6.4.3 Automatic defrost.....	33
6.4.4 Automatic dehydration.....	33
6.4.5 Knife movement.....	33
6.4.6 Extraction system	35
6.4.7 Section program	35
6.4.8 Sledge speed.....	36
6.4.9 Operation mode	36
6.4.10Cutting window.....	37

6.5	Parameter settings.....	37
6.5.1	Parameter settings.....	38
6.5.2	Password management.....	41
6.5.3	Configuration.....	43
6.5.4	Reference voltages	47
6.5.5	Language selection.....	47
6.5.6	Initialization.....	48
6.6	Temperature curves	48
6.6.1	Work space.....	49
6.6.2	Diagram	49
6.7	Chronological event list.....	50
6.7.1	Work space.....	51
6.7.2	Event list	52
6.8	Alarm list.....	52
6.8.1	Work space.....	53
6.8.2	Alarm list.....	54
6.8.3	Error messages: Meaning and troubleshooting	55
6.9	Chamber illumination	55
6.10	Section documentation	55
6.11	Photo mode.....	59
6.12	Screen printout	59
6.13	Help.....	59
6.14	Save.....	59
6.15	Printing labels	60
6.16	Foot switch.....	60
6.17	User log-in/log-out	60
6.18	Quitting the application	60
7.	Operating the Leica CM3600 XP.....	61
7.1	Check list	61
7.2	Switching the instrument on	61
7.3	Starting the software	61
7.4	Setting the chamber temperature.....	62
7.5	Specimen stages	62
7.5.1	Inserting the specimen stage, orientable, with ball-joint	63
7.6	Knife	65
7.6.2	Inserting the disposable blade holder with disposable blade	67
7.6.3	Adjusting the knife angle.....	69
7.9	Dehydrating the sections	71
7.10.2	Knife holder description	73
7.10.5	Sectioning thick blocks	75

Table of contents

- 8. Cleaning and Maintenance76**
 - 8.1 Cleaning.....76
 - 8.1.1 Removing the microtome.....76
- 10. Warranty and Service82**
- 11. Decommissioning and Disposal83**
- 12. Decontamination Confirmation84**

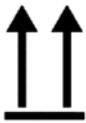
1. Important Information

1.1 Symbols and their meaning

Symbol: 	Title of the symbol: Description:	Warning Warnings appear in a white box, orange header and are marked by a warning triangle.
Symbol: 	Title of the symbol: Description:	Note Notes, i. e. important user information, appear in a white box, blue header and are marked by an information symbol.
Symbol: 	Title of the symbol: Description:	Warning, low temperature / freezing conditions Instrument parts close to this symbol are exposed to low temperatures / freezing conditions that pose a threat to health. Avoid direct contact or use appropriate protective clothing, e.g. frost protection gloves.
Symbol: → "Fig. 7-1"	Title of the symbol: Description:	Item number Item numbers for numbering illustrations. Numbers in red refer to item numbers in illustrations.
Symbol: Save	Title of the symbol: Description:	Function key Software symbols that have to be pressed on the input screen are displayed as bold, gray text.
Symbol: <u>Start</u>	Title of the symbol: Description:	Keys and switches on the instrument Keys and switches on the instrument that are supposed to be pressed by the user in various situations are displayed as bold, gray and underlined text.
Symbol:  	Title of the symbol: Description:	Attention Indicates the need for the user to consult the Instructions for Use for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself. Special meaning of this symbol located at the microtome sledge: (→ p. 18 – Microtome sledge)
Symbol:  	Title of the symbol: Description:	Warning, risk of electric shock Instrument surfaces or areas which become energized during operation are marked with this symbol. Therefore, direct contact is to be avoided.
Symbol: 	Title of the symbol: Description:	China ROHS Environmental protection symbol of the China RoHS directive. The number in the symbol indicates the "Environment-friendly Use Period" of the product. The symbol is used if a substance restricted in China is used in excess of the maximum permitted limit.

Symbol: 	Title of the symbol: Description:	WEEE Symbol Symbol for labeling electrical and electronic equipment in accordance with Section 7 of the German Electrical and Electronic Equipment Act (ElektroG). ElektroG is the law regarding the sale, return and environmentally sound disposal of electrical and electronic equipment.
Symbol: 	Title of the symbol: Description:	CE Label The CE marking is the manufacturer's declaration that the medical product meets the requirements of the applicable EC directives and regulations.
Symbol: 	Title of the symbol: Description:	UKCA Label The UKCA (UK Conformity Assessed) marking is a new UK product marking that is used for goods being placed on the market in Great Britain (England, Wales and Scotland). It covers most goods which previously required the CE marking.
Symbol: 	Title of the symbol: Description:	Country of Origin The Country of Origin box defines the country where the final character transformation of the product has been performed.
Symbol: 	Title of the symbol: Description:	Manufacturer Indicates the manufacturer of the medical product.
Symbol: 	Title of the symbol: Description:	Manufacturing date Indicates the date when the medical device was manufactured.
Symbol: 	Title of the symbol: Description:	Article number Indicates the manufacturer's catalog number so that the medical device can be identified.
Symbol: 	Title of the symbol: Description:	Serial number Indicates the manufacturer's serial number so that a specific medical device can be identified.
Symbol: 	Title of the symbol: Description:	Consult Instructions for Use Indicates the need for the user to consult the Instructions for Use.
Symbol: 	Title of the symbol: Description:	Fragile, handle with care The package contents are fragile and must be handled with care.

Symbol:



Title of the symbol:

This way up

Description:

Indicates correct upright position of the transport package.

Symbol:



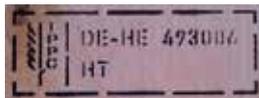
Title of the symbol:

Store dry

Description:

The package must be kept in a dry environment.

Symbol:



Example of labeling in accordance with IPPC

Title of the symbol:

IPPC symbol

Description:

The IPPC symbol includes

- IPPC symbol
- Country code in accordance with ISO 3166, e. g. DE for Germany
- Regional identifier, e. g. HE for Hesse
- Registration number, unique number beginning with 49.
- Treatment code, e. g. HT (heat treatment), MB (methyl bromide), and possibly DB (debarked)

Appearance:



Indication:

Tilt indicator

Description:

Tip-n-Tell indicator to monitor whether the shipment has been transported and stored in upright position according to your requirements. With a tilt of 60° or more, the blue quartz sand flows into the arrow-shaped display field and remains there permanently. Improper handling of the shipment is immediately detectable and can be proven definitively.



Note

When delivering the instrument, the recipient must check that the tilt indicator is intact. The responsible Leica representative must be notified in the case that one or all indicators have been triggered.

1.2 Instrument type

All information provided in these Instructions for Use applies only to the instrument type indicated on the title page. An nameplate with the serial number is attached on the center on the rear side of the cabinet.



Note

The exact data of the different instrument versions are specified in Chapter (→ p. 12 – 2.2 Technical data).

1.3 User group

Only trained laboratory personnel may operate the Leica CM3600 XP. The instrument is intended for professional use only.

Prior to operating the instrument, the operator must carefully read and understand these Instructions for Use and must familiarize him/herself with all technical details of the instrument.

1.4 Intended use

The Leica CM3600 XP is a PLC-controlled and motorized precision cryomacrotome for large surface sections, equipped with a convection-cooled chamber for deep-freezing, sectioning and freeze-drying large biological and industrial specimens.

The instrument is designed for the aforementioned applications only and must be operated according to the instructions in these Instructions for Use.

**Warning**

Any use of the instrument not described in these Instructions for Use is considered improper.

If you wish to use the instrument for special applications or modes of operation not listed in this manual, it is absolutely necessary that you contact your local Leica representation prior to doing so. Otherwise, you will lose the Leica warranty on your instrument.

Only trained personnel, skilled in the use of the above-mentioned applications, may operate the Leica CM3600 XP.

Prior to working with the instrument, each operator must thoroughly read and understand these Instructions for Use.

2. Characteristics of the Leica CM3600 XP

2.1 Layout of the Leica CM3600 XP

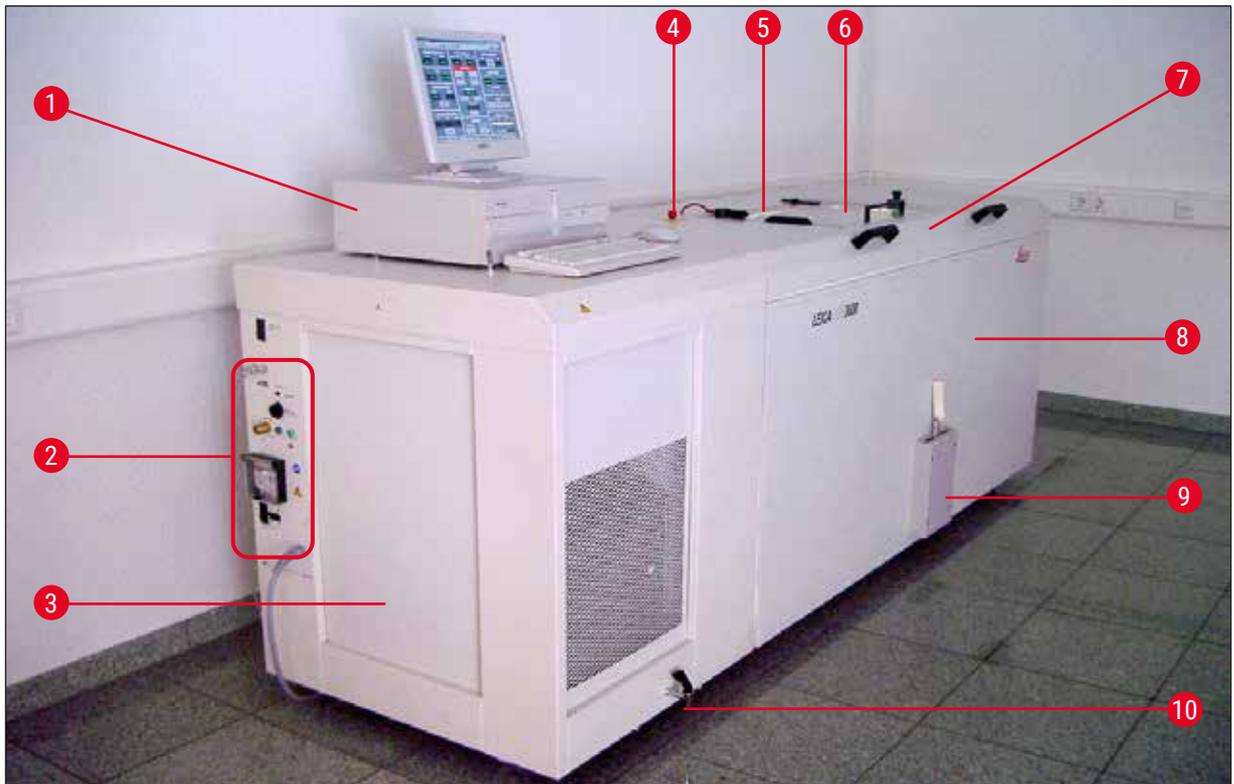


Fig. 1

- | | | |
|----|---|---|
| 1 | PC | Commercially available computer with monitor, keyboard and mouse. |
| 2 | Port and switch panel | The port and switch panel contains the main power switch and several sockets and ports. |
| 3 | Refrigeration and control unit | The refrigeration and control unit cools the cryochamber and controls the microtome and the entire electronics. |
| 4 | Emergency stop switch | Press the Emergency stop switch to stop the microtome immediately. |
| 5 | Window | The window is heated and can be opened completely. |
| 6 | Microtome (in the cabinet) | The microtome is used to section the specimens. |
| 7 | Chamber lid | The chamber lid can be opened completely for maintenance and cleaning work on microtome and/or cryochamber. |
| 8 | Cabinet | The cabinet contains the cryochamber which houses the microtome. |
| 9 | Knee lever | The knee lever is used for manual operation of the specimen sledge. |
| 10 | Drain valve for condensation water | Condensation water is drained through the drain valve. The drain valve should always be open to prevent the backup of condensation water. The tray at the drain valve must remain at the instrument at all times and must be emptied regularly. |

2.2 Technical data

Microtome type

450 C Sliding microtome

Sectioning thickness setting: 1 - 500 μm , in 1 μm increments

Sectioning range: 0 - 450 mm

Max. sectioning speed: 80 mm/s

Knife retraction after sectioning stroke: 50 - 250 μm

Total vertical stroke of knife: 100 mm

Total specimen feed: 450 mm

Specimen orientation via ball-and-socket joint: approx. 5° (x/y/z-axis)

Specimen orientation via large specimen stage
(450 x 150 mm): Rotation around longitudinal axis (x-axis)

Maximum specimen size (L x W x H): 450 x 150 x 200 mm

Knife holder for steel and tungsten carbide knife: 160 mm

Knife holder for disposable blade holder: 160 mm

Knife (160 mm) with facet angle of: 20°, 35°

Control unit

The Leica CM3600 XP is equipped with a commercially available computer with monitor, keyboard and mouse. For further information, please refer to the manual of the PC.

Operating system: Windows®

Software: CM3600 version 3.2.2

Dimensions and weights

Inner (cryochamber L x H x W): 1650 x 720 x 600 mm

Outer (L x H x W): 2800 x 1090 x 920 mm

Total dimensions with connecting lines:

- Outer length (overall): 2800 mm

- Outer length (cabinet only): 1940 mm

- Outer length (control unit): 860 mm

- Outer height (overall): 1090 mm

- Outer height (working height): 1050 mm

- Outer width: 920 mm

- Weight (total weight incl. microtome) 660 kg

- Weight (microtome only): 190 kg

Electrical connections

380 V / 50 Hz

- Nominal supply voltages: 380 V AC \pm 10 %

• Nominal frequency:	50 Hz
• Line voltage tolerance:	± 10 %
• Power draw:	2400 VA
• Automatic cutout:	3 x 8 A / 1 x 16 A
• Power safety switch	in accordance with DIN IEC 127-2
• Power plug (CEE, in accordance with IEC 60309)	Mennekes ProTOP 13A (fits to socket type 3473)

208 V / 60 Hz

• Nominal supply voltages:	208 V AC
• Nominal frequency:	60 Hz
• Line voltage tolerance:	± 10 %
• Power draw:	2400 VA
• Automatic cutout:	2 x 8 A / 1 x 10 A
• Power safety switch	UL-listed
• Power plug (CEE, in accordance with IEC 60309)	Mennekes ME 320P6W (fits to socket type ME320R6W)

200 V / 50 Hz

• Nominal supply voltages:	200 V AC
• Nominal frequency:	50 Hz
• Line voltage tolerance:	± 10 %
• Power draw:	2400 VA
• Automatic cutout:	2 x 8 A / 1 x 10 A
• Power safety switch	UL-listed
• Power plug (CEE, in accordance with IEC 60309)	Mennekes ProTOP 148A (fits to socket type 1632)

200 V / 60 Hz

• Nominal supply voltages:	200 V AC
• Nominal frequency:	60 Hz
• Line voltage tolerance:	± 10 %
• Power draw:	2400 VA
• Automatic cutout:	2 x 8 A / 1 x 10 A
• Power safety switch	UL-listed
• Power plug (CEE, in accordance with IEC 60309)	Mennekes ProTOP 148A (fits to socket type 1632)

220 V / 60 Hz

• Nominal supply voltages:	220 V AC
• Nominal frequency:	60 Hz
• Line voltage tolerance:	± 10 %
• Power draw:	2400 VA
• Automatic cutout:	2 x 8 A / 1 x 10 A
• Power safety switch	UL-listed
• Power plug (CEE, in accordance with IEC 60309)	Mennekes ProTOP 148A (fits to socket type 1632)

Refrigeration system – cryochamber

Selectable temperature range:	0 °C to -30 °C
At an ambient temperature of 22 °C, closed window and humidity ≤ 60 %:	-30 °C ±10 % (adjustable in 1 K increments)
Control accuracy:	+1 to -3 K
Electrical power consumption:	1160 W
Refrigerating output at -25 °C:	1370 W
Nominal pressure:	20 bar (maximum value)
Cutoff pressure:	25 bar (via Pressostat)
Safety factor:	2, as per UL 1262
Refrigerant:	1100 g, refrigerant R452A
Compressor oil:	1220 cm ³ Alpha 22, Kyodo
Defrosting:	Automatic hot gas defrost, programmable, 2 x automatic hot gas defrost/24 hours. Duration: 1 - 15 minutes, manual defrost.

General parameters

Protection class:	I
Pollution degree:	2
Overvoltage category:	II

Noise information

A-weighted noise level:	78.5 dB (A)
Distance between sound meter and instrument:	1 meter
Measuring uncertainty:	±1.5 dB (A)
Instrument setting for measurement:	Normal instrument operation with extraction

**Warning**

The user must wear hearing protection when using the extraction.

2.3 Instrument parts

The Leica CM3600 XP consists of a sliding microtome in a large-volume cryochamber. The instrument is designed for cryosectioning large specimens or for processing specimens with the so-called cryo-planing technique.

The large-scale heavy-duty microtome of the instrument is made for sectioning large biomedical and industrial specimens such as whole animals or large tissue specimens by applying the sectioning techniques for large-surface sections. The sturdy construction of the instrument also permits sectioning very hard specimens such as undecalcified bones.

The microtome is housed in a convection-cooled large-volume cryochamber. The large chamber in connection with the special cooling system enables dehydration of sections within a very short time.

The low temperatures are achieved and maintained by cold air circulating inside the cryochamber. A fan controls the air circulation speed.

The large specimens are frozen onto metal specimen stages which are subsequently clamped in the specimen sledge.

Optionally the instrument can be operated with an extraction system which largely prevents the cryochamber being soiled with section waste.

2.4 Function

The motor-driven specimen sledge moves horizontally underneath the knife, either producing a section (cryosectioning) with each stroke or a high-quality specimen surface (cryo-planing technique).

Prior to each sectioning stroke, a stepper motor feeds the microtome knife downwards towards the specimen by a selected amount of microns (section thickness).

During each return stroke of the specimen sledge, the stepper motor automatically carries out a knife retraction movement, programmable between 50 and 250 μm . This protects both the knife blade and the specimen surface from being damaged.

Before starting the next sectioning stroke, the motor lowers the knife towards the specimen surface by the selected sectioning feed plus the set value for knife retraction.

Trimming is programmable; the desired section thickness can be preselected. The number of sections to be performed during trimming can be programmed via the section counter. When the programmed number of sections has been carried out, the microtome will stop automatically.

Once the desired specimen block height has been reached, those sections that will actually be used for further examination are collected manually via the knee lever.

The Leica CM3600 XP is operated via PC and/or manually via the knee lever. All data entries are made via the PC.

The Leica CM3600 XP features two automatic defrost cycles.

Defrost cycle duration is software-controlled. If the evaporator surface is already completely deiced before the programmed defrost time is up, the defrost cycle will be aborted. In addition, manual defrost cycles can be set as needed.

3. Safety



Warning

The safety and caution notes in this chapter must be observed at all times. Be sure to read these notes even if you are already familiar with the operation and use of other Leica products.

3.1 Safety notes

These Instructions for Use include important instructions and information related to the operating safety and maintenance of the instrument.

The Instructions for Use are an important part of the product, and must be read carefully prior to startup and use and must always be kept near the instrument.



Note

These Instructions for Use must be appropriately supplemented as required by the existing regulations on accident prevention and environmental safety in the operator's country.

This instrument has been built and tested in accordance with the safety requirements for electrical equipment for measurement, control and laboratory use.

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



Note

The instrument's EC Declaration of Conformity and UKCA Declaration of Conformity can be found on the Internet at:
<http://www.LeicaBiosystems.com>



Warning

The protective devices located on the instrument and the accessories must not be removed or modified. Only qualified service personnel authorized by Leica may repair the instrument and access its internal components.

3.2 Warnings

The safety devices installed in this instrument by the manufacturer only constitute the basis for accident prevention. Operating the instrument safely is, above all, the responsibility of the owner, as well as the designated personnel who operate, service or repair the instrument.

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

**Warning**

- The protective devices on the instrument must neither be removed nor modified.
- The instrument has to be connected to an appropriate and grounded socket, (→ p. 12 – 2.2 [Technical data](#)).
- Do not interfere with the grounding function by using an extension cord without a ground wire.
- Use extreme caution when handling microtome knives and disposable blades.
- Handle knives and blades as per manufacturer's directions.
- Never operate the instrument in rooms with an explosion hazard.
- During instrument setup/installation do not switch the instrument on before being prompted to do so by these Instructions for Use.
- While working through these Instructions for Use, do not insert either the knife or the specimen block.
- The lid of the instrument must always be opened by two persons. No one must work on the instrument until it has been ensured that the lid has latched into place.

Below you find a summary of all warnings contained in these Instructions for Use.

**Warning**

- Any use of the instrument not described in these Instructions for Use is considered improper.
- Always swing the knee lever upwards before leaving the instrument.
- The chamber lid must be lifted by 2 persons when opened. When opening the chamber lid, the lid retainer must engage. Only when the lid is lifted can the user work in the instrument.
- Prior to any work involving the knife, microtome or inside the cryochamber, activate the **Emergency stop** switch, see (→ p. 18 – 3.3.1 [Emergency stop switch](#)).
- The chamber lid must be closed at all times when the instrument is operated, as otherwise the emergency stop switch is not accessible.
- The user must be able to reach the specimen easily while working on the microtome. During all work, wear close-fitting clothing and use safety glasses.
- Caution when using the foldaway extraction! Before you manipulate the specimen or the knife, the extraction must always be folded all the way to the side. Otherwise, it could fold back and press your hand against the knife.
- Prior to any work involving the knife, microtome or inside the cryochamber, swing the knee lever upwards.
- For any work involving the knife, microtome or inside the cabinet always wear special safety gloves.
- For reasons of safety and accuracy, the maximum trimming thickness should not exceed 100 µm per section.
- When trimming biological material (particularly bone), the section thickness should not exceed 50 µm.
- Never try to catch or grab the knife.
- Never put your hands into the space between specimen and knife.
- Caution when adjusting the knife holder from 100 to 200 mm – a crushing hazard exists.
- Radioactive specimen waste must be disposed of according to the local radiation safety regulations.
- For removing the microtome (weight is approx. 190 kg) from the cryochamber, a ceiling crane capable of carrying that weight should be available.
- For safety reasons, we strongly advise against lifting the microtome (approx. 190 kg) from the cryochamber without appropriate lifting gear. Do not attempt to lift the microtome from the cryochamber manually, even if several persons are there to help.

Microtome sledge



Warning

Unintentional touching of the knife or unintentional movement of the microtome sledge

Severe cutting injuries and / or severe crushing injuries

- Move the microtome sledge to the position which is most appropriate for your purpose and that ensures the best safety.
- Prior to any work involving the knife or the microtome, or inside the cryochamber, activate the **Emergency stop** switch, see (→ p. 18 – 3.3.1 Emergency stop switch).
- For any work involving the knife or the microtome, or inside the cryochamber, wear the safety gloves provided, see (→ p. 23 – 5.2 Standard delivery).
- Prior to any work involving the knife or the microtome, or in the cryochamber, swing the knee lever upwards, see (→ p. 19 – 3.3.2 Knee lever).

3.3 Safety features

3.3.1 Emergency stop switch

The Leica CM3600 XP is equipped with an **Emergency stop** switch (→ Fig. 2-1) located on the cabinet to the left of the window.

To activate the **Emergency stop** switch:

Press the **Emergency stop** switch (→ Fig. 2-1) to stop the microtome immediately.



Warning

Always press the **Emergency stop** switch before making modifications to the microtome, knife or specimen (see warning message below the window (→ Fig. 2-2)) to prevent accidental activation of the microtome using the knee lever.

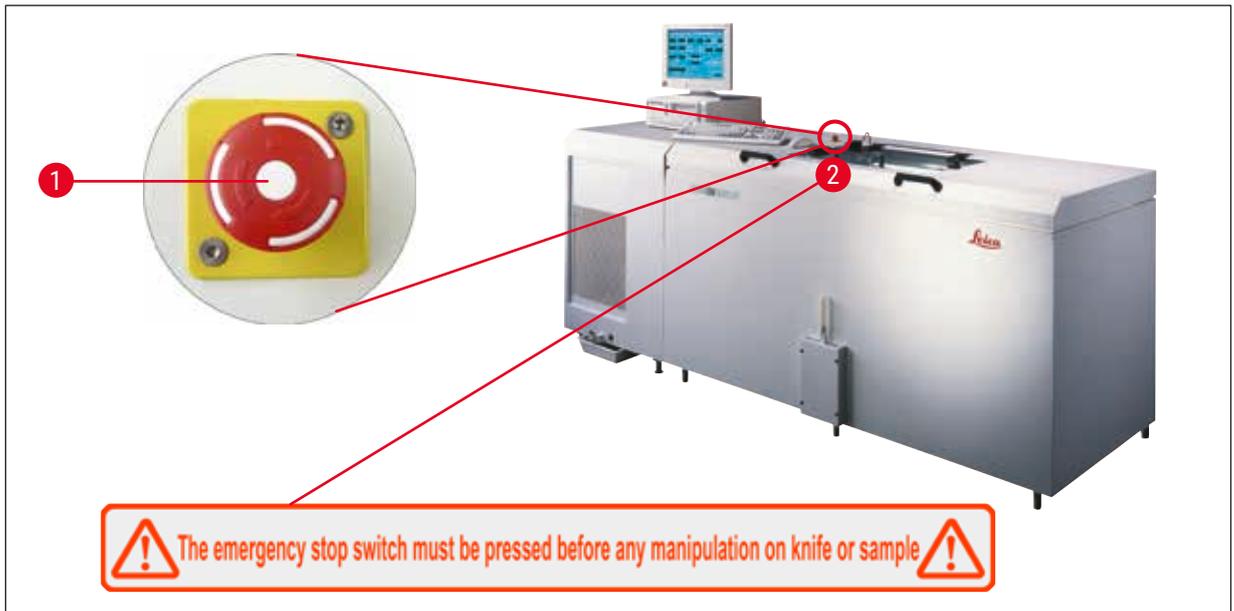


Fig. 2

Resetting the emergency stop switch

- To reset the **Emergency stop** switch (→ Fig. 2-1) turn it in the direction of the arrow until it is released upwards back to its original position.
- The reset then has to be confirmed in the alarm list, see (→ p. 52 – 6.8 Alarm list) and (→ p. 53 – 6.8.1 Work space).
- Afterwards, the sectioning program has to be reselected, see (→ p. 35 – 6.4.7 Section program).

3.3.2 Knee lever



Fig. 3

Never leave the Leica CM3600 XP unattended when the knee lever (→ Fig. 3-1) is folded out to prevent the microtome from being set in motion accidentally.



Warning

Always swing the knee lever upwards before leaving the instrument.

3.3.3 Window

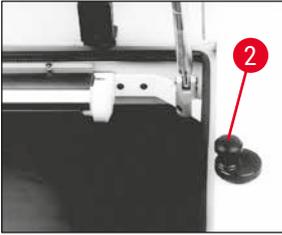


Fig. 4

The window is heatable and equipped with a locking knob (→ Fig. 4-2). To open the window, lift locking knob (→ Fig. 4-2) slightly upwards and turn it by 180°.



Warning

You must make sure that the window has been locked before the chamber lid is opened.

3.3.4 Cabinet



Fig. 5

Before opening the chamber lid, you must first close the window and lock it with the locking knob (→ Fig. 4-2).

When opening the chamber lid, make sure the lid retainer (→ Fig. 5-3) engages to prevent the chamber lid from falling.



Warning

When opening the chamber lid, the lid retainer must engage.

4. Site requirements

4.1 Site requirements at place of installation



Warning

- Relative humidity not over 60 % and non-condensing.
- Room temperature consistently between +5 °C and +22 °C.
- The room volume must be at least 30 m³.
- The surface under the instrument must have sufficient load capacity and rigidity for the weight of the instrument, 660 kg.
- The cryochamber section should not be directly under the outlet of an air-conditioning system to prevent condensation on the heated window.
- Do not operate the instrument in rooms with an explosion hazard.

- The instrument is designed for indoor use only.
- The type of the supplied power plug depends on your instrument model (→ p. 12 – 2.2 Technical data). The instrument has to be connected to an appropriate and grounded socket.
- Only use the cable provided; never use an extension cable.
- The power plug and **Emergency stop** switch must be easily accessible.
- Avoid vibrations, direct sunlight and extreme variations in temperature.
- Installation elevation up to 2,000 m above sea level.

If possible at all, the room should be air-conditioned. If ambient conditions are not maintained as specified, instrument performance may be negatively affected (lowest specified temperature may not be reached, frost may accumulate).

All transport paths for the Leica CM3600 XP must be at least 1.50 m wide; especially doorways must have that width. 95 cm is a sufficient width for the instrument to pass through a doorway at an angle (if the instrument can pass straight through the doorway, a width of 95 cm will be sufficient). The Leica CM3600 XP has a total length (refrigeration and control unit plus cabinet) of 2.70 m or 2.80 m including the connecting lines on the left side of the refrigeration and control unit, i. e. a minimum installation wall width of 2.90 m is required to install the instrument. Ideally the wall should measure 3.50 m or more to provide sufficient access to the left side of the instrument for technical service work. The required minimum distance between the back panel of the instrument and the wall is 30 cm, the recommended distance is 50 cm.

Room requirements

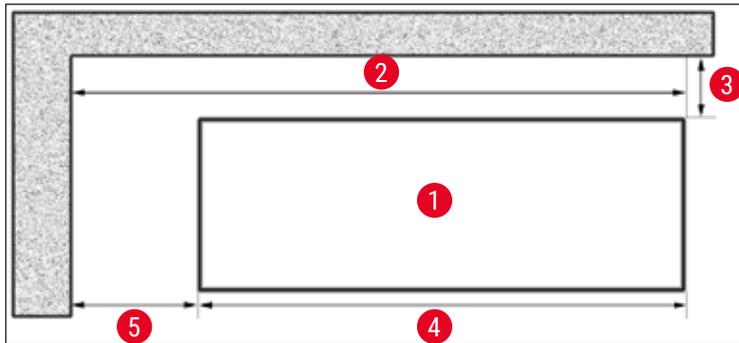


Fig. 6

Installation wall, ideal dimensions
(view from above)

- 1 LEICA CM3600 XP
- 2 approx. 3.5 m
- 3 0.5 m
- 4 approx. 2.7 m
- 5 approx. 0.8 m



Note

Room temperatures and humidity levels in excess of the recommendations above will affect the cryostat's cooling capacity and the lowest stated temperatures will not be reached.

4.2 Electrical connections

Country	Europe	USA	Japan
Installation cord cross section:	2.5 mm ²	2.5 mm ²	2.5 mm ²
Fuse protection/connection:	16 A / 380 V	25 A / 208 V	25 A / 200 V
Power cable length is 3 m			

A second protective conductor terminal is located on the instrument.

Both terminals must be used.

There must not be any differences in potential between the two protective conductor terminals.

4.3 Other connections

Compressed air supply

If you want to use the optional extraction system:

Compressed air supply for the extraction system ($p = 5 - 8$ bar) must be available.

5. Installation

5.1 Unpacking and installation

Only duly trained personnel may unpack and install the Leica CM3600 XP. Please contact your local Leica sales organization for appropriate advice.



Caution

Instrument insufficiently leveled

Damage to the instrument and insufficient functioning

- Do not apply any changes to the machine feet at the bottom of the instrument that are used for leveling. Only Leica Service representatives are authorized to install the instrument which includes leveling.

5.2 Standard delivery

Qty.	Designation	Order No.
1	Leica CM3600 XP basic instrument	14 0417 33766
1	Sliding microtome 450C with integrated knife holder and specimen sledge	14 0417 33905
1	Computer with operating system and CM3600 XP software, keyboard, mouse, network cable and dongle	14 0417 43799
1	Flat screen	14 0417 33846
1	Mouse pad	14 0417 29029
1	Disposable blade holder 157 AR	14 0417 26152
1	Dispenser with 10 disposable blades, type H45 L	14 0216 26153
1	Sectioning tool, 150 mm	14 0417 19039
1	Positioning tool for knife	14 0417 19141
1	Levelling device for specimen adjustment	14 0387 18191
1	Positioning tool for use with disposable blade holder	14 0417 28760
1	Connector, male (external alarm)	14 0417 30126
1	Section collecting tape, 148 mm x 50 m	14 0417 39652
1	Hose band clip	14 0313 24281
1	Push-in socket	14 0417 19320
4	Foot leveling element	14 0417 37227
6	Foot leveling element control unit	14 0417 37228
1	Petri dish	14 0417 28911
1	Footswitch D-sub	14 0417 33847
1	Tool set, consisting of:	14 0022 50344
1	Hexagon key, size 1.5	14 0222 10050
1	Hexagon key, size 6.0	14 0222 04141
1	Hexagon key with handle, size 2.0	14 0194 04790
1	Hexagon key with handle, size 2.5	14 0194 13195
1	Hexagon key with handle, size 3.0	14 0194 04764

5 Installation

Qty.	Designation	Order No.
1	Hexagon key with handle, size 4.0	14 0194 04782
1	Hexagon key with handle, size 5.0	14 0194 04760
1	Hexagon key with handle, size 6.0	14 0194 03959
1	Double open-ended wrench, size 14/15	14 0329 38799
1	Double open-ended wrench, size 16/17	14 0329 38800
1	Pair of safety gloves, size S	14 0340 40859
1	Pair of safety gloves, size M	14 0340 29011
1	"Leica" brush with magnet	14 0183 40426
1	Bottle, 500 ml, Isoflex PDP 38 cooling oil for Leica CM3600 XP	14 0336 06101
1	International bundle Instructions for Use (incl. English printout and additional languages on a data storage device 14 0417 80200)	14 0417 80001



Note

Check the delivery carefully against the packing list, delivery note and your order. Should there be any deviations, please contact the Leica sales office handling your order or your Leica dealer.

5.3 Port and switch panel

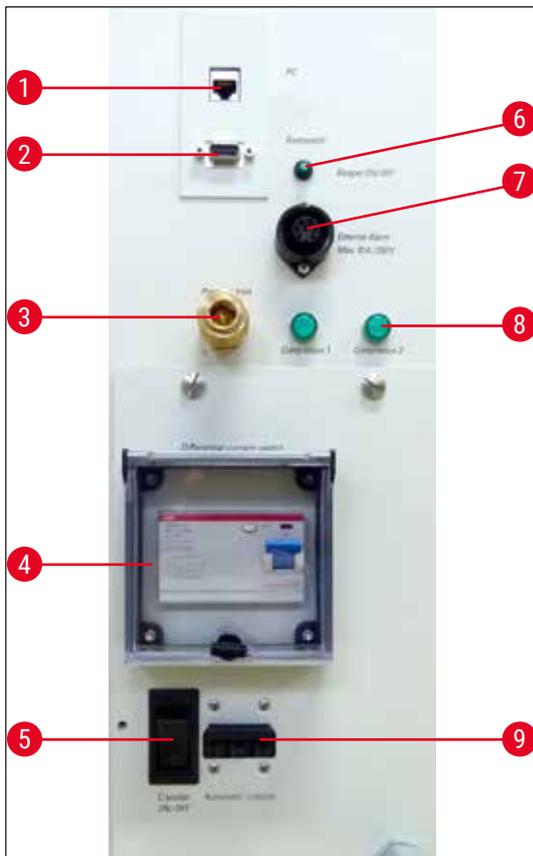


Fig. 7

- 1 Connection for computer (Ethernet)
- 2 Connection for footswitch
- 3 Compressed air supply
- 4 GFCI switch
- 5 **Main power switch**
- 6 Switch for local alarm signal
- 7 Connection for external alarm
- 8 Control lamps
- 9 Automatic cutout

**Warning**

Notice! Only the Main power switch (→ Fig. 7-5) disconnects the instrument from the power supply! To do so, move the switch into the 0 position.

5.3.1 Port and switch functions

Connection for computer (→ Fig. 7-1)

The Ethernet interface is the connection of the computer to the PLC (electronic control unit).

Connection for footswitch (→ Fig. 7-2)

Optionally, a foot switch can be connected for the purpose of section thickness documentation (GLP).

Connection for compressed air (→ Fig. 7-3)

Connection of compressed air hose to extraction unit.

GFCI switch (→ Fig. 7-4)

Protects the entire instrument.

Main power switch (→ Fig. 7-5)

Switch in the 0 position disconnects the instrument from the power supply.

Switch for local alarm signal (→ Fig. 7-6)

- To activate the local alarm function, press the alarm signal switch.
- The green LED in the switch button lights up.
- To deactivate the local alarm function, press the alarm signal switch once again.
- The green LED in the switch button is extinguished.

Connection for external alarm (→ Fig. 7-7)

Forwarding an external alarm.

5 Installation



Note

- The external alarm is triggered when the cryochamber temperature falls below the selected value.
- When the temperature dips back down below the defined threshold, the external alarm is immediately switched off.
- Loss of mains power supply (instrument switched off or power failure) will also trigger the external alarm.
- On return of mains supply the alarm is automatically switched off.
- The instrument has a socket via which an external alarm can be output (→ Fig. 7-7) and circuit diagram). The maximum permitted voltage that can be switched is 250 V.
- Because a compatible plug is provided with the instrument, the user must make a corresponding connection onsite.



Warning

Important! The connection of an alarm to the plug provided must be carried out by trained personnel if the voltages are greater than 33 V AC or 70 V DC.

Wiring the connection for external alarm in the instrument

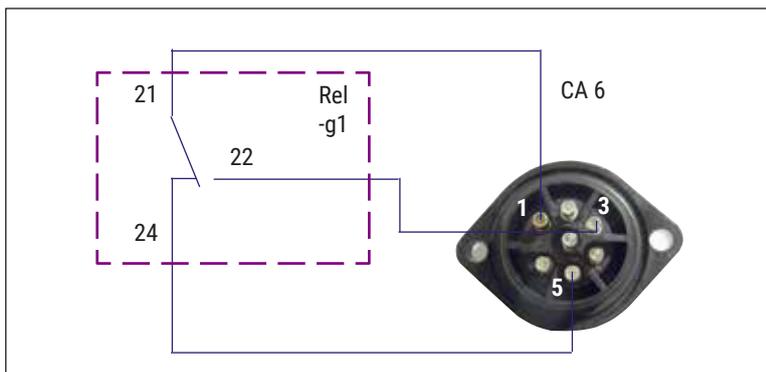


Fig. 8

The wiring diagram shown here illustrates how the socket for the external alarm is wired in the instrument.

The specified digits correspond to those on the plug provided.

Indicator LEDs (→ Fig. 7-8)

Indicate function of the refrigerating sets.

Automatic cutout (→ Fig. 7-9)

Protects the refrigerating sets and all electronic components.

5.3.2 Fuses

The Leica CM3600 XP is equipped with the following fuses:

- GFCI switch
- Automatic cutout
- Fuse protecting the **main power switch**

GFCI switch (→ Fig. 7-4) and (→ Fig. 9-4)

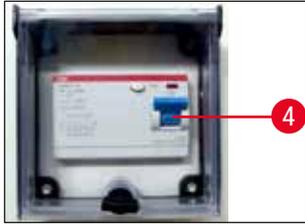


Fig. 9

If the GFCI switch (→ Fig. 9-4) is triggered, it will be in the lower position.

- To switch it back on, flip the GFCI switch upwards.



Note

To check the function, trigger the GFCI switch once a month.

Automatic cutout (→ Fig. 7-9) and (→ Fig. 10-9)



Fig. 10

If the automatic cutout (→ Fig. 10-9) is triggered, the switch will be in the lower position.

- Flip it upwards to switch it back on.

Fuse protecting the main power switch (→ Fig. 11-10)



Fig. 11

After the automatic cutout has been activated, it will be in the lower position.

- Flip it upwards to switch it back on.

5.4 PC

The Leica CM3600 XP is equipped with a commercially available computer with monitor, keyboard and mouse. For further information, please refer to the manual of the PC.



Note

If a computer is to be provided by the user, please request the required PC configuration in advance from your responsible Leica sales company.

6. Software

6.1 Start and log-in procedure



Prerequisite:

PC must be switched on and the Microsoft Windows® operating system must have booted and be ready for service.

- Double-clicking the **CM3600** icon starts the application.

Login screen:



- Type the user name (→ Fig. 12-1) in the identification field.
- Type the correct password (→ Fig. 12-2) in the password field.
- Click the **Ok** button (→ Fig. 12-3) to complete the login.

Fig. 12

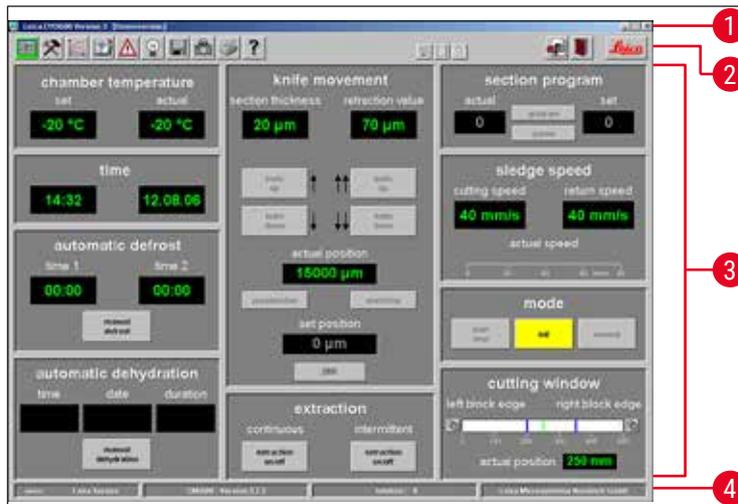
After successfully logging in, the **Main** window will open (for additional information, refer to Chapter (→ p. 32 – 6.4 Main window)).



Note

After 5 failed registration attempts, access to the unit will be locked. Only an administrator can remove the lock, see (→ p. 41 – 6.5.2 Password management).

6.2 Description of the window elements



- 1 Title bar
- 2 Toolbar
- 3 Working area
- 4 Status bar

Fig. 13

The window interface is divided into several areas:

Title bar

The **Title bar** (→ Fig. 13-1) displays information on the instrument name and software version number.

Toolbar

The **Toolbar** (→ Fig. 13-2) provides quick access to individual software functions at the click of a mouse by clicking on an icon.

When clicking on an icon, the corresponding window will open up. The selected icon lights up green while active.

Toolbar icons



Clicking on the icon opens the **Main** window, which also opens up the start window after completion of the start and log-in procedure.



Clicking on the icon opens the **Parameter setting** window.



Clicking on the icon opens the **Temperature curves** window.



Clicking on the icon opens the **Chronological event list** window.



Clicking on the icon opens the **Alarm list** window.

Toolbar icons



Clicking on the icon switches the cryochamber illumination on or off. The icon will light up yellow when it is active.



Clicking on the icon opens the **Section documentation** window.



Clicking on the icon activates the **Photo mode**.



Clicking on the icon creates a printout of the current screen.



Clicking on the icon opens the **Help** window.



Clicking on the icon opens the **Save** window, see (→ p. 59 – 6.14 Save). When activated, the icon will light up in green.



Clicking on the icon opens the **Print label** window. When activated, the icon will light up in green.



Clicking on the icon opens the **Foot switch** window, see (→ p. 60 – 6.16 Foot switch). When activated, the icon will light up in green and the current sectioning data will be saved.



The **Stop** icon appears as soon as the **Emergency stop** switch has been pressed. The icon flashes red. The instrument will not be operational until the operator has acknowledged the corresponding error message in the **Alarm list** window, see (→ p. 52 – 6.8 Alarm list).



Clicking on the **Log off** icon logs off the user currently logged on. Clicking again reopens the registration window for Log-in.



Clicking on the **Quit** icon closes the application.



Clicking on the icon opens a window providing information on software version number, date, copyright and serial number of the application.

Working area

In the **Working area** (→ Fig. 13-3) all information and settings for operating the instrument are entered. Display format may vary depending on the icon selected in the toolbar.

Status bar

The **Status bar** (→ Fig. 13-4) displays the following information:

- The currently registered user
- Instrument name and software version number
- Number of sections carried out so far
- Name of laboratory

6.3 Initialization



Note

To be able to work with the instrument, after completion of the start and log-in procedure the microtome must be initialized.

For initialization, proceed as follows:

- In the **Main** window (→ Fig. 16-9), click on the yellow flashing **Init** button (→ Fig. 14-1) in **Mode**.

The **Safety check – initialisation** window will open.

- If you can answer Yes to a confirmation prompt (→ Fig. 15-2) and have carried out the required actions, check the checkbox next to it.
- After successfully answering all queries, click the **Ok** button (→ Fig. 15-3).

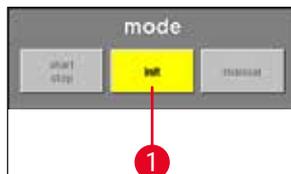


Fig. 14

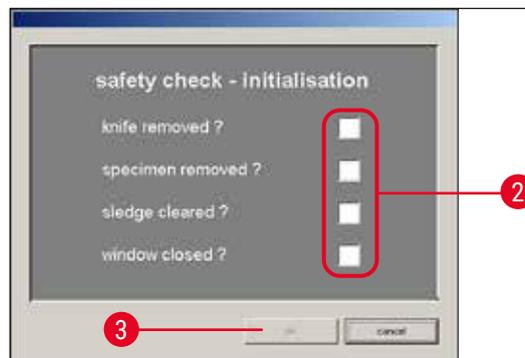


Fig. 15

The microtome will then be initialized:

- The knife holder moves to the uppermost position.
- The microtome sledge moves to the end positions on the right and left.

After the initialization procedure has been completed, the color of the **Init** button will first change from yellow to green and after a few seconds, the caption on the button will change from **Init** to **Automatic**.

The microtome is now ready to operate, see (→ p. 36 – 6.4.9 Operation mode).



Note

Once initialization process has been started, it can only be interrupted by pressing the **Emergency stop** switch, see (→ p. 18 – 3.3.1 Emergency stop switch).

6.4 Main window



The main window either opens up automatically after completing the start and log-in procedure or by clicking on the **Main window** icon.

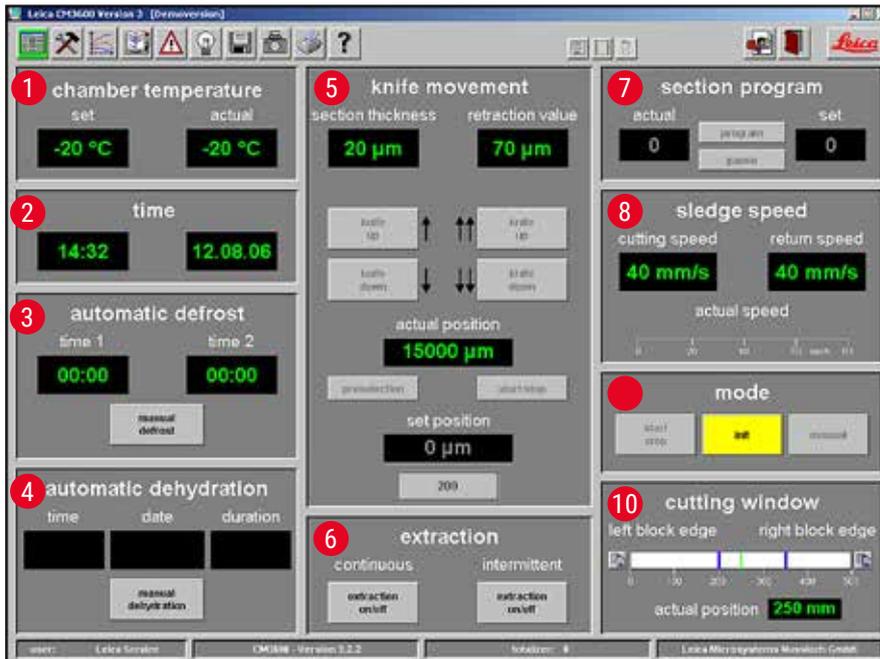


Fig. 16

- | | |
|-------------------------|-------------------|
| 1 Chamber temperature | 6 Extraction |
| 2 Time | 7 Section program |
| 3 Automatic defrost | 8 Sledge speed |
| 4 Automatic dehydration | 9 Mode |
| 5 Knife movement | 10 Cutting window |

6.4.1 Chamber temperature



Fig. 17

Displays actual or set chamber temperature.

- See (→ p. 38 – 6.5.1 Parameter settings) on how to configure these settings.

6.4.2 Time



Fig. 18

Displays real time and date.

- See (→ p. 38 – 6.5.1 Parameter settings) on how to configure these settings.

6.4.3 Automatic defrost



Fig. 19

Displays start time of 1st or 2nd automatic defrost cycle.

- See (→ p. 38 – 6.5.1 Parameter settings) on how to configure these settings.

Manual defrost button

- Clicking on this button (→ Fig. 19-11) immediately starts a defrost cycle.
- During the defrost cycle, the button blinks yellow.
- Clicking on the button once more aborts the defrost cycle.

6.4.4 Automatic dehydration



Fig. 20

Displays start time, start date and duration of the automatic dehydration.

- See (→ p. 38 – 6.5.1 Parameter settings) on how to configure these settings.

Manual dehydration button

- Clicking on this button (→ Fig. 20-12) starts the dehydration process.
- Clicking on this button once more, stops dehydration.
- When activated, the button blinks yellow.
- If a reduction in temperature is to be carried out during automatic dehydration, the required settings have to be made in the **Parameter setting** window, see (→ p. 38 – 6.5.1 Parameter settings).

6.4.5 Knife movement

Displays section and retraction thickness. The **Actual position** (→ Fig. 21-13) displays the current position of the knife holder. The **Set position** (→ Fig. 21-14) displays the set position of the knife holder.

- The red **Retraction** display (→ Fig. 21-15) only appears during the return stroke of the sledge.
- To modify any of the settings, click on the corresponding icon. Entries are completed by pressing the **Enter** button.



Note

- The knife movement buttons can only be used when the **Manual** operating mode has been set, see (→ p. 36 – 6.4.9 Operation mode).
- The entry limit for the actual and target position can either be a maximum of 100,000 or 200,000 µm, depending on the knife holder position.

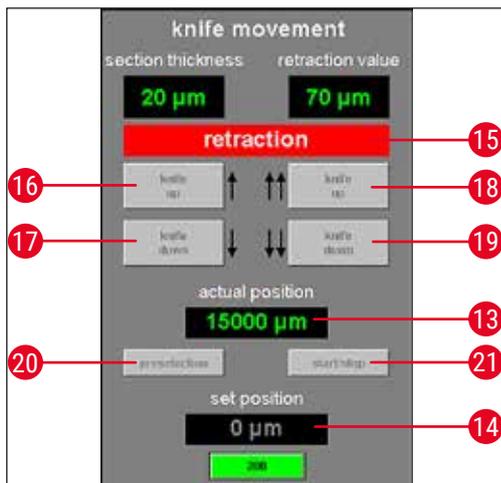


Fig. 21

- 16 Knife up**

 - Clicking on this button briefly moves the knife holder upwards.
 - If you click on and hold this icon, the knife holder will continue to move upward until the left mouse button is released.
 - While active, the icon blinks yellow.
- 17 Knife down**

 - Clicking on this button briefly moves the knife holder downwards.
 - If you click on and hold this icon, the knife holder will continue to move downward until the left mouse button is released.
 - While active, the button lights up in yellow.
- 18 Knife up**

 - Clicking on the **Knife up** button on the right activates the corresponding function.
 - The knife holder will move upwards until reaching the upper limit position.
 - To stop the knife movement, click on the button once more.
 - When activated, the button will light up in green.
- 19 Knife down**

 - Clicking on this button moves the knife holder fast downwards for a short while.
 - If you click on and hold this button, the knife holder will continue to move downward until the left mouse button is released.
 - While active, the button lights up in yellow.
- 20 Preselection**

 - Clicking on this button activates the target position display.
 - Click on the displayed value to change the setting.
 - While active, the icon lights up in green color.
- 21 Start/Stop**

 - The **Start/Stop** button can be activated only when the **Preselection** button is active.
 - Clicking on **Start/Stop** moves the knife holder so the selected set position.
 - When activated, this button will light up in green.
 - Clicking on this button once more stops the knife holder.

**Note**

- Once the knife holder has reached the upper limit position, both **Knife up** buttons blink in green color.
- Once the knife holder has reached the lower limit position, both **Knife down** buttons blink in yellow color.
- Once the target position has been reached, it can only be left by activating the knee lever, see (→ p. 19 – 3.3.2 Knee lever). A corresponding message will appear on the screen.

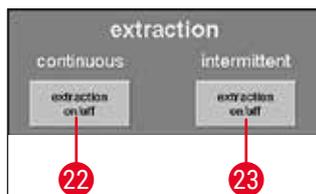
6.4.6 Extraction system

Fig. 22

Extraction on/off button in continuous mode

- Clicking on this button (→Fig. 22-22) activates or deactivates continuous extraction. When activated, the button will light up in green.

Extraction on/off button in intermittent mode

- Clicking on this button (→Fig. 22-23) activates or deactivates intermittent extraction. When activated, the button will light up in green.

**Note**

The extraction function can only be activated if an extraction unit is connected to the instrument.

6.4.7 Section program

Displays set or actual number of sections.

- To modify any of the settings, mouse-click on the corresponding button.
- Entries are completed by pressing the **Enter** button.

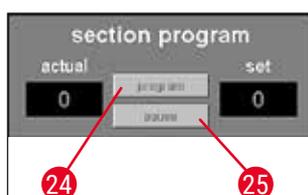


Fig. 23

Program button

- Clicking on this button (→Fig. 23-24) activates the set value display.
- Click on the activated set value field to modify the setting.

Pause button

- Clicking on this button (→ Fig. 23-25) stops the section program.
- Clicking on the button once more restarts the section program, resuming the current section where it was left off.

**Note**

The buttons can be activated only in **Automatic** mode. Clicking on the **Start/Stop** button located in the **Mode** field starts or stops the section program, see (→ p. 36 – 6.4.9 Operation mode).

6.4.8 Sledge speed

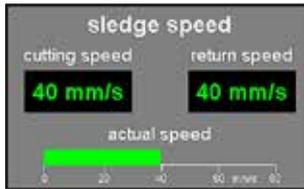


Fig. 24

Displays current sectioning or return stroke speed in mm/s (millimeters per second).

- To modify any of the settings, click on the corresponding value.



Note

The graphic display is active only while sectioning is in progress. The currently selected sectioning and return stroke speed are displayed via a green bar on a scale of 0 - 80 mm/s.

6.4.9 Operation mode

Displays current sectioning or return stroke speed in mm/s (millimeters per second).

- To modify any of the settings, click on the corresponding value.



Note

An initialization of the microtome must first be carried out after startup to be able to work with the instrument after it is switched on, see (→ p. 31 – 6.3 Initialization).

Displays current sectioning or return stroke speed in mm/s (millimeters per second).

- To modify any of the settings, click on the corresponding value.

Buttons prior to initialization Buttons after initialization

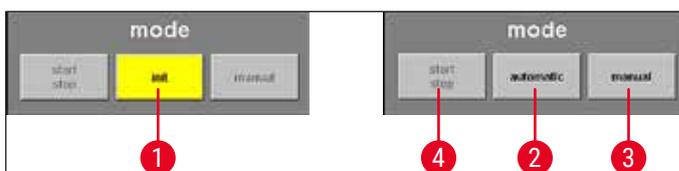


Fig. 25

- 1 Init**
 - Clicking on this button opens the **Safety check – initialisation** window, see (→ p. 31 – 6.3 Initialization).
 - Prior to initialization, the button blinks yellow.
 - After the initialization procedure has been completed, the color of the **Init** button will change from yellow to green.
 - After a few seconds, the caption on the button will change from **Init** to **Automatic**.
- 2 Automatic**
 - Clicking on this button switches the instrument to automatic mode.
 - When activated, the button will light up in green.

- 3 Manual**
 - Clicking on this button switches the instrument to manual mode.
 - When activated, the button will light up in green.
- 4 Start/Stop**
 - This button can only be activated in automatic mode, where it starts or stops the section program.
 - When activated the **Start/Stop** and **Automatic** buttons will light up in green.

6.4.10 Cutting window

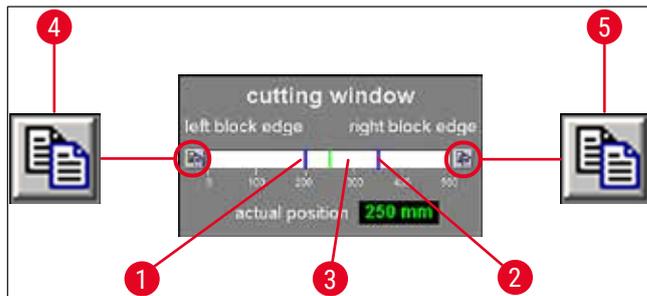


Fig. 26

Displays the left (→ Fig. 26-1) and right (→ Fig. 26-2) block edges graphically represented by blue lines. They indicate the maximum horizontal stroke of the microtome sledge on a scale of 0 - 500 mm.

Displays the current position of the microtome sledge (→ Fig. 26-3). The sledge position is graphically displayed by the green line. Clicking on the **Actual position** display changes the setting.

The icons on the left and right side of the scale (→ Fig. 26-4) and (→ Fig. 26-5) are used for adjusting the left and/or right block half to the value of the current microtome sledge position according to the display.

Left block edge button (→ Fig. 26-4)

Clicking here opens up an entry window. The value to where the microtome sledge can be manually adjusted on a scale of 0 - 500 mm for the left limit position can be set here.

Right block edge button (→ Fig. 26-5)

Clicking here opens up an entry window. The value to where the microtome sledge can be manually adjusted on a scale of 0 - 450 mm for the right limit position can be set here.

6.5 Parameter settings



Clicking on **Parameter settings** icon opens the parameter settings window.



Fig. 27

The working area of the parameter settings window is divided as follows:

- | | | | |
|---|--------------------|---|--------------------|
| 1 | Parameter settings | 4 | Initialization |
| 2 | Password list | 5 | Language selection |
| 3 | Configuration | 6 | Reference voltages |

6.5.1 Parameter settings

Different settings can be selected using the **Parameter setting** menu.

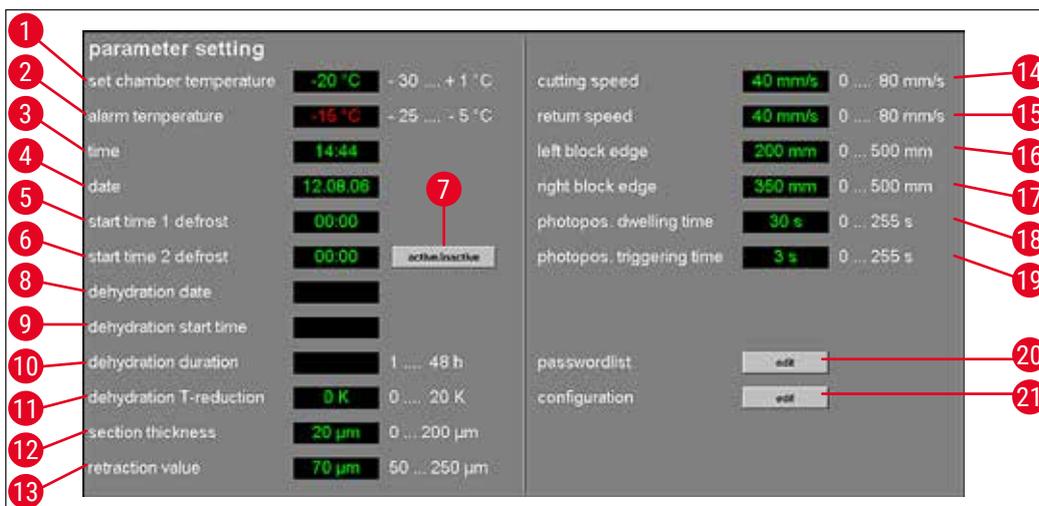


Fig. 28

Set chamber temperature (→ Fig. 28-1)

Click on this display to change the currently selected value. Temperature values from -30 to +1 °C are permitted.

Alarm temperature (→ Fig. 28-2)

Click on this display to change the currently selected value. Temperature values from -25 to -5 °C are permitted.

**Note**

The alarm temperature should not be too close to the set chamber temperature. If the alarm temperature is too close to the set chamber temperature, an alarm can be triggered simply when working with the instrument during a prolonged period of time or during the daily defrost cycle. A temperature difference of approx. 5 K (Kelvin) is recommended.

Time (→ Fig. 28-3) **and Date** (→ Fig. 28-4)

Fig. 29

Displays time and date. Clicking on this display opens the **System time** dialog box (→ Fig. 29).

- Clicking on a subarea of the display (day, month, year, hour or minutes) lets you change the setting.
- The entry must be confirmed by pressing the **Ok** button.

Start time 1 of the defrost (→ Fig. 28-5)

Fig. 30

Displays start time of the 1st automatic defrost cycle. Clicking on this display opens the **Defrost time 1** dialog box (→ Fig. 30).

- Click on individual parameters (hours or minutes) to change the corresponding settings.
- The entry must be confirmed by pressing the **Ok** button.

Start time 2 of the defrost (→ Fig. 28-6)

Fig. 31

Displays start time of the 2nd automatic defrost cycle. Clicking on this display opens the **Defrost time 2** dialog box (→ Fig. 31).

- Click on individual parameters (hours or minutes) to change the corresponding settings.
- The entry must be confirmed by pressing the **Ok** button.

Active/Inactive button (→ Fig. 28-7)

Clicking on this button activates or deactivates the 2nd automatic defrost cycle.

Dehydration date (→ Fig. 28-8)

Dehydration start time (→ Fig. 28-9)

Dehydration duration (→ Fig. 28-10)

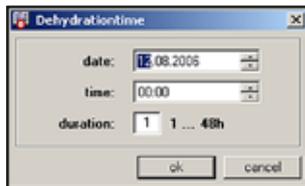


Fig. 32

Displays start date and time, and duration of the automatic dehydration cycle. Clicking on one of the indications opens the **Dehydration time** dialog box (→ Fig. 32).

- Click on individual parameters (day, month, year, hour or minutes) to change the corresponding settings.
- The desired duration of the dehydration procedure can be selected in the duration field. Values from 1 - 48 hours are permitted.
- The entry must be confirmed by pressing the **Ok** button.



Note

- To speed up the dehydration procedure, the dehydration cryochamber temperature can be lowered. This can be done via the **Dehydration T-reduction** display.
- The duration of the dehydration depends on the number of sections, the section thickness and the type of tissue. To use this function efficiently, it is advisable to remove the section waste from the cryochamber before the start of the dehydration.

Dehydration T-reduction (→ Fig. 28-11)

Displays temperature reduction for dehydration. Click on this display to change the currently selected value. Values from 0 - 20 K can be selected.

Section thickness (→ Fig. 28-12)

Displays section thickness. Click on this display to change the currently selected value. Values from 0 - 200 µm can be selected.

Retraction value (→ Fig. 28-13)

Displays the currently selected retraction value. Click on this display to change the currently selected value. Values from 50 - 250 µm are permitted.

Cutting speed (→ Fig. 28-14)

Return speed (→ Fig. 28-15)

Displays cutting and return speed. Click on one of the displays to change the currently selected value. Values 0 - 80 mm/s are permitted.

Left block edge (→ Fig. 28-16)

Right block edge (→ Fig. 28-17)

Displays left and right block edge. Click on the individual display to change the currently selected value. Values 0 - 500 mm/s are permitted, see (→ p. 37 – 6.4.10 Cutting window).

Photo position dwelling time (→Fig. 28-18)

Photo position triggering time (→Fig. 28-19)

Displays photo position dwelling and triggering time. Click on the individual display to change the currently selected value. Values 0 - 255 seconds are permitted, see (→ p. 59 – 6.11 Photo mode).

Edit button next to Password list (→Fig. 28-20)

Clicking on this button opens the **User configuration** window, see (→ p. 41 – 6.5.2 Password management).

Edit button next to Configuration (→Fig. 28-21)

Clicking on this button opens the **Configuration** window, see (→ p. 43 – 6.5.3 Configuration).

6.5.2 Password management



Note

To access the **User configuration**, the registered user must be an administrator.

no.	active	user name	full name	user rights
1	X	Service	Leica Service	supervisor
2	X	CM	Customer	user
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

Fig. 33

The **User configuration** display is divided into the following columns:

- | | |
|----------------------|--|
| 1 No. | Displays the program-controlled running number. |
| 2 Active | Displays status of the user selected. Active users are displayed with an X. |
| 3 User name | Displays the user name, which is introduced in the identification field during the start and log-in procedure. |
| 4 Full name | Displays full user name. |
| 5 User rights | Displays the corresponding access right. The administrator has full access to all application functions. Users have only limited access. |
| 6 Close | Clicking on this button closes the User configuration window. |



Note

- Double-clicking a line in the configuration display opens the **User configuration** dialog box (→ Fig. 34).
- Administrators have full access to all application functions. Users do not have access to password management and to the configuration parameters in the **Parameter setting** window.

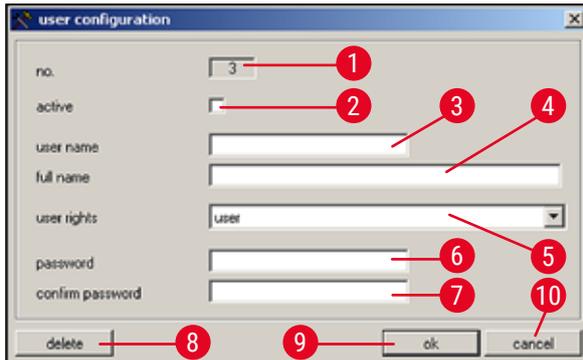


Fig. 34

In the **User configuration** dialog box, the following settings can be selected:

- | | |
|--|--|
| 1 No. | Displays the running number. No changes can be made in this field. |
| 2 Active | Clicking on the checkbox sets the user status to Active . Only after this step can a user successfully register via the start and log-in procedure. |
| 3 User name | Enter the desired user name. A maximum of 10 characters (numerical or alphanumerical) can be entered. |
| 4 Full name | Enter full first and last name of user. |
| 5 User rights | Click on the User rights line to open a drop down menu. The user property Administrator or User can be selected. |
| 6+7 Password and Confirm password | Enter the password that is required for logging in and enter the password again to confirm it. |
| 8 Delete | Clicking on this button deletes the selected user without any prior safety query. |
| 9 Ok | Clicking on this button saves the entries and closes the User configuration dialog box. |
| 10 Cancel | Clicking on this button closes the User configuration dialog box. Any changes made are not saved. |

6.5.3 Configuration

**Note**

To access **Configuration**, the registered user must be an administrator.

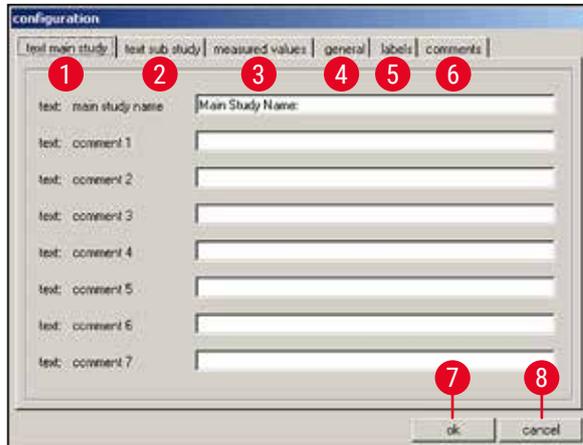


Fig. 35

- | | |
|--------------------------|--|
| 1 Text main study | see explanation in (→ Fig. 36) |
| 2 Text substudy | see explanation in (→ Fig. 36) |
| 3 Measured values | see explanation in (→ Fig. 37) |
| 4 General | see explanation in (→ Fig. 38) |
| 5 Labels | see explanation in (→ Fig. 39) |
| 6 Comments | see explanation in (→ Fig. 40) |
| 7 Ok | Clicking on this button saves the entries and closes the Configuration window. |
| 8 Cancel | Clicking on this button closes the Configuration window without saving any of the changes made. |

Text main study ([→ Fig. 35-1](#)) and Text substudy ([→ Fig. 35-2](#)) tabs

The structure of the two tabs is identical. A header and 7 freely selectable comments for each main study or substudy can be defined.

The text entered into the 8 input fields is copied into the dialog box for creating main studies and substudies. Each individual text can consist of up to 30 characters. The configuration of a main study or substudy is covered in Chapter ([→ p. 55 – 6.10 Section documentation](#)).

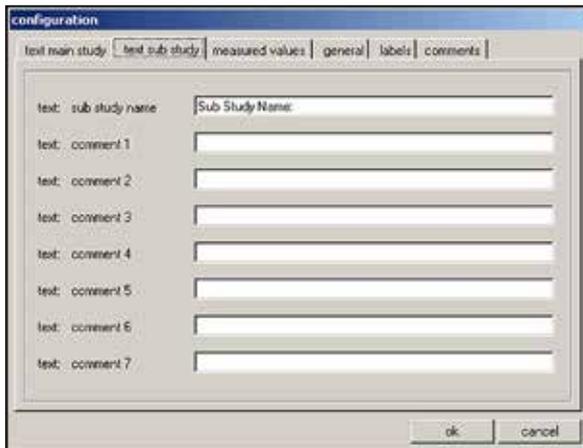


Fig. 36

Measured values tab (→ Fig. 35-3)

Selecting the measured values that are to be displayed in the **Section documentation** window after selecting a main study or substudy.

The configuration of a main study or substudy is covered in Chapter (→ p. 55 – 6.10 **Section documentation**).

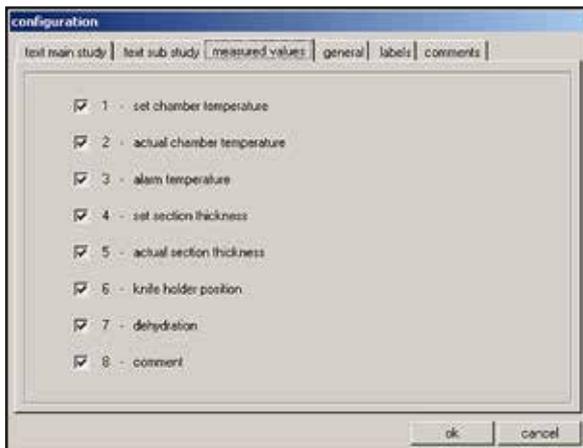


Fig. 37

The following measured values can be selected:

- Set chamber temperature target value
- Chamber temperature actual value
- Alarm temperature
- Section thickness set value
- Section thickness actual value
- Knife holder position
- Dehydration
- Comment

General tab (→ Fig. 35-4)

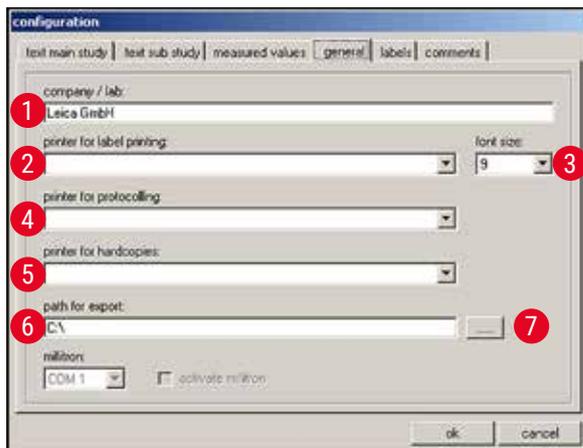


Fig. 38

The **General** tab contains the following fields:

- | | | |
|-------|---|--|
| 1 | Company/lab | Enter the name of the company or the laboratory. This is displayed in the Status bar on the right side, see (→ p. 29 – 6.2 Description of the window elements). |
| 2,4,5 | Printer selection | Clicking on the respective line opens a drop-down menu. The printer selection takes place here, if one is present. |
| 3 | Font size | Here you can select the desired font size for the labels. |
| 6 | Path for export | Clicking the Export path icon opens the Path selection for data export dialog box. A directory in which data (main studies and substudies, measured values, events and alarms) is to be stored can be selected here. The export file is stored as a text file. |
| 7 |  | |



Note

If no printer can be selected, a printer has to be installed later on the present operating system.

Labels tab (→ Fig. 35-5)

You can enter the text for the labels in this tab, see (→ p. 60 – 6.15 Printing labels).

- 9 lines of 50 characters each can be entered. Lines where no characters have been entered are printed as empty lines.
- Clicking on the **Bold** checkbox in the corresponding line activates bold print.
- Specific information can be entered during label printing for the output of predefined variables commencing with the special character "@".

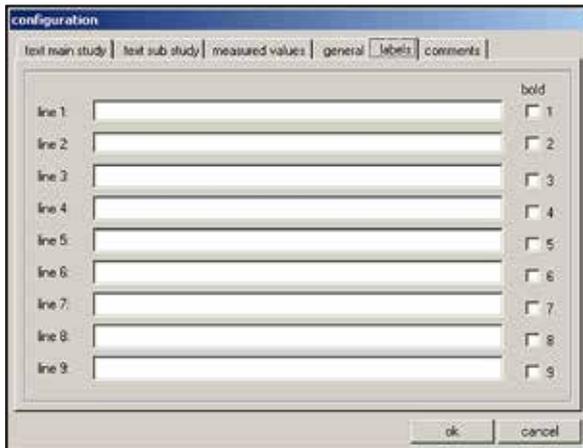


Fig. 39



Note

- Repeating the variable wild card defines the length of the variable. The variable wild card @333, for example, will display the "target cryochamber temperature" with a length of 4 characters.
- The "@" character represents one character.
- Text variables are always printed left-justified, numbers right-justified.
- Possible variables are listed in the following list.

@a	Main study – name	@o	Substudy – comment line 5
@b	Main study – comment line 1	@p	Substudy – comment line 6
@c	Main study – comment line 2	@q	Substudy – comment line 7
@d	Current date	@t	Current time
@e	Main study – comment line 3	@0	Measured value – no. of section
@f	Main study – comment line 4	@1	Measured value – date of section
@g	Main study – comment line 5	@2	Measured value – time of section
@h	Main study – comment line 6	@3	Measured value – target cryochamber temperature
@i	Main study – comment line 7	@4	Measured value – actual cryochamber temperature
@j	Substudy name	@5	Measured value – alarm temperature (yes/no)
@k	Substudy – comment line 1	@6	Measured value – target section thickness
@l	Substudy – comment line 2	@7	Measured value – actual section thickness
@m	Substudy – comment line 3	@8	Measured value – knife holder position
@n	Substudy – comment line 4	@9	Measured value – dehydration (on/off)

Comments tab (→ Fig. 35-6)

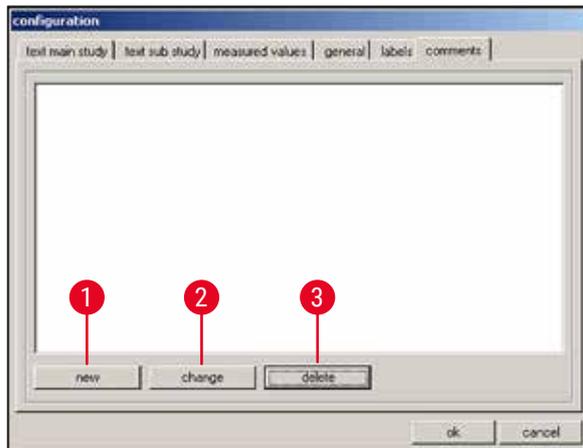


Fig. 40

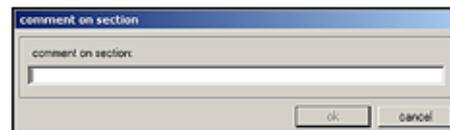


Fig. 41

Frequently used comments can be entered into this tab.

- 1 **New** Clicking on this button opens the **Comment on section** dialog box (→ Fig. 41).
 - You can enter a comment on a section in the **Comment on section** dialog box.
 - Clicking on the **Ok** button in the dialog box saves the entry and closes the window.
 - Clicking on the **Cancel** button closes the **Comment on section** dialog box.

Any entry made is not saved.
- 2 **Change** Clicking on this button opens the **Comment on section** dialog box. The existing entry can be changed.
- 3 **Delete** Clicking on this indication opens a safety query dialog. If the safety query is confirmed by clicking on **Ok**, the comment will be permanently deleted.

6.5.4 Reference voltages



Fig. 42

Displays the current reference voltage in volts is inactive.

Buttons 1 to 8

Buttons 1 to 8 are inactive.

6.5.5 Language selection



Fig. 43

The flag buttons indicate the languages that can be selected. Clicking on one of the flag symbols changes the user interface to the corresponding language.

6.5.6 Initialization



Fig. 44

Clicking the **Execute** button in the initialization field opens the **Main** window and the **Init** button reappears in the **Mode** field.

Clicking the **Init** button opens the **Safety check – initialisation** dialog box, see (→ p. 31 – 6.3 Initialization).

6.6 Temperature curves



Clicking the **Temperature curves** icon opens the window.

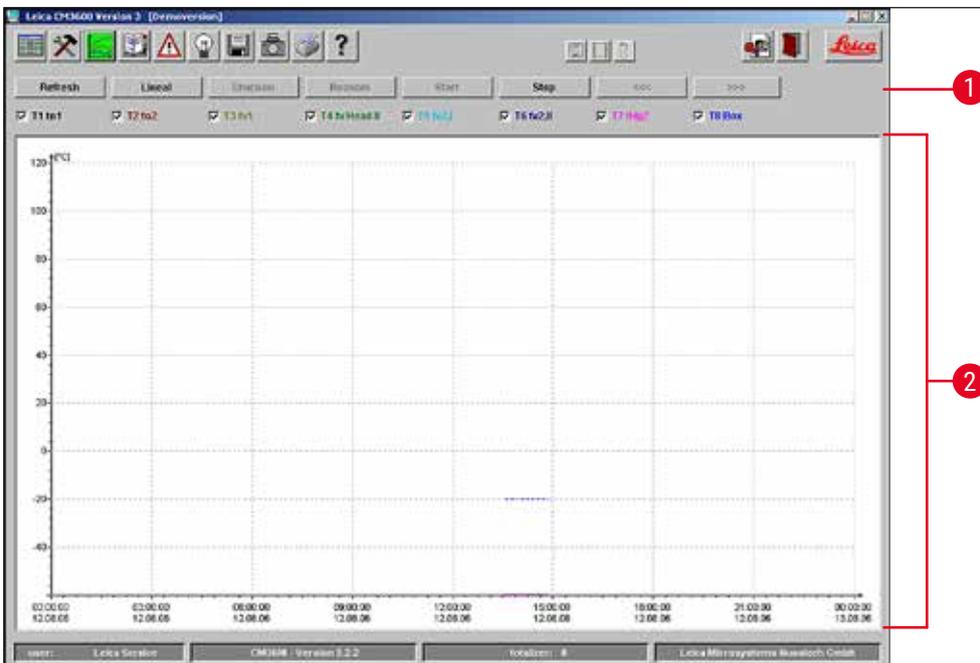


Fig. 45

The window contains the following areas:

- 1 Work space
- 2 Diagram



Note

The **Temperature curves** display is only for failure analysis by Leica service technicians.

6.6.1 Work space

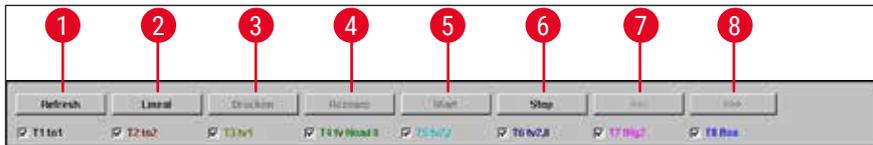


Fig. 46

- | | |
|--|---|
| 1 Refresh | Clicking on this button updates the diagram display. |
| 2 Ruler | If you click on this button, a ruler will be displayed in the diagram. Use the mouse cursor to move ruler to a certain measuring value position in order to read the measured value more exactly. |
| 3 Print | Clicking on this button creates a screen printout of the current diagram display. |
| 4 Rezoom | Clicking on this button resets the diagram display back to the original position. |
| 5+6 Start and Stop | Clicking on one of these buttons starts or stops the recording of measured values in the diagram. |
| 7+8 <<< and >>> | Clicking on one of these buttons starts a forward or backward scroll in the diagram. |

Clicking on one of the check boxes in the work space, the 8 temperature sensors of the instrument can be displayed individually in the diagram. The font color of the check boxes helps to identify the corresponding measured values in the diagram, which are displayed in the same color.

The following check boxes can be activated/deactivated via a mouse click:

T1 to 1	T2 to 2	T3 tv1	T4 tv Head I
T5 tv2,I	T6 tv2,II	T7 tHg2	T8 Box

6.6.2 Diagram

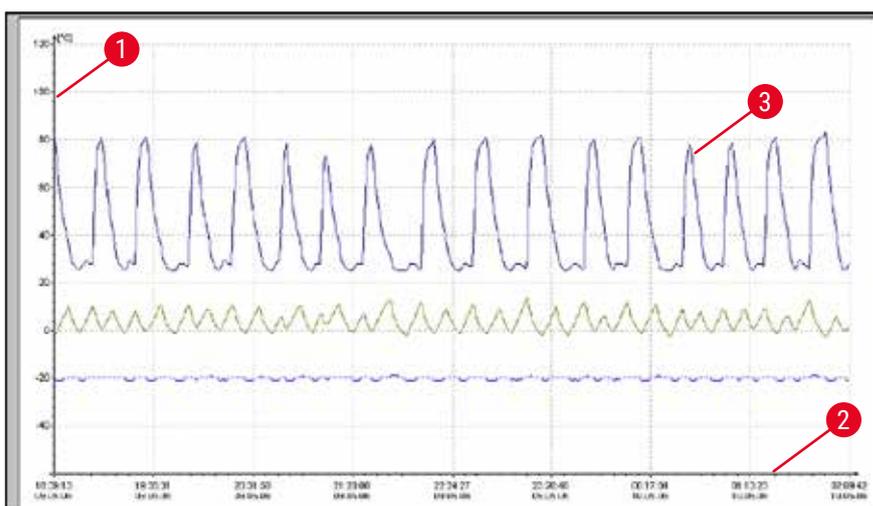


Fig. 47

The window contains the following areas:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1 Temperature in degree centigrade on the y-axis 2 Time and date on the x-axis | <ol style="list-style-type: none"> 3 Graphical representation of the 8 temperature measuring points attached to the instrument by colored-coded lines |
|---|--|

The diagram can be enlarged as follows:

- Within the diagram, press and hold the left mouse button.
- With the mouse, create a zoom box on the area to be enlarged
- by dragging the mouse cursor to the right and downwards at the same time.
- Release the left mouse button.

The selected diagram zoom box is enlarged. All measured values activated via the check boxes in the work space are displayed.

6.7 Chronological event list



Click on **Event list** icon to open the corresponding window.

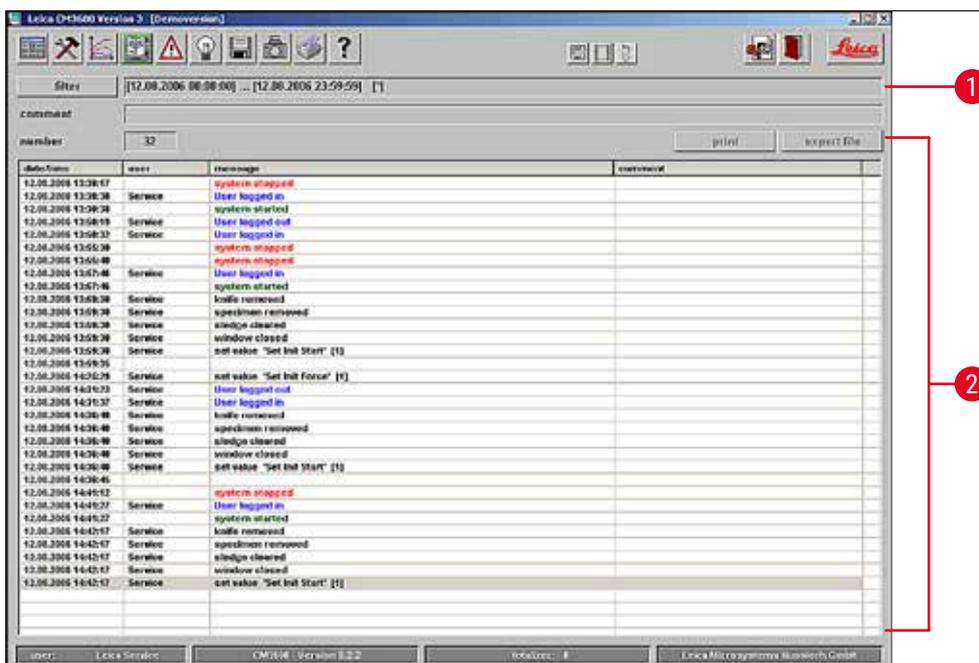


Fig. 48

The working area is divided up as follows:

- 1 Work space
- 2 Event list

The **Events list** is a table displaying the events chronologically by date and time. In this list, all events concerning the program are saved.

6.7.1 Work space



Fig. 49

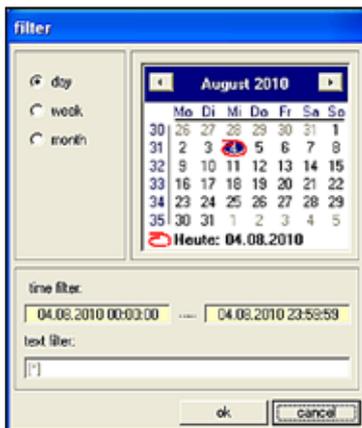


Fig. 50

- 1 Filter** Clicking on this button opens the **Filter** dialog box (→ Fig. 50). Here you can define a time filter limiting the event table display to one day, one week or one month.

To set a filter, proceed as follows:

 - Select the desired time interval by clicking on one of the radio buttons **Day**, **Week** or **Month**.
 - Select the desired start day in the calendar display. For this purpose, you can also use the two navigation buttons on the left and right of the **Month** header.

In the **Time filter** field you can now see the start time (left) and end time (right) of the selected time interval.

You can set an additional filter in the **Text filter** field.

Click on **Ok** to close the dialog box and display the desired alarm messages in the events list.

Click on **Cancel** to close the window without saving any of the changes made.
- 2 Comment** Clicking on an event in the event table activates the **Comment** field. You can enter a comment regarding the selected event. After confirmation with the **Enter** button, the note will be displayed in the event table.
- 3 Number** Number of events displayed in the events list.
- 4 Print** Clicking on this button creates a screen printout of the current display.

- 5 **Export file** Clicking on this button exports the event table to a text file, see (→ Fig. 38-6) and (→ Fig. 38-7).

6.7.2 Event list

date/time	user	message	comment
12.08.2006 13:30:14	Service	system stopped	
12.08.2006 13:30:18	Service	User logged in	
12.08.2006 13:30:38	Service	system started	
12.08.2006 13:58:18	Service	User logged out	
12.08.2006 13:58:33	Service	User logged in	
12.08.2006 13:58:39	Service	system stopped	
12.08.2006 13:58:40	Service	system started	
12.08.2006 13:57:46	Service	User logged in	
12.08.2006 13:57:46	Service	system started	
12.08.2006 13:58:30	Service	knife removed	
12.08.2006 13:58:30	Service	specimen removed	
12.08.2006 13:58:30	Service	sledge cleared	
12.08.2006 13:58:30	Service	window closed	
12.08.2006 13:58:30	Service	set value 'Set Init Start' [1]	
12.08.2006 13:58:35	Service	set value 'Set Init Force' [1]	
12.08.2006 14:25:29	Service	User logged out	
12.08.2006 14:31:23	Service	User logged in	
12.08.2006 14:31:37	Service	User logged in	
12.08.2006 14:36:40	Service	knife removed	
12.08.2006 14:36:40	Service	specimen removed	
12.08.2006 14:36:40	Service	sledge started	
12.08.2006 14:36:40	Service	window closed	
12.08.2006 14:36:40	Service	set value 'Set Init Start' [1]	
12.08.2006 14:36:45	Service	set value 'Set Init Force' [1]	
12.08.2006 14:41:12	Service	system stopped	
12.08.2006 14:41:27	Service	User logged in	
12.08.2006 14:41:27	Service	system started	
12.08.2006 14:42:17	Service	knife removed	
12.08.2006 14:42:17	Service	specimen removed	
12.08.2006 14:42:17	Service	sledge cleared	
12.08.2006 14:42:17	Service	window closed	
12.08.2006 14:42:17	Service	set value 'Set Init Start' [1]	

Fig. 51

The table is divided into the following columns:

- 1 **Date/time** Date and time of the events.
- 2 **User** Name of the user who was logged in when the event occurred.
- 3 **Message** Event messages (short description of event).
- 4 **Comment** Display of comments related to the events, see (→ p. 51 – 6.7.1 Work space).



Note

Individual events messages will be displayed in the events list for a maximum of 90 days from the date when the event occurred. After that, the data will be saved into a text file, see (→ Fig. 38-6) and (→ Fig. 38-7).

6.8 Alarm list



Click the **Alarm list** icon to open the corresponding window.

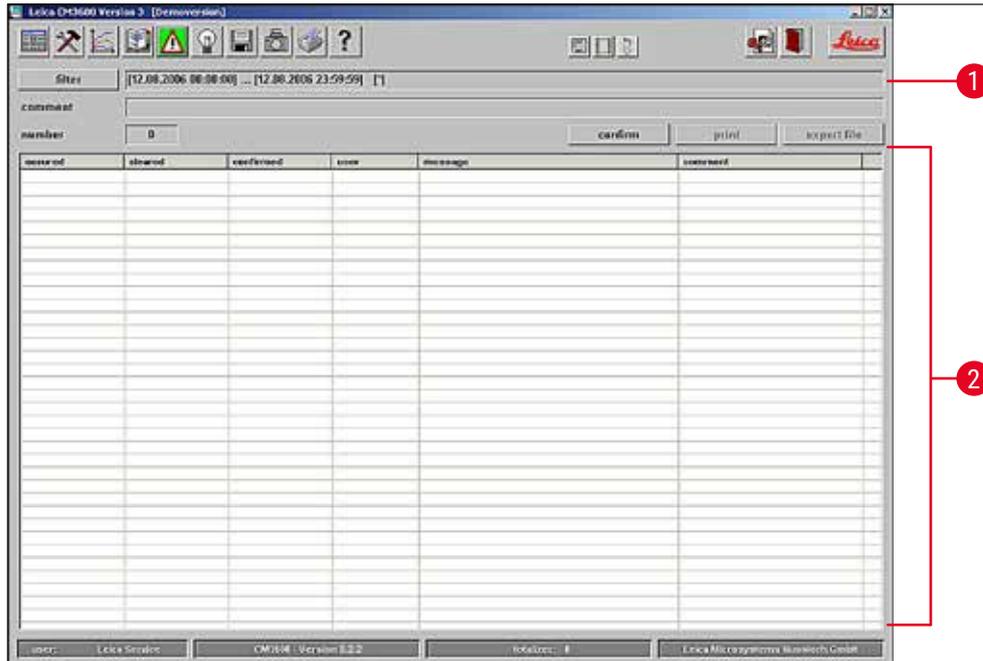


Fig. 52

The working area is divided up as follows:

- 1 Work space
- 2 Alarm list

Chronological display of the **Alarm list** as a table in order of date and time. In this list, all events concerning the program are saved.

- If the **Emergency stop** switch has been activated, the reset must be acknowledged in the alarm list (→ Fig. 53-3).
- Afterwards, the section program has to be reselected, see (→ p. 35 – 6.4.7 Section program).

6.8.1 Work space

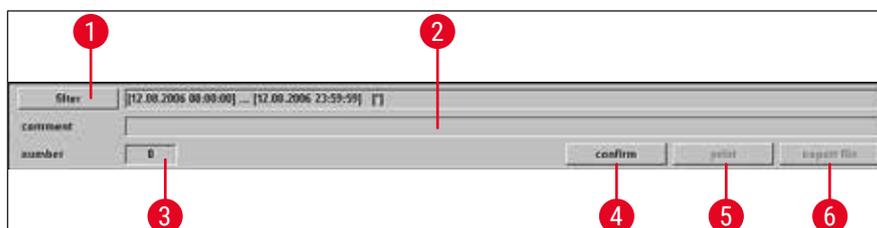


Fig. 53

In the work space the following parameters can be selected:

- 1 **Filter** Clicking this button opens the **Filter** dialog box, see (→ p. 51 – 6.7.1 Work space).

6.8.3 Error messages: Meaning and troubleshooting

Error code	Error message	Confirm elimination
Error 01	Knife holder – limit position exceeded	<ul style="list-style-type: none"> • Re-initialize instrument. If the problem recurs, call Service Technician.
Error 02	Limit position of sledge exceeded	<ul style="list-style-type: none"> • Re-initialize instrument. If the problem recurs, call Service Technician.
Error 03	Chamber – Alarm temperature exceeded	<ul style="list-style-type: none"> • Check whether there has been a power failure! • Check the set value of the alarm temperature. It must differ at least 5 K from the chamber temperature selected.
Error 04	Power failure	
Error 05	Data transfer failed (happens frequently subsequent to a power failure)	<ul style="list-style-type: none"> • Check the cable connection between PC and control unit. • If the problem recurs, call Service Technician.
Error 06		<ul style="list-style-type: none"> • Not defined
Error 07	Emergency stop activated	<ul style="list-style-type: none"> • Deactivate the emergency stop!
Error 08	Stepper motor – step error	<ul style="list-style-type: none"> • Inform Service Technician.
Error 09	Refrigerating system – pressure exceeded	<ul style="list-style-type: none"> • Check the air circulation between the condenser and the control unit. • Check the distance of the instrument to the wall (at least 50 cm)! • If the problem recurs, call Service Technician.
Error 10	Flap limit switch malfunction	<ul style="list-style-type: none"> • Re-initialize instrument. If the problem recurs, call Service Technician.
Error 11	Call Service Technician	<ul style="list-style-type: none"> • Call Service Technician.

6.9 Chamber illumination



Click on the symbol to switch on the illumination of the cryochamber. Another mouse click will switch the chamber illumination back off. Active icons will light up in yellow.

6.10 Section documentation



Click on the **Section documentation** symbol to open the corresponding window.

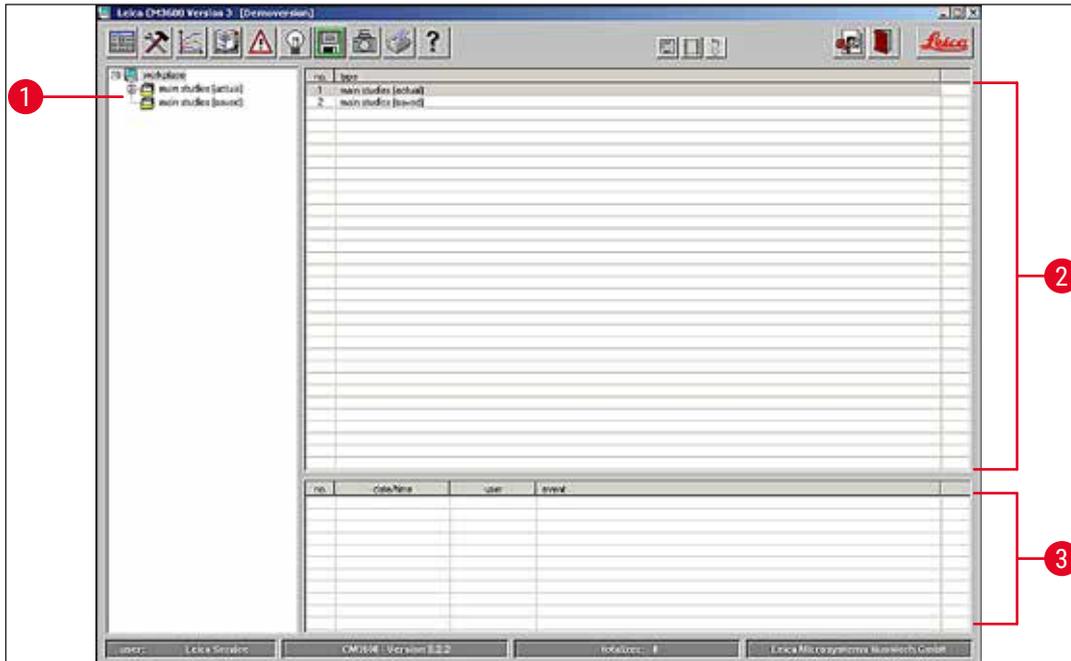


Fig. 55

The window contains the following areas:

- 1 Tree diagram
- 2 Studies protocol
- 3 Event table

Tree diagram

Displays all main studies or substudies in a tree diagram. For navigation purposes, click on the preceding plus or minus sign.

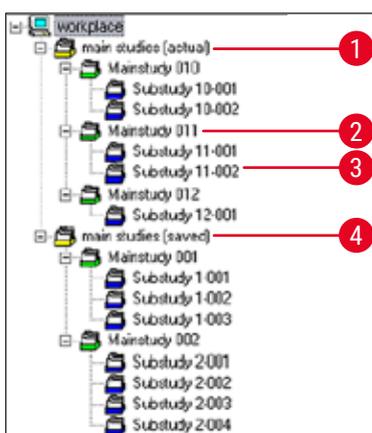


Fig. 56

The different study types are identified by the preceding colored folder symbols:

- 1 **Yellow folder icon** Collective folder for main studies
- 2 **Green folder icon** Main studies
- 3 **Blue folder icon** Substudy
- 4 **"Saved" yellow folder icon** Collective folder for saved main studies

- If you click on a study, the studies protocol and the events table will be displayed on the right, see (→ p. 57 – Studies protocol).
- To save a main study, select it using the left mouse button and move it into the **Saved** folder.



Note

Saved main studies can no longer be edited.

Studies protocol

By clicking on a main study in the tree diagram (→ Fig. 56), the following display will appear in the **Studies protocol** area:

no.	date	main study name

Fig. 57

The table is divided into the following columns:

- | | | |
|----------|------------------------|---|
| 1 | No. | Running number automatically allocated by the application |
| 2 | Date | Date when the main study was created |
| 3 | Main study name | Name of main study |

To create a new main study or substudy proceed as follows:

- Right-click on a spot anywhere in the upper table with the mouse. A context menu will open up.
- Select the **New** menu item. A dialog box for a new main study or substudy will open up.

Fig. 58

- Enter the name of the new main study or substudy.
- Press the **Ok** button to confirm the entry and close the dialog box.

When clicking on a created substudy in the tree diagram, the following display will appear in the **Studies protocol** area:

n.	date/time	T-set	T-actual	T-error	set t.	act.	knife holder position	dehydration	comment
1	09.05.2006 12:42:10	-25 °C	-25 °C	na	35 µm	35 µm	18475 µm	off	
2	09.05.2006 12:43:15	-25 °C	-25 °C	na	35 µm	35 µm	18440 µm	on	
3	09.05.2006 12:44:21	-25 °C	-25 °C	na	35 µm	35 µm	18405 µm	on	
4	09.05.2006 12:45:17	-25 °C	-25 °C	na	35 µm	35 µm	18370 µm	on	
5	09.05.2006 13:22:10	-25 °C	-25 °C	na	35 µm	35 µm	18335 µm	on	
6	09.05.2006 13:23:43	-25 °C	-25 °C	na	35 µm	35 µm	18300 µm	off	
7	09.05.2006 13:24:41	-25 °C	-25 °C	na	35 µm	35 µm	18265 µm	off	
8	09.05.2006 13:48:10	-25 °C	-25 °C	na	35 µm	35 µm	18230 µm	off	
9	09.05.2006 13:47:02	-25 °C	-25 °C	na	35 µm	35 µm	18195 µm	off	
10	09.05.2006 13:43:16	-25 °C	-25 °C	na	30 µm	30 µm	18165 µm	off	
11	09.05.2006 13:51:34	-25 °C	-25 °C	na	30 µm	30 µm	18135 µm	off	

Fig. 59

The table is divided into the following columns:

- 1 **No.** Displays the running number automatically allocated by the application, in the order of date of creation of the main study
- 2 **Date/Time** Current date/time when the section was made
- 3 **T-set** Set temperature at the time the section was made
- 4 **T-actual** Current temperature at the time the section was made
- 5 **T-error** Alarm temperature at the time the section was made
- 6 **Set section thickness** Set section thickness at the time the section was made
- 7 **Actual section thickness** Actual section thickness at the time the section was made
- 8 **Knife holder position** Knife holder position at the time the section was made
- 9 **Dehydration** Time when dehydration started/finished
- 10 **Comment** Comments can be entered by the user

When clicking on a created substudy in the tree diagram, the following display will appear in the **Studies protocol** area:

no.	date/time	user	event
1	09.05.2006 12:30:15	CM	documentation started
2	09.05.2006 12:05:20	CM	user logged out
3	09.05.2006 12:41:08	Dorenkamp	user logged in
4	09.05.2006 12:41:56	Dorenkamp	set section thickness [35 mm]
5	09.05.2006 12:47:34	Dorenkamp	documentation stopped
6	09.05.2006 13:20:32	Dorenkamp	documentation started
7	09.05.2006 13:47:43	Dorenkamp	set section thickness [30 mm]
8	09.05.2006 13:49:04	Dorenkamp	set cutting speed [15 mm/s]
9	09.05.2006 13:52:01	Dorenkamp	documentation stopped

Fig. 60

The table is divided into the following columns:

1	No.	Displays the running event number automatically allocated by the application
2	Date/Time	Displays date or time when the event occurred
3	User	Displays the user who was logged in when the event occurred
4	Event	Displays the event message Red: Stopping an action Green: Starting an action Black: Changing a value, e. g. section thickness, sledge speed

6.11 Photo mode



Clicking on the photo icon activates or deactivates **Photo mode** and moves the microtome sledge to the mechanical limit stop. When active, the symbol will light up in green.

The **Photo mode** enables you to position the specimen or rather the microtome sledge exactly for one or more photos to be taken after each section.

The settings for the **Photo position dwelling time** and the **Photo position triggering time** are configured under the **Parameter setting**.

Photo position dwelling time

To define how long the microtome sledge will remain stopped in the camera position.

Photo position triggering time

Time until the camera actually takes a photo using the attached camera, see ([→ p. 38 – 6.5.1 Parameter settings](#)).

6.12 Screen printout



Clicking the **Screen printout** icon creates a printout of the current screen on the specified printer, see ([→ p. 43 – 6.5.3 Configuration](#)).

6.13 Help



Clicking the **Help** icon starts Adobe Acrobat Reader® and opens the manual in PDF format.

6.14 Save



Clicking the **Save** icon saves the section data. This documents all sections.

All sections added by pressing the foot switch are documented, see ([→ p. 60 – 6.16 Foot switch](#)).

6.15 Printing labels



Clicking the **Label printing** icon opens the label printing window. When activated, the icon will light up in green.

When the label printing feature is activated, a label will be printed every time a section has been completed.

Please see (→ p. 43 – 6.5.3 Configuration) on how to select the printing parameters and the printer for label printing.



Note

Labels cannot be printed without activating the **Save** icon.

6.16 Foot switch



Clicking the **Foot switch** icon activates the optional foot switch connected to the instrument, i. e. documentation of the last section carried out will be saved when the foot switch is pressed.



Note

The foot switch cannot be used without first activating the **Save** icon.

6.17 User log-in/log-out



Clicking on the symbol logs off the user currently logged in. Clicking again causes the start-and-login window to appear, see (→ p. 29 – 6.2 Description of the window elements).



Note

Logging off does not automatically stop or delete the actions and settings initiated in the application.

6.18 Quitting the application



Clicking the icon closes the application.



Note

When quitting the application, all settings made are reset. Any application steps still in progress are terminated.

7. Operating the Leica CM3600 XP



Note

To ensure proper handling of the Leica CM3600 XP as well as use of the specimen stages and the specimen blocks themselves, we strongly recommend participating in Leica application training.

7.1 Check list



Note

- The checklist below provides an overview on how to successfully operate the Leica CM3600 XP.
- The exact procedure is described in the following chapters.
- We recommend that you make a copy of this checklist and attach it to an instrument surface where it is clearly visible to ensure that all points of the list are observed.

Step	Task	For the procedure, see:
1	Switch on the instrument.	(→ p. 61 – 7.2 Switching the instrument on)
2	Start the software	(→ p. 61 – 7.3 Starting the software)
3	Adjust the cryochamber temperature and the sectioning temperature	(→ p. 62 – 7.4 Setting the chamber temperature)
4	Insert the specimen stage	(→ p. 62 – 7.5 Specimen stages)
5	Insert the knife	(→ p. 65 – 7.6 Knife)
6	Set the trimming value	(→ p. 70 – 7.7 Setting the trimming parameters)
7	Change the knife	(→ p. 65 – 7.6 Knife)
8	Set the sectioning parameters	(→ p. 70 – 7.8 Setting the sectioning parameters)
9	Dehydrate the specimen	(→ p. 71 – 7.9 Dehydrating the sections)

7.2 Switching the instrument on

Proceed as follows:

- Switch on the **main power switch**, see (→ p. 24 – 5.3 Port and switch panel).
- The refrigeration and control unit is activated.
- Switch on the computer and peripheral devices. For further information, please refer to the manual of the PC.

7.3 Starting the software

Proceed as follows:

- Carry out the **Start and log-in procedure**, see (→ p. 28 – 6.1 Start and log-in procedure).



Note

If the Leica CM3600 XP had been completely switched off, an initialization procedure must be carried out, see (→ p. 31 – 6.3 Initialization).

7.4 Setting the chamber temperature

Proceed as follows:

- Open the **Parameter setting** window in the software and adjust the cryochamber temperature to the target value, see (→ p. 38 – 6.5.1 Parameter settings).

7.5 Specimen stages

This chapter provides instructions on how to insert the specimen stages.

There are three different types of specimen stages:

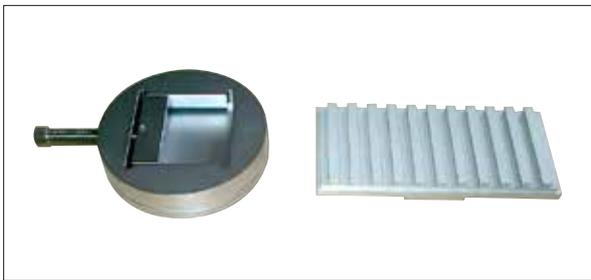


Fig. 61



Fig. 62



Fig. 63

- Specimen holder, orientable, with separate ball-and-socket joint (→ Fig. 61)
- Specimen stage, orientable, with integrated ball-and-socket joint (→ Fig. 62)
- Specimen stage, non-orientable (→ Fig. 63)

When inserting the specimen stages, bear in mind the following:

- Prior to sectioning, it is important to ensure that the specimen temperature has adjusted to the set sectioning temperature (approx. -20 °C).
- To place the frozen specimen (including the specimen stage) onto the sledge, the knife holder must first be moved into its upper end position, see (→ p. 33 – 6.4.5 Knife movement).

Since there is a considerable risk of injury when inserting the specimen stage/block, please observe the following safety measures:



Warning

- Prior to any work involving the knife or the microtome, or inside the cryochamber, activate the **Emergency stop** switch, see (→ p. 18 – 3.3.1 [Emergency stop switch](#)).
- Prior to any work involving the knife or the microtome, or in the cryochamber, swing the knee lever upwards, see (→ p. 19 – 3.3.2 [Knee lever](#)).
- For any work involving the knife or the microtome, or inside the cryochamber, wear the safety gloves provided, see (→ p. 23 – 5.2 [Standard delivery](#)).

7.5.1 Inserting the specimen stage, orientable, with ball-joint

To insert the specimen stage, orientable, with ball-and-socket joint proceed as described below. The specimen holder, orientable, with ball joint is inserted the same way.

Required tools:

- Open-end wrench, size 17.

Proceed as follows:

- Use the knee lever to move the sledge to the right-side reversal position, see (→ p. 36 – 6.4.9 [Operation mode](#)) and (→ p. 19 – 3.3.2 [Knee lever](#)).
- Observe the safety notes in Chapter (→ p. 62 – 7.5 [Specimen stages](#)).
- Open the window, see (→ p. 20 – 3.3.3 [Window](#)).
- Attach the specimen stage (→ [Fig. 64-1](#)) to the T-piece (→ [Fig. 64-2](#)).
- Rotate the specimen stage (→ [Fig. 65-1](#)) 90° clockwise.
- Align the specimen stage (→ [Fig. 65-1](#)) by eye.

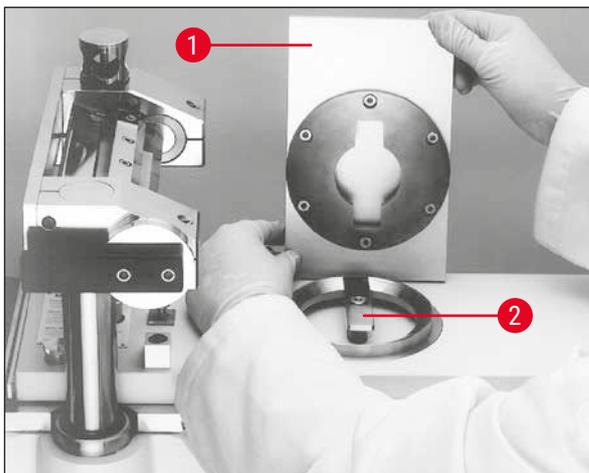


Fig. 64

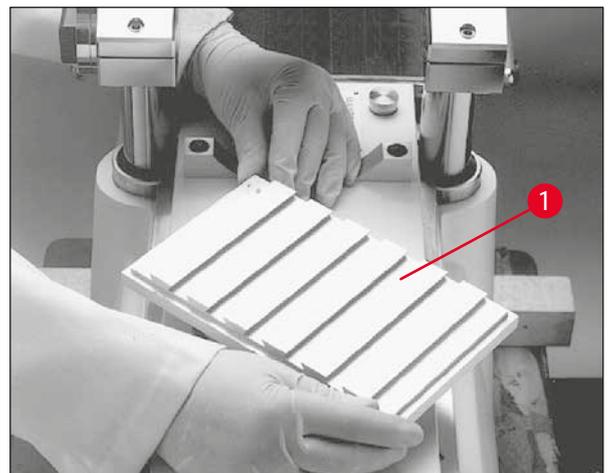


Fig. 65

- Tighten the screw (→ [Fig. 66-3](#)).
- Check the specimen stage (→ [Fig. 67-1](#)) for correct orientation and proper tightening.

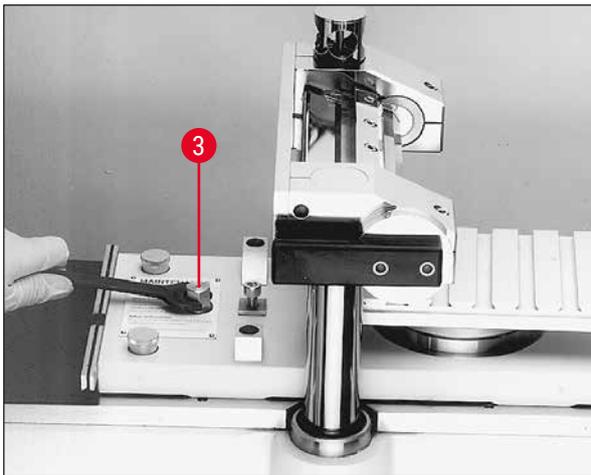


Fig. 66

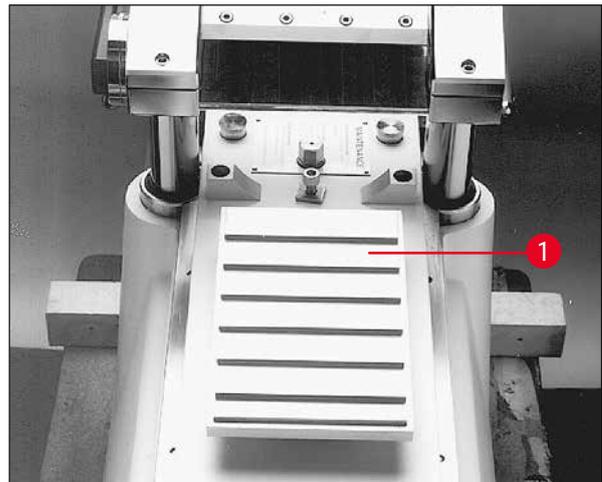


Fig. 67

7.5.2 Inserting the specimen stage, non-orientable

Required tools:

- Hexagon key, size 6

Proceed as follows:

- Use the knee lever to move the sledge to the right-side reversal position, see (→ p. 36 – 6.4.9 Operation mode) and (→ p. 19 – 3.3.2 Knee lever).
- Observe the safety notes in Chapter (→ p. 62 – 7.5 Specimen stages).
- Open the window, see (→ p. 20 – 3.3.3 Window).
- Remove the screw (→ Fig. 68-1).
- Lift off the T-piece (→ Fig. 68-2) and support ring (→ Fig. 68-3).
- Remove the screws (→ Fig. 69-4) and bases (→ Fig. 69-5) located on the right and left side of the sledge.

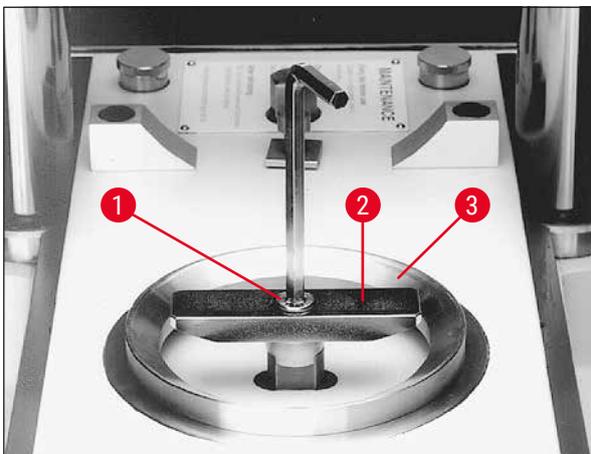


Fig. 68

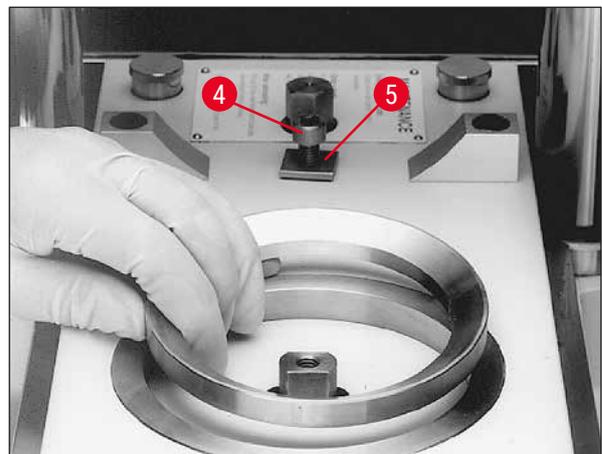


Fig. 69

- Insert the specimen stage, non-orientable (→ Fig. 70-6) and align by eye.
- Attach the bases (→ Fig. 71-5) and fasten the screws (→ Fig. 71-4) on the left and right of the sledge.
- Check the specimen stage, non-orientable (→ Fig. 70-6) for correct orientation and proper tightening.

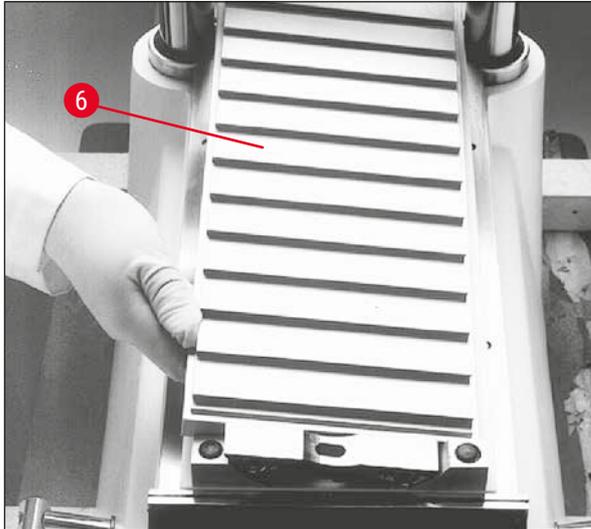


Fig. 70

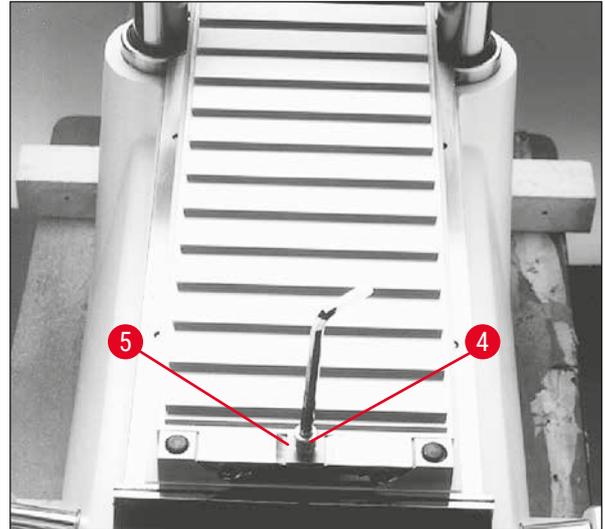


Fig. 71

7.6 Knife



Warning

Unintentional touching of the knife or unintentional movement of the microtome sledge

Severe cutting injuries and / or severe crushing injuries

- Move the microtome sledge to the position which is most appropriate for your purpose and that ensures the best safety.
- Prior to any work involving the knife or the microtome, or inside the cryochamber, activate the **Emergency stop** switch, see (→ p. 18 – 3.3.1 Emergency stop switch).
- For any work involving the knife or the microtome, or inside the cryochamber, wear the safety gloves provided, see (→ p. 23 – 5.2 Standard delivery).
- Prior to any work involving the knife or the microtome, or in the cryochamber, swing the knee lever upwards, see (→ p. 19 – 3.3.2 Knee lever).

This chapter provides instructions on how to insert the knives.

- Since there is a considerable risk of injury, the safety notes listed above must be observed.
- Two types of knives can be used in the Leica CM3600 XP:

Standard knife



Fig. 72

Disposable blade holder and blade



Fig. 73

7.6.1 Inserting standard knives

To insert a standard knife, proceed as follows.

Required tools:

- Hexagon key, size 4

Proceed as follows:

- Use the knee lever to move the sledge to the right-side reversal position, see (→ p. 36 – 6.4.9 [Operation mode](#)) and (→ p. 19 – 3.3.2 [Knee lever](#)).
- Observe the safety notes in Chapter (→ p. 65 – 7.6 [Knife](#)).
- Open the window, see (→ p. 20 – 3.3.3 [Window](#)).

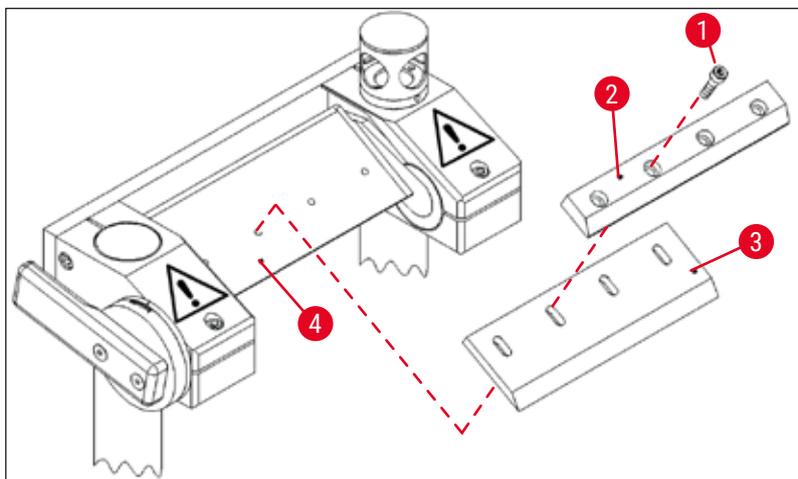


Fig. 74

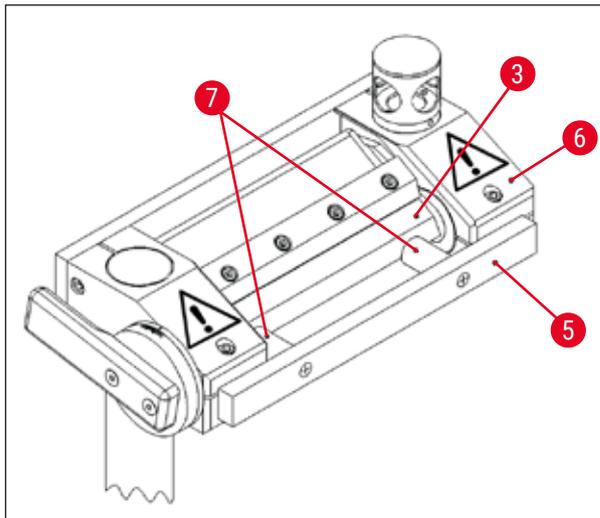


Fig. 75

- Remove the screws (→ Fig. 74-1) and lift off the pressure plate (→ Fig. 74-2).
- Attach the knife (→ Fig. 74-3) to the base (→ Fig. 74-4).
- Attach the pressure plate (→ Fig. 74-2) to the knife (→ Fig. 74-3).
- Attach the screws (→ Fig. 74-1).
- Align the knife (→ Fig. 75-3) using the positioning tool (→ Fig. 75-5). To do so, attach the positioning tool onto the knife holder (→ Fig. 75-6) from the outside. The two plastic pegs (→ Fig. 75-7) press the knife (→ Fig. 75-3) into the correct position.
- Tighten the screws (→ Fig. 74-1).
- Adjust the knife angle, see (→ p. 69 – 7.6.3 Adjusting the knife angle).

7.6.2 Inserting the disposable blade holder with disposable blade

To insert the disposable blade holder with disposable blade proceed as described below.

Required tools:

- Hexagon key, size 4,
- Hexagon key, size 2.5

Proceed as follows:

- Use the knee lever to move the sledge to the left-side reversal position, see (→ p. 36 – 6.4.9 Operation mode) and (→ p. 19 – 3.3.2 Knee lever).
- Observe the safety notes in Chapter (→ p. 65 – 7.6 Knife).
- Open the window, see (→ p. 20 – 3.3.3 Window).

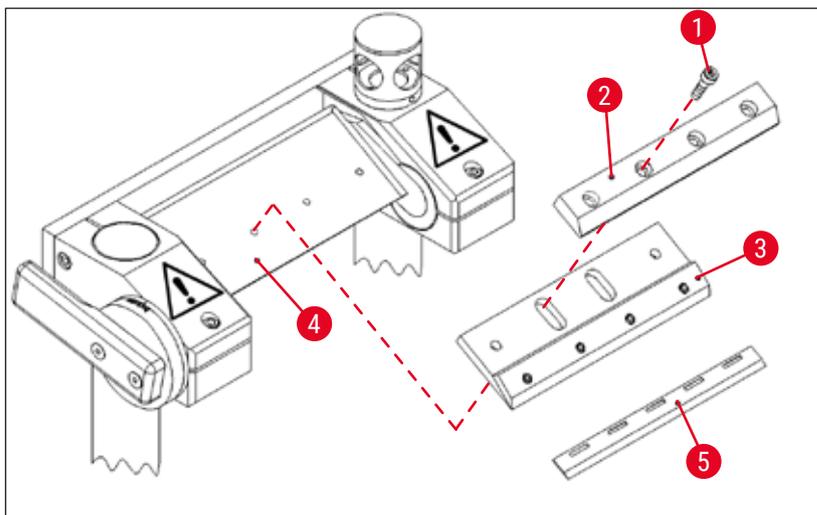


Fig. 76

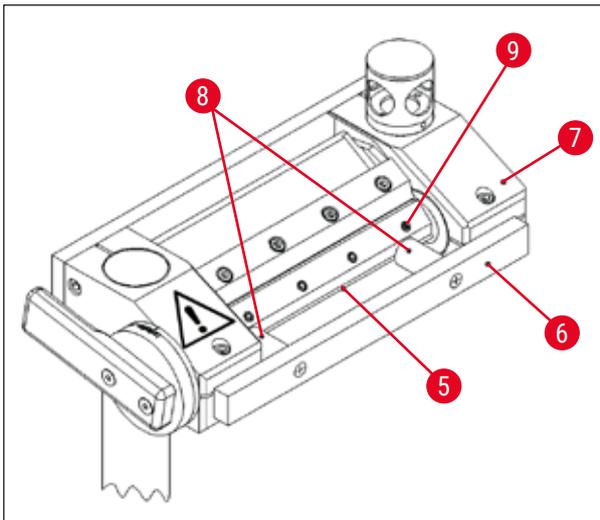


Fig. 77

- Remove the screws (→ Fig. 76-1) and lift off the pressure plate (→ Fig. 76-2).
- Attach the disposable blade holder (→ Fig. 76-3) onto the base (→ Fig. 76-4).
- Attach the pressure plate (→ Fig. 76-2) to the disposable blade holder (→ Fig. 76-3).
- Insert and tighten the screws (→ Fig. 76-1).
- Loosen the screws (→ Fig. 77-9) of the disposable blade holder (→ Fig. 76-3).
- Insert the disposable blade (→ Fig. 76-5). The disposable blade is in the correct position when the disposable blade fits close to the limit stop of the disposable blade holder (→ Fig. 76-3).

- Tighten the screws (→ Fig. 77-9) of the disposable blade holder (→ Fig. 76-3).
- Loosen the screws (→ Fig. 76-1).
- Align the disposable blade holder (→ Fig. 76-3) using the positioning tool (→ Fig. 77-6).
- To do so, attach the positioning tool to the knife holder from the outside (→ Fig. 77-7).
- The two plastic pegs (→ Fig. 77-8) press the disposable blade holder (→ Fig. 76-3) into the correct position.
- Tighten the screws (→ Fig. 76-1)
- Adjust the Knife angle, see (→ p. 69 – 7.6.3 Adjusting the knife angle).

7.6.3 Adjusting the knife angle

Required tools:

- Hexagon key, size 5

Proceed as follows:

- Observe the safety notes in Chapter (→ p. 65 – 7.6 Knife).
- Loosen the screws (→ Fig. 78-1).
- Rotate the knife holder (→ Fig. 79-2) and set the desired knife angle on the scale (→ Fig. 79-3) (recommend angle = 20°).
- Tighten the screws (→ Fig. 78-1).

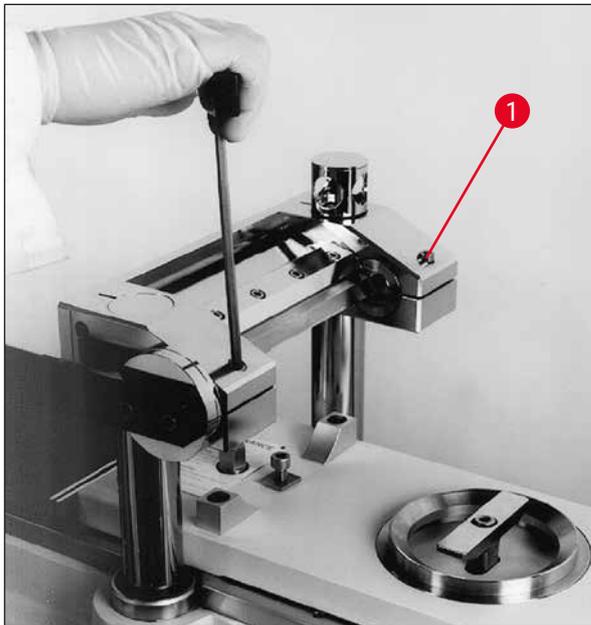


Fig. 78

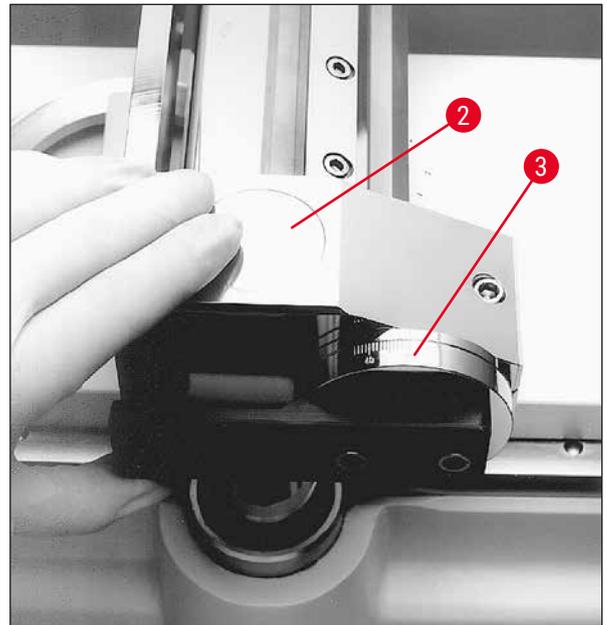


Fig. 79

7.7 Setting the trimming parameters



Warning

- For reasons of safety and accuracy, the maximum trimming thickness should not exceed 100 µm per section.
- When trimming biological material (particularly bone), the section thickness should not exceed 50 µm.

Proceed as follows:

- Open the **Main** window in the software.
- Afterwards, adjust the desired section thickness, sledge speed, cutting window and section program, see (→ p. 32 – 6.4 Main window).
- Adjust the **Automatic** operating mode and then press the **Start** button, see (→ p. 32 – 6.4 Main window).
- The trimming procedure will be carried out automatically.

7.8 Setting the sectioning parameters

Proceed as follows:

- Open the **Main** window in the software and then set the **Manual** operating mode.
- Afterwards, adjust the section thickness and the sectioning window, see (→ p. 32 – 6.4 Main window).

7.8.1 Sectioning the specimen

For the sectioning procedure, you need brush, pressure plate and special section collecting tape and – depending on the application – a dehydration frame.



Note

The required accessories should be stored in the cryochamber for some time prior to sectioning to make sure they have the same temperature as the specimen.

Proceed as follows:

- Activate the knee lever, see (→ p. 19 – 3.3.2 Knee lever).

7.8.2 Collecting the sections

Prior to removing a section, an appropriately sized piece of tape must be attached to the specimen block surface. When doing so, please comply with the following safety instructions:

**Warning**

- Wear safety gloves.
- Never try to catch or grab the knife.
- Never put your hands into the space between specimen and knife.

Proceed as follows:

- Select manual operating mode and adjust the desired section thickness.
- Activate the section documentation function.
- Use the knee lever to move the sledge to the right-side reversal position (left edge of the specimen block just about clears the knife).
- Cut the specimen and clean the specimen surface with a brush.
- Cut off a desired length from the tape roll. The width of the tape should not be larger than the specimen block; the length should be long enough to easily hold the tape with your left hand while sectioning and to attach the completed section to a dehydration frame.
- If the tape has been kept outside the cryochamber, let the tape length rest a few seconds inside the cryochamber before attaching it to the specimen block, this will ensure that there is no temperature difference between the tape and specimen block.
- Use the pressure plate to aid in pressing the tape onto the block surface.
- Fix the tape first in the middle and then press out to both ends. This method prevents air bubbles from being trapped between tape and block surface.
- Now fix the tape in place with a cooled brush, paper towel or cotton wadding. Never touch the specimen block face with your hands.
- Hold the left end of the tape in your left hand. Drive the microtome gently until some of the embedding medium is apparent on the left edge of the tape.
- Use the pressure plate to aid in pressing the tape onto the block surface. To do this, press the pressure plate firmly on the block close to the knife blade.
- Shift the knee lever to start sectioning; keep the pressure plate pressed on the specimen block.
- Carefully guide the tape to the upper left (away from the specimen) – do not pull tightly!
- Completely remove the section and stop the sledge behind the knife. Be sure to leave the section in the cryochamber. It must not be exposed to room temperature.
- Check the section.
- Add the section data to the documentation.

Section removal

- Fasten the section to a dehydration frame that has been stored in the cryochamber.
- To speed up the dehydration process after completing the section removal, the automatic or manual dehydration of the instrument can be used.

7.9 Dehydrating the sections

To be able to store the sections or use them otherwise outside the cryochamber, they must be properly dehydrated. For this purpose, the instrument has a programmable and a manual dehydration function.

During dehydration, the fan speed is increased, thus speeding up the removal of moisturesaturated cold air. The moisture is separated at the evaporator.

During the course of a dehydration cycle, the automatic defrost cycles are skipped and carried out immediately after the dehydration procedure is completed.

Proceed as follows:

- Open the **Main** window in the software and adjust the automatic dehydration, see (→ p. 32 – 6.4 [Main window](#)).

7.10 Manually shifting the knife holder for high specimens



Note

Specimens with a total height of 200 mm can be sectioned with the Leica CM3600 XP. For this purpose, however, the manual shifting of the knife holder is necessary. The individual steps are described in the following chapters.

7.10.1 User interface

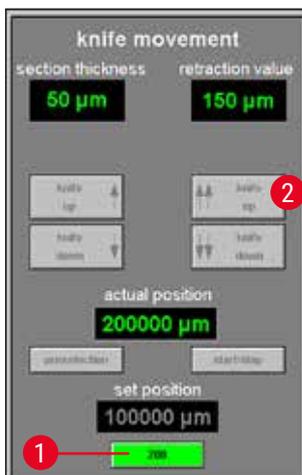


Fig. 80

The user interface has an additional **200** button (→ Fig. 80-1) in the **Knife movement** field of the main window.

- To activate the button, the knife holder is first to be brought to the highest position (100,000/200,000 µm) using the user interface (→ Fig. 80-2).
- The knife holder must then be manually shifted into the desired position, see (→ p. 74 – 7.10.3 [Knife holder height adjustment](#)) and (→ p. 75 – 7.10.5 [Sectioning thick blocks](#)).
- The **200** button works as a switch. Clicking one time (button is illuminated in green) sets the knife holder position start value, from which all following sections are counted, to 200 mm.
- Clicking again disables the 200 mm position again (button is gray).



Note

- If a specimen that is thicker (higher) than 100 mm is to be sectioned, the **200** button must be activated before starting the sectioning process so that the display in the **Actual position** field is set to the 200,000 µm value.
- This is important because this is the only way that all the data for values under the 100,000 µm mark can be recorded in the studies.

7.10.2 Knife holder description

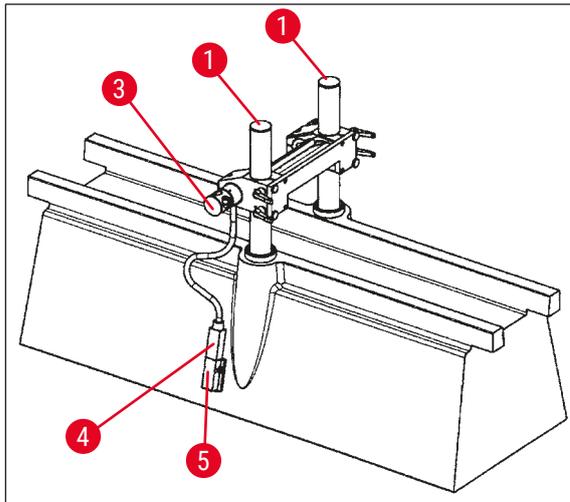


Fig. 81

(→ Fig. 81) shows the knife holder in the 100 mm position of vertical height.

- A groove (→ Fig. 83-2) in the support columns (→ Fig. 83-1) mark the 100 mm position. This requires that the groove match the upper edge of the knife holder, see (→ Fig. 83).



Warning

Under no circumstances can the knife holder be set to a lower position as this can cause serious damage to the instrument.

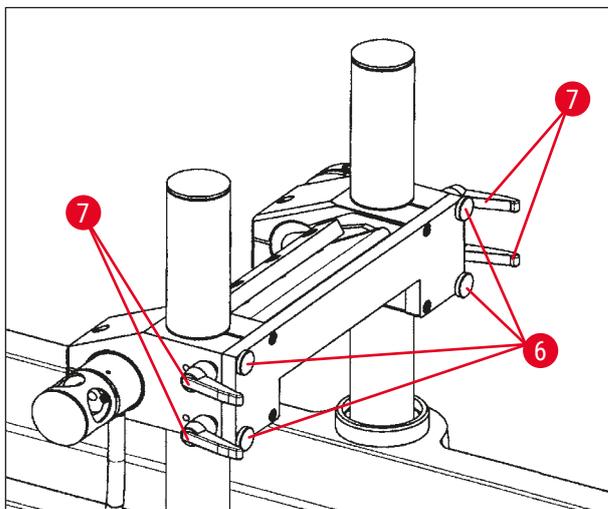


Fig. 82

- Four knurled screws (→ Fig. 82-6) and four clamping levers (→ Fig. 82-7) on the front hold the knife holder in its position and enable a fast height changeover (100 mm to 200 mm) on the columns.
- The temperature sensor (→ Fig. 84-4) is located on the side of the knife holder in this version.

7.10.3 Knife holder height adjustment

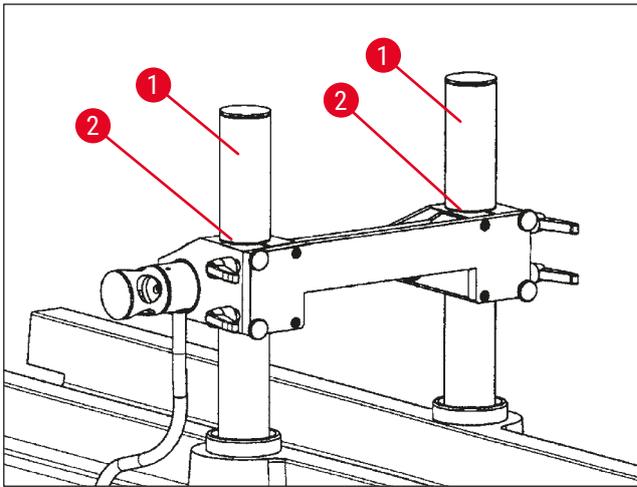


Fig. 83

- To adjust the knife holder on the support columns (→ Fig. 83-1), first unscrew both clamping levers (→ Fig. 82-7) on the bottom side.
- Afterwards, slightly unscrew the 4 knurled screws (→ Fig. 82-6) and loosen the other two clamping levers.

**Warning**

Secure the knife holder so that it does not fall down.

- Position the knife holder with the upper edge for the groove (→ Fig. 83-2) in the support columns in the 100 mm position or all the way at the top for the 200 mm position, see (→ Fig. 85).
- Then re-tighten the 4 clamping levers (→ Fig. 82-7) and the four knurled screws (→ Fig. 82-6).

7.10.4 Uninstalling the knife holder

**Warning**

Before the knife holder can be uninstalled, the temperature sensor (→ Fig. 84-4) has to be disconnected.

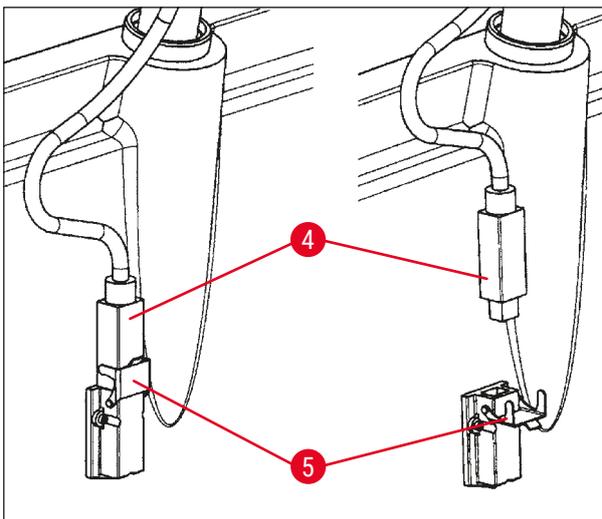


Fig. 84

- To loosen the temperature sensor, swing the locking clip (→ Fig. 84-5) to the bottom and pull the sensor (→ Fig. 84-4) out of the mount.
- To remove the knife holder, loosen the knurled screws (→ Fig. 82-6) and clamping levers (→ Fig. 82-7), see (→ p. 74 - 7.10.3 Knife holder height adjustment), then pull the knife holder upwards and remove it.

8. Cleaning and Maintenance

8.1 Cleaning



Warning

- Switch the instrument off before each cleaning.
- Wear safety gloves when cleaning the instrument.
- When using cleaning agents, observe the manufacturer's safety instructions and the laboratory regulations valid in the country of use.
- Do not use any of the following for cleaning the outside surfaces of the instrument: alcohol, detergents containing alcohol (window cleaner!), abrasive cleaning powders, solvents containing acetone or xylene!
- No liquid may come into contact with the electrical connections or spill into the interior of the instrument!
- Radioactive specimen waste must be disposed of according to the local radiation safety regulations.



Note

- For cleaning and disinfection of the stainless steel cryochamber and the microtome, use commercial alcoholic disinfectants or alcohol.
- The outer surfaces of the cryochamber and the control unit can be cleaned with mild household cleaners.

8.1.1 Removing the microtome



Note

- Normally it is not necessary to extract the microtome from the cryochamber.
- However, if you wish to lift the microtome out of the cabinet, i. e. for thorough cleaning, it is strongly recommended to use an overhead crane which has to be installed on the ceiling above the instrument.



Warning

- For safety reasons we strongly advise you against lifting the microtome (190 kg) from the cabinet without appropriate lifting gear! Do not attempt to lift the microtome from the cryochamber manually, even if several persons are there to help.
- When removing the microtome (approx. 190 kg), a ceiling crane capable of carrying that weight should be available.

Required tools:

- Hexagon key, size 6

Proceed as follows:

- Observe the safety notes in Chapter (→ p. 16 – 3. Safety).
- Switch off the instrument and unplug the power plug, see (→ p. 25 – 5.3.1 Port and switch functions).

- Remove the knife from the knife holder, see (→ p. 65 – 7.6 Knife).
- Lock the window, see (→ p. 20 – 3.3.3 Window).
- Open the chamber lid, see (→ p. 20 – 3.3.4 Cabinet).

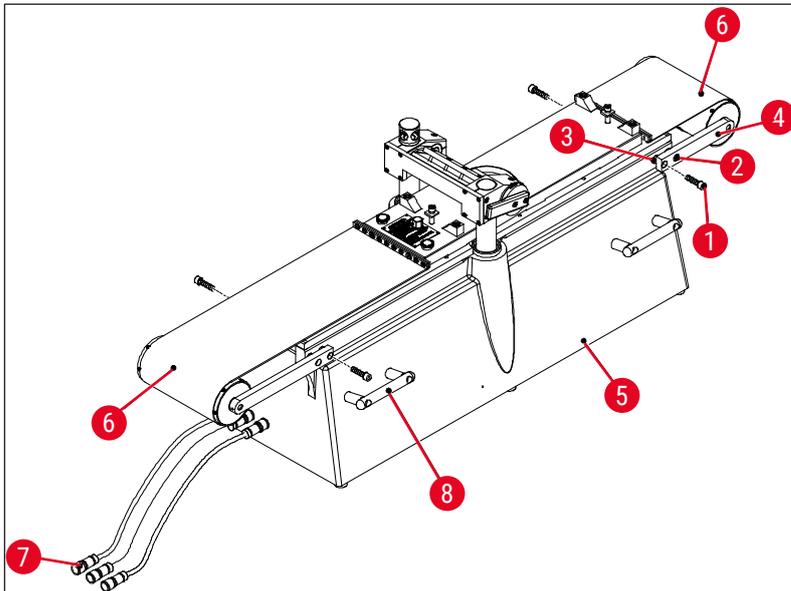


Fig. 87

- Remove the screws (→ Fig. 87-1) and loosen screws (→ Fig. 87-2). When removing the screws (→ Fig. 87-1), make sure that the spacer rings (→ Fig. 87-3) between the bracket (→ Fig. 87-4) and the microtome (→ Fig. 87-5) do not get lost.
- Fold down the belt covers (→ Fig. 87-6).
- Disconnect the connections (→ Fig. 87-7) on the left side of the cabinet (not on the microtome).
- Fasten cables or straps that have a sufficient carrying capacity to the carrying handles (→ Fig. 87-8).
- Carefully lift the microtome (→ Fig. 87-5) out of the cabinet using the crane.
- In doing so, securely fasten the microtome (→ Fig. 87-5) to prevent rotation or vibrations as this could lead to damage to the cabinet.

8.2 Maintenance



Note

- The instrument requires maintenance from Leica Service at an interval of once per year.
- The pushbutton switch of the refrigeration must likewise be pressed at least once a year.

8.2.1 Oiling



Note

Be sure to check the oil level every day and before each sectioning procedure.



Fig. 88

Checking the oil level

Unscrew both covers (→ Fig. 88-1). The oil level must always be above the small capillary tubes (→ Fig. 88-2).

Filling up the oil reservoirs

Unscrew both covers (→ Fig. 88-1) and refill the PDP 38 low-temperature oil (order number, see (→ p. 80 – 9.1 Ordering information)).

Then screw both covers (→ Fig. 88-1) back on.

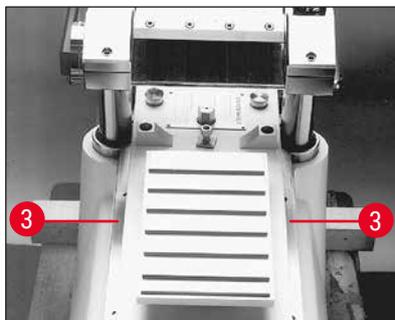


Fig. 89

Oiling the sledge guides

The sledge guide (→ Fig. 89-3) is to be oiled with PDP 38 low-temperature oil (order number, see (→ p. 80 – 9.1 Ordering information)) once a month.

8.2.2 Defrosting

Three defrost procedures are available:

- Automatic defrost I
- Automatic defrost II
- Manual defrost

Automatic defrost I

This defrost cycle takes place automatically once every 24 hours. The defrost cycle itself is mandatory, i. e. cannot be deactivated by the user. The start time is freely selectable, see ([→ p. 38 – 6.5.1 Parameter settings](#)).

Automatic defrost II

If the Automatic defrost cycle I is not sufficient (high humidity, high ambient temperature), defrost cycle II is to be activated in addition, see ([→ p. 38 – 6.5.1 Parameter settings](#)).

Manual defrost

This defrost cycle can be activated manually and starts immediately, see ([→ p. 33 – 6.4.3 Automatic defrost](#)).

9. Optional Accessories

9.1 Ordering information

Designation	Order No.
Specimen stages	
Specimen stage, non-orientable, 40 x 80 mm	14 0022 50103
Specimen stage, non-orientable, 80 x 180 mm	14 0022 50105
Specimen stage, orientable, with ball-and-socket joint 120 x 200 mm	14 0022 50106
Specimen stage, orientable, with ball-and-socket joint 120 x 250 mm	14 0417 19635
Specimen stage, orientable, 150 x 450 mm	14 0022 50107
Specimen holders	
Special specimen holder, orientable, with ball-and-socket joint, for non-orientable specimen stages, maximum specimen size 55 x 70 mm	14 0417 24784
Embedding frames	
Embedding frame, 40 x 80 mm	14 0022 50123
Embedding frame, 80 x 180 mm	14 0022 50126
Embedding frame, 120 x 200 mm	14 0022 50125
Embedding frame, 120 x 250 mm	14 0417 19632
Embedding frame, 150 x 450 mm	14 0022 50127
Disposable blade system for large-surface cryosections	
Leica disposable blade holder 157 AR, for disposable blades, type H 45 L	14 0417 26152
1 dispenser with 10 H 45 L disposable blades, with special coating, 45°, 157 mm length (cannot be used with other blade holders or instruments)	14 0216 26153
Positioning tool	
Positioning tool for disposable blades	14 0417 28760
Positioning tool for steel or tungsten carbide knife	14 0417 19141
Microtome knives	
Tungsten carbide knife, facet angle 35°, 160 mm long	14 0216 19157
Tungsten carbide knife, facet angle 20°, 160 mm long	14 0216 19156
Knife case for knife 160 mm	14 7022 50148
Freezing accessories	
Freezing device for specimen alignment	14 0022 50152
Section collecting tape	
Section collecting tape, 76 mm x 50 m	14 0417 39651
Section collecting tape, 148 mm x 50 m	14 0417 39652

Designation	Order No.
Microtome oils and grease	
Special oil PDP 38, 100 ml bottle for Leica CM3600 XP	14 0336 06099
Special oil PDP 38, 500 ml bottle for Leica CM3600 XP	14 0336 06101
Low-temperature grease, for Leica CM3600 XP	14 0022 50192
Dehydration accessories	
Dehydration frames (plastic) for Leica CM3600 XP	14 0417 32995
Frame holder (for 4 dehydration frames) for Leica CM3600 XP	14 0417 32996
Other accessories	
Section waste tray	14 0417 32980
Tray	14 0417 32993
Height adjustment frame 100 mm, assembly	14 0417 33970
Service agreements	
Maintenance contract Leica CM3600 XP	14 0417 32590
Application training	
Application training for Leica CM3600 XP	14 0417 32587

10. Warranty and Service

Warranty

Leica Biosystems Nussloch GmbH guarantees that the contractual product delivered has been subjected to a comprehensive quality control procedure based on the Leica in-house testing standards, and that the product is faultless and complies with all technical specifications and/or agreed characteristics warranted.

The scope of the warranty is based on the content of the concluded agreement. The warranty terms of your Leica sales organization or the organization from which you have purchased the contractual product shall apply exclusively.

Service information

If you are in need of technical customer support or spare parts, please contact your Leica representative or the Leica dealer where you purchased the instrument.

Please provide the following information:

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

Yearly Preventive Maintenance

Leica recommends to conduct a yearly preventive maintenance. This has to be performed by a qualified Leica Service Representative.

11. Decommissioning and Disposal



Warning

The instrument or parts of the instrument must be disposed of according to existing applicable, local regulations. All objects contaminated with spilled reagents must be disinfected immediately with a suitable disinfectant to prevent spreading to other areas of the lab or to lab personnel.

Please comply with the Cleaning and Maintenance chapter and the Decontamination Declaration at the end of these Instructions for Use for notes on cleaning the Leica CM3600 XP.

The instrument can be contaminated when using biohazardous specimens. Thorough disinfecting is required before re-commissioning or disposal (e. g. multiple cleaning steps, disinfection or sterilization). Dispose of the instrument in compliance with the applicable laboratory specifications. Contact your Leica representative for more information.



Instrument components such as the computer, monitor, etc. that are labeled with the crossed-out dust bin are affected by the European Directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE) of the European Parliament and the Council of January 27, 2003.

These objects must be disposed of via the collection points in accordance with the local regulations. More information on disposal of the instrument can be obtained from your local disposal company or your local Leica support staff.

12 Decontamination Confirmation

12. Decontamination Confirmation

Any product that is to be returned to Leica Biosystems or serviced on site must be properly cleaned and decontaminated. The associated decontamination certificate template can be found on our website www.LeicaBiosystems.com in the product menu. This template must be used to enter all required data.

If a product is returned, a copy of the completed and signed decontamination certificate must either be enclosed or handed over to a service technician. The user shall be responsible for products that are returned without a completed decontamination certificate or with a missing decontamination certificate. Return shipments that are classified by the company as a potential hazard source will be returned to the sender at his/her own expense and risk.

www.LeicaBiosystems.com



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