Leica VT1000 S

Vibrating-blade microtome

Instructions for Use
English

Order No.: 14 0472 80101 - Revision N

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

CE

Version 2.5, Revision N - 07.2022

The information, numerical data, notes and value judgments contained in this Instructions for Use represent the current state of scientific knowledge and state-of-the-art technology as we understand it following thorough investigation in this field.

We are under no obligation to update the present Instructions for Use periodically and on an ongoing basis according to the latest technical developments, nor to provide our customers with additional copies, updates etc. of this Instructions for Use.

To the extent permitted in accordance with the national legal system as applicable in each individual case, we shall not be held liable for erroneous statements, drawings, technical illustrations etc. contained in this Instructions for Use. In particular, no liability whatsoever is accepted for any financial loss or consequential damage caused by or related to compliance with statements or other information in this Instructions for Use.

Statements, drawings, illustrations and other information regarding the contents or technical details of the present Instructions for Use are not to be considered warranted characteristics of our products.

These are determined only by the contract provisions agreed between ourselves and our customers.

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

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

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Table of contents

1. Important Information

1.1 Symbols and their meanings

Caution

Leica Biosystems GmbH assumes no liability for consequential loss or damage due to failure to observe the following instructions, particularly in relation to transportation and package handling, and failure to observe the instructions for handling the instrument carefully.

Symbol:	**Title of the symbol:**	Warning
	**Description:**	If this danger is not avoided, then this may result in death or serious injury.
Symbol:	**Title of the symbol:**	Caution
	**Description:**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
Symbol:	**Title of the symbol:**	Note
	**Description:**	Indicates a situation with the potential for property damage which, if not avoided, could result in damage to the machine or something in its vicinity.
Symbol:	**Title of the symbol:**	Item number
→ "Fig. 7 - 1"	**Description:**	Item numbers for numbering illustrations. Numbers in red refer to item numbers in illustrations.
Symbol:	**Title of the symbol:**	Function key
Start	**Description:**	Software symbols that have to be pressed on the input screen are displayed as bold, gray and underlined text.
Symbol:	**Title of the symbol:**	China ROHS
	**Description:**	Environmental protection symbol of the China RoHS directive. The number in the symbol indicates the "Environment-friendly Use Period" of the product in years. The symbol is used if a substance restricted in China is used in excess of the maximum permitted limit.
Symbol:	**Title of the symbol:**	WEEE symbol
	**Description:**	The WEEE symbol, indicating separate collection for WEEE - Waste of electrical and electronic equipment, consists of the crossed-out wheeled bin (§ 7 ElektroG).
Symbol:	**Title of the symbol:**	Manufacturer
	**Description:**	Indicates the manufacturer of the product.

Symbol:	Title of the symbol:	Manufacturing date
	Description:	Indicates the date when the device was manufactured.
Symbol:	Title of the symbol:	CE Compliance
	Description:	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives and regulations.
Symbol:	Title of the symbol:	UKCA Label
	Description:	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:	UK Responsible Person
	Description:	The UK Responsible Person acts on behalf of the non-UK manufacturer to carry out specified tasks in relation to the manufacturer's obligations.
Symbol:	Title of the symbol:	Country of Origin
	Description:	The Country of Origin box defines the country where the final character transformation of the product has been performed.
Symbol:	Title of the symbol:	Observe the Instructions for Use
	Description:	Indicates the need for the user to consult the instructions for use.
Symbol:	Title of the symbol:	Order No.
	Description:	Indicates the manufacturer's catalog number so that the device can be identified.
Symbol:	Title of the symbol:	Serial number
	Description:	Indicates the manufacturer's serial number so that a specific device can be identified.
Symbol:	Title of the symbol:	Fragile, handle with care
	Description:	Indicates a device that can be broken or damaged if not handled carefully.
Symbol:	Title of the symbol:	Store dry
	Description:	Indicates a device that needs to be protected from moisture.

Symbol:

Title of the symbol: This way up

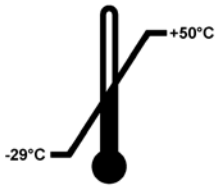
Description: Indicates correct upright position of the transport package.

Symbol:

Title of the symbol: Stack limit

Description: The largest number of identical packages allowed to be stacked; **"2"** stands for the number of permitted packages.

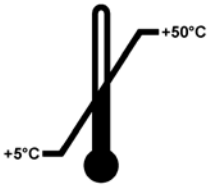
Symbol:



Title of the symbol: Temperature limit for transport

Description: Indicates the temperature limits for transport to which the device can be safely exposed.

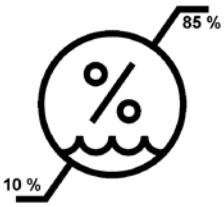
Symbol:



Title of the symbol: Temperature limit for storage

Description: Indicates the temperature limits for storage to which the device can be safely exposed.

Symbol:



Title of the symbol: Humidity limitation for transport and storage

Description: Indicates the range of humidity for transport and storage to which the device can be safely exposed.

Symbol:

Title of the symbol: 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 pitch of 60° or more, the blue quartz sand flows into the arrow-shaped indicator window and sticks there permanently.

Improper handling of the shipment is immediately detectable and can be proven definitively.

Symbol:	**Title of the symbol:**	Shockdot Impact Indicator
	**Description:**	In the Shockwatch system, a shock dot shows shocks or impacts that are above a specified intensity through red coloration. Exceeding a defined acceleration (g value) causes the indicator tube to change color.
Symbol:	**Title of the symbol:**	Recycling
	**Description:**	Indicates, that the item can be recycled where correct facilities exist.
Symbol:	**Title of the symbol:**	Regulatory Compliance Mark (RCM)
	**Description:**	The Regulatory Compliance Mark (RCM) indicates a device's compliance with applicable ACMA technical standards of New Zealand and Australia - that is, for telecommunications, radio communications, EMC and EME.

1.2 Instrument model

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

1.3 Information

When making inquiries, please specify correctly:

- Instrument model
- Serial number

1.4 Qualification of personnel

The Leica VT1000 S should be operated by trained laboratory personnel only. The instrument is intended for professional use only.

All laboratory personnel designated to operate this instrument must read these Instructions for Use carefully and must be familiar with all technical features of the instrument before attempting to operate it.

1.5 Intended use/improper use

The Leica VT1000 S is used for sectioning in the fields of medicine, biology and industry, and is especially designed for sectioning fixed or unfixed fresh tissue in a buffer solution.

Warning

The Leica VT1000 S may be used for research purposes only. Sections made using the Leica VT1000 S must NOT be used for diagnostics!

The instrument must be used exclusively according to the instructions contained in these Instructions for Use.

Any other use of the instrument is considered improper.

2. 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.

2.1 Safety notes

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

The Operating Manual is an important part of the product, and must be read carefully prior to startup and use and must always be kept near the instrument.

This instrument 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.

The current EC Declarations of Conformity and UKCA Declaration of Conformity can be found on the Internet: www.LeicaBiosystems.com

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.

Warning

The protective devices located on the instrument and the accessories must not be removed or modified. The instrument must only be opened and repaired by service technicians authorized by Leica.

2.2 Warnings

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

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

2.3 Safety instructions for handling the instrument

Danger

Caution

Extremely sharp blades pose risk of injury when touched!

Caution

Fresh tissue poses risk of infection!

Caution

When not in use, cover magnifier with corresponding lid to avoid risk of fire.

Warning

Avoid touching live parts under any circumstances!

Proper handling

- Be sure to handle knives and blades very cautiously!
- Never touch the cutting edge of knives and blades!
- Do not leave knives, blades and bladed knife holders unprotected.
- All appropriate safety precautions must be met to avoid the risk of infection.
- Protective clothing according to safety regulations for "Working with harmful substances" (Safety mask, gloves, protective clothing) must be worn!
- Cover the magnifier during work breaks as it may act as a burning glass when not covered!
- In case of emergency, press the red EMERGENCY STOP switch (at the right side of the instrument). To release the switch, turn it in the direction of the arrow.
- The instrument may be opened by authorized service personnel only.
- Before removing the cover, ensure that the instrument is unplugged.

3. Instrument Characteristics

3.1 Technical data

Electrical Specifications	
Nominal supply voltage	100 V - 240 V
Nominal supply frequencies	50/60 Hz
Mains supply voltage fluctuations	Not to exceed ± 10 % of the nominal supply voltage
Power consumption	50 VA
Mains input fuses	2x T1.25A L 250VAC
Dimensions and Weight Specification	
Overall size of device in operating mode (Width x Depth x Height, mm)	480 mm x 360 mm x 200 mm
Overall size serial packaging (Width x Depth x Height, mm)	780 mm x 585 mm x 656 mm
Empty weight (without accessories, kg)	17 kg
Overall weight (with accessories, kg)	19 kg
Device weight including packaging (kg)	40 kg
Enviromental Specification	
Operating altitude (meters)	up to 2000 m above sea level
Temperature (operation) (min/max)	min. +5 °C to max. +40 °C
Relative humidity (operation) (min/max)	max. 80 %
Temperature (transit) (min/max)	-29 °C to +50 °C
Temperature (storage) (min/max)	+5 to +50 °C
Relative humidity (transit/storage)	10 %-85 %rh
Operating noise level	<70 dB
Emissions and Boundary Conditions	
Overvoltage category to IEC 61010-1	II
Pollution degree to IEC 61010-1	2
Means of protection to IEC 61010-1	Class I
Degree of protection to IEC 60529	IP20
Heat emission	50J/s
A-weighted noise level, measured at 1 m distance	<70 dB
EMC class	B
Electrical Connections and Interfaces	
Power supply	Connecting socket for power cord
Electrical Connections	Connection for foot switch, 9-pole
Mechanical Connections	
Interfaces to other devices	Fixture for magnifier support, Knife holder, Buffer tray S, Magnifier support, Magnifier, Module Hi-Power spot, LED 1000 (optional), Module LED Hi-Power spots, 2-arm (optional)

Other Specifications	
Sectioning frequency (± 10 %)	0 - 100 Hz
Amplitude	adjustable in 5 steps: 0.2; 0.4; 0.6; 0.8; 1 mm
Sectioning range	1 - 40 mm (adjustable)
Specimen orientation, rotating	330°, 0 - 999 µm (adjustable; can be deactivated)
Electrical overload protection	Yes
Internal current limit for the electronics	Yes
Height with magnifier support	285 mm
Magnifier support	2 kg
CE	Yes
Sectioning speed (± 10 %)	0.025 - 2.5 mm/s
Return stroke speed (± 10 %)	5 mm/s
Total vertical specimen stroke	15 mm (motorized)
Maximum specimen size: with standard knife holder	33 x 40 mm
Section thickness selection	1 - 999 µm, in 1 µm steps
Magnifier, assy. (standard accessory of the configured instrument)	2 x magnification

3.2 General overview - Leica VT1000 S

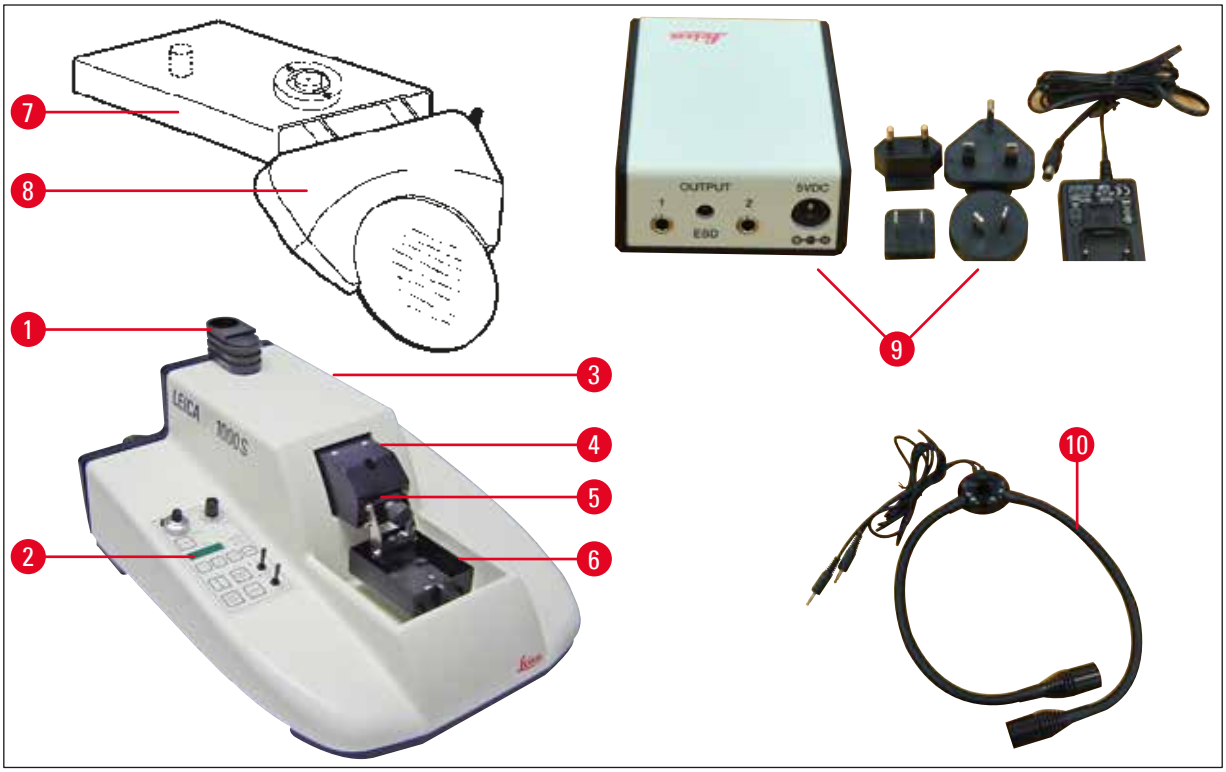


Fig. 1

1	Fixture for magnifier support	**6**	Buffer tray S
2	Control panel	**7**	Magnifier support
3	EMERGENCY STOP switch (not visible here)	**8**	Magnifier
4	Cutting head	**9**	Module Hi-Power spot, LED 1000 (optional)
5	Knife holder	**10**	Module LED Hi-Power spots, 2-arm (optional)

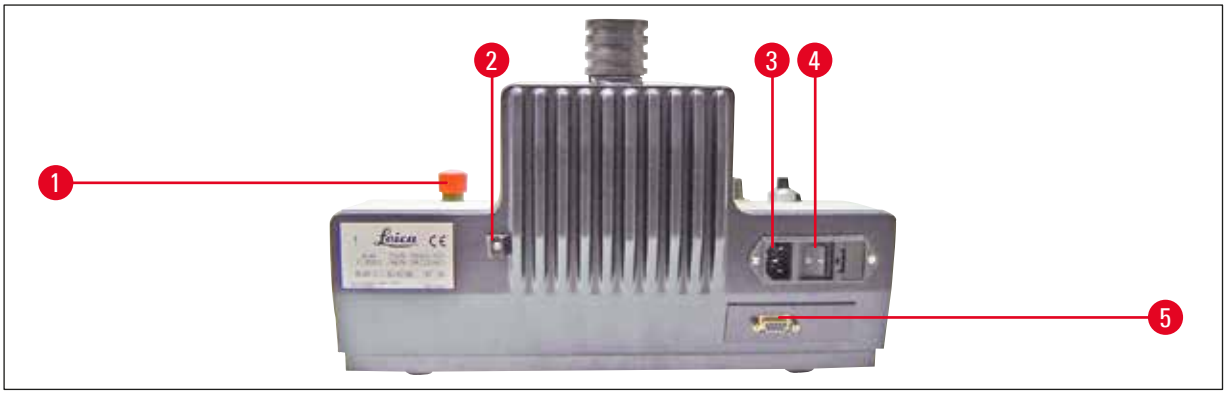


Fig. 2

1	EMERGENCY STOP button	**3**	Connecting socket for power cord
2	Fixing device for drain tube	**4**	Power switch
		5	Connection for foot switch, 9-pole

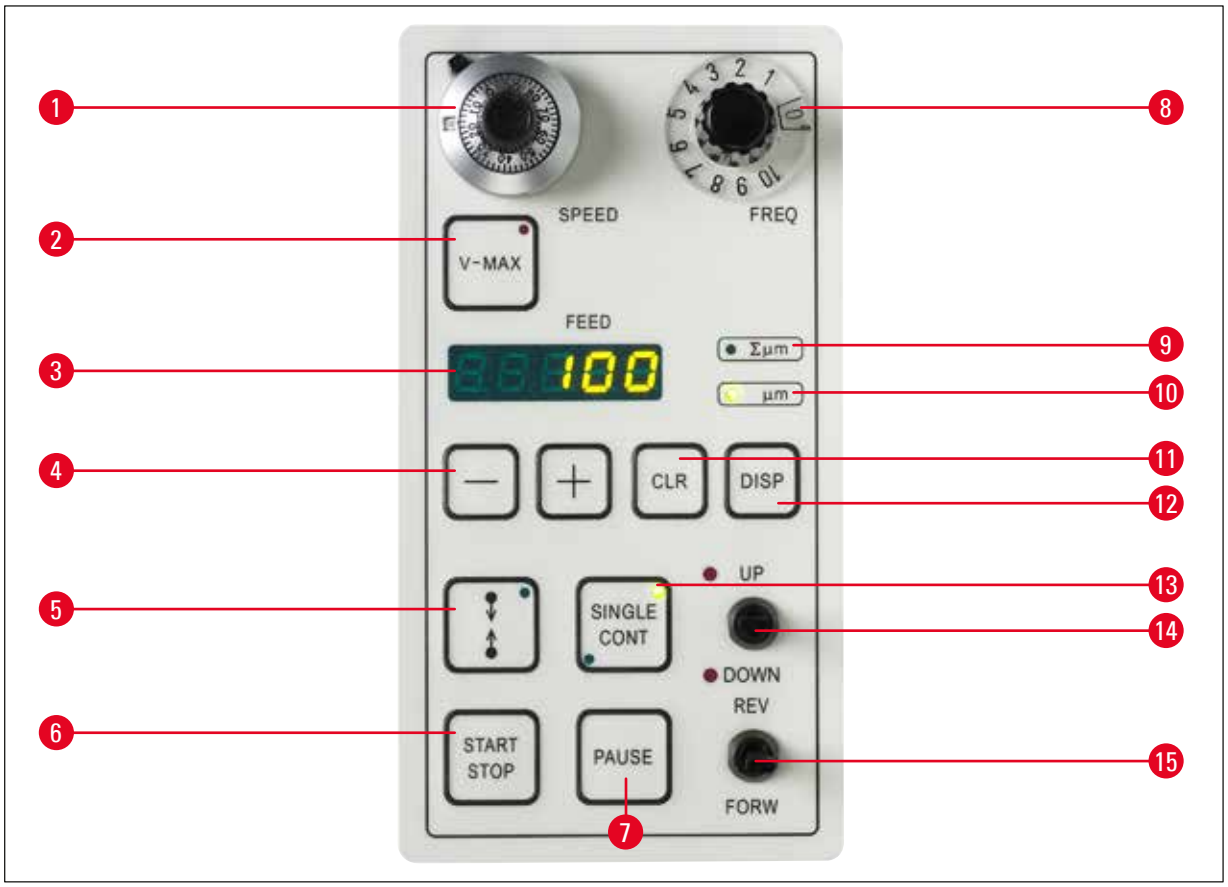


Fig. 3

1	Rotary knob for sectioning speed	**8**	Rotary knob for sectioning frequency
2	Button for maximum advance speed	**9**	LED mode indication: "Totalized section thickness"
3	Indication of selected section thickness or totalized section thickness in µm	**10**	LED mode indication: "Section thickness"
4	+/- selection button for section thickness (1 - 999 µm selectable), retraction and/or volume	**11**	CLR-Clear button
5	Button for setting the limit stops of the sectioning window	**12**	DISP-Programming button
6	Start button for single / continuous sectioning stroke	**13**	Selector button "Single/continuous stroke" (LEDs indicate selected mode)
7	Pause button - stops sectioning process	**14**	Toggle switch "Buffer tray height adjustment" (LEDs indicate limit positions)
		15	Toggle switch for knife forward and return stroke

4. Installation

4.1 Standard delivery

Qty	Designation	Order No.
	Basic instrument	14 0472 35612
1	Silicon tube	14 0462 27513
1	set of replacement fuses 2 x T 1.25 A	14 6000 04803
1	toolset:	
	1 Allen key, No. 2.5	14 0194 13195
	1 Allen key, No. 8.0	14 0222 04143
	1 Manipulator	14 0462 28930
1	Microtome protective cover	14 0212 04091
1	Instructions for Use printed (English, with Language CD 14 0472 80200)	14 0472 80001
	Leica VT1000 S complete configuration	**14 0472 35613**
	Leica VT1000 S basic instrument	14 0472 35612
	Specimen discs S, non orientable	14 0463 27404
	Buffer tray S	14 0462 30132
	5 Countersunk screw, M 5 x 8	14 2101 77121
	2 Hose clamps	14 0481 41952
	Knife holder S – for injector and razor blades	14 0462 30131
	Allen key w/handle, size 3	14 0194 04764
	1 Bottle of Cyanoacrylate adhesive	14 0371 27414
	Magnifier assy. (magnifier glass & carrier)	14 0462 31191

If the supplied local power cord is defective or lost, please contact your local Leica Biosystems representative.

Note

When ordering additional accessories, compare the parts received with the parts ordered. If the parts received do not match your order, contact the sales company responsible for your order immediately.

4.2 Unpacking and setting up the instrument

Note

The packaging has two indicators, ShockDot Impact Indicator and Tilt Indicator, that indicate improper transport. When the instrument is delivered, check these first. If one of the indicators is triggered, the package was not handled as prescribed. In this case, please mark the shipping documents accordingly and check the shipment for damage.

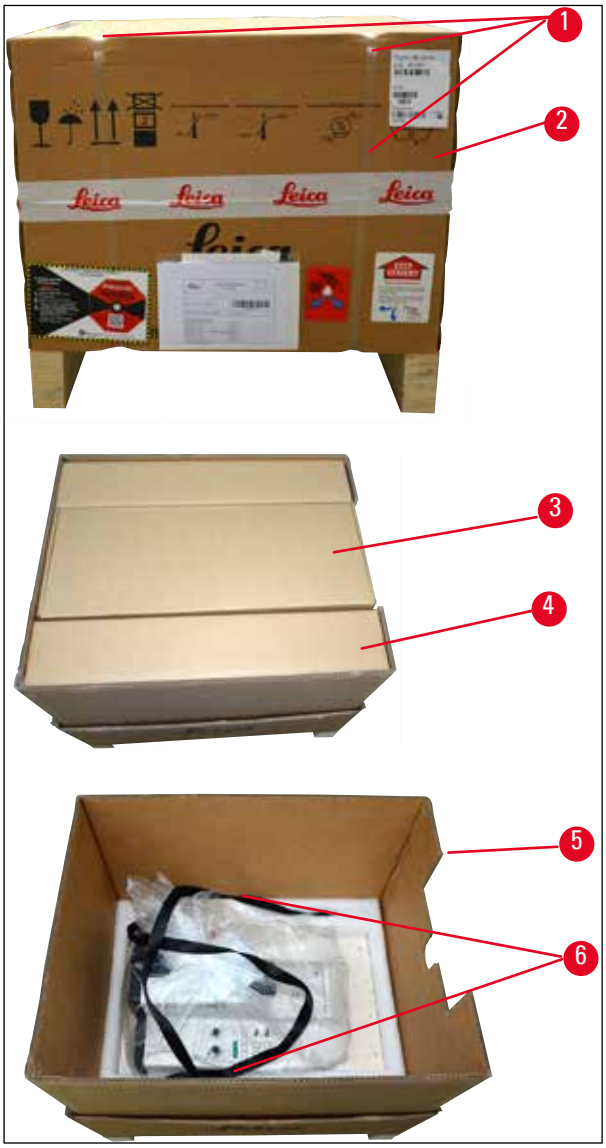


Fig. 4

- Remove the packing strap and the adhesive
- tape (→ Fig. 4-1).
- Remove the carton lid (→ Fig. 4-2).
- Take out the accessory carton (→ Fig. 4-3).
- Take Allen key No. 8 out of the accessory carton and put it aside for later use.
- Remove the fixing carton (→ Fig. 4-4).
- Remove the outer carton wall (→ Fig. 4-5).
- Lift the instrument out of the carton by the carrying straps (→ Fig. 4-6) and place it on a suitable stable laboratory table.

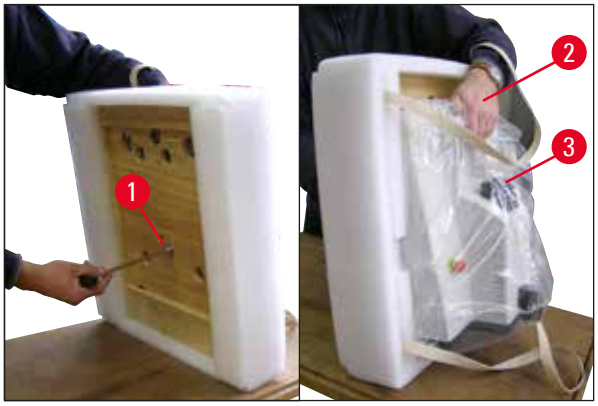


Fig. 5

- Tilt the instrument including the baseplate (→ Fig. 5) - hold the instrument with one hand on the recess (→ Fig. 5-2) for the buffer tray! NEVER lift or hold it by the cutting head (→ Fig. 5-3)! Unscrew the screw (→ Fig. 5-1) using the size 8 Allen key provided and remove the base plate.

Fig. 6

- Using both hands at the sides (→ Fig. 6), grasp the bottom of the instrument and carefully place it on a suitable laboratory table.

Note

Compare with the attached packing list to make sure the delivery is complete.

Note

The transport carton and included retaining elements should be kept in case a return shipment is necessary later. To return the instrument, follow the instructions above in reverse order.

Assembling the drain tube

- Bottom of the instrument (→ Fig. 7).
- Connect the drain tube (→ Fig. 7) to the bottom of the instrument (→ Fig. 7-1).
- Ensure that the loose end of the drain tube is closed tightly with the matching stopper.
- Secure the loose end of the drain tube in the holder at the rear of the instrument (→ Fig. 7-2).

Fig. 7

Assembling the magnifier support and foot switch (optional)

- The magnifier support (→ Fig. 8-1) is packaged separately.
- Set it on the instrument as shown in (→ Fig. 8).
- Attach the optional foot switch.
- Securely plug the foot switch into the 9-pin socket (→ Fig. 8-2).

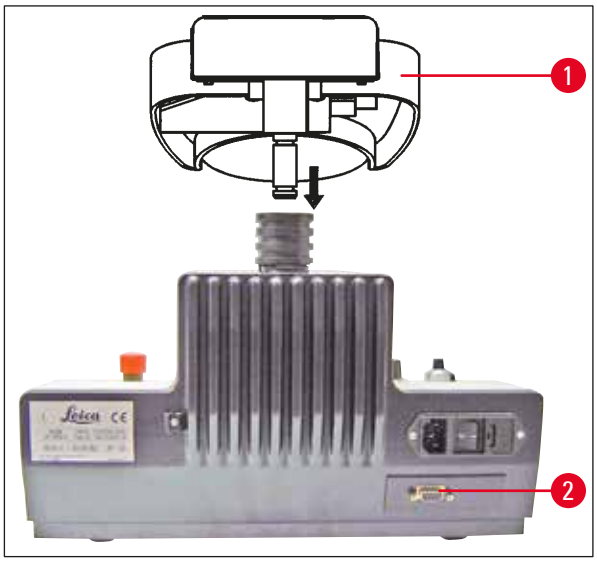


Fig. 8

Note

When transporting the instrument, always do so WITHOUT the magnifier support!

5. Operation

5.1 Installation site requirements

The place of installation must meet the following requirements:

- The instrument is designed for indoor use only.
- The power plug must be freely and easily accessible.
- Power supply at a distance no greater than the length of the power cable (3m) – an extension cable must not be used.
- Level installation location,
- Substrate as free of vibration as possible,
- Relative humidity should not exceed 80 %
- Room temperature consistently between +5 °C and +40 °C
- Avoid vibrations, direct sunlight, and large temperature fluctuations!

Warning

The instrument may not be operated in hazardous locations.

Warning

The instrument MUST be connected to a grounded power socket. Use only a provided power cable that is intended for the local power supply.

5.2 Setting up the instrument

Note

The instrument MUST be connected to a grounded power socket. Use only a provided power cable that is intended for the local power supply.

Warning

The instrument MUST be set up so that the power plug and switch are free and easily accessible at all times!

Note

The Leica VT1000 S is equipped with a autoranging power supply to cover voltages from 100 V to 240 V.

After switching on the main switch, the instrument carries out an initial startup run: The blade returns to the rear starting position after a short forward movement.

1. Put the main switch at the back of the instrument to the OFF position.
2. Make sure the power cable is connected correctly to the instrument.
3. Attach the magnifier support.
4. Insert the buffer tray.

5. Insert the knife holder.
6. Insert a blade into the knife holder.
7. Connect the magnifier support with Module LED Hi-Power spots, 2-arm, as shown in (→ Fig. 9). Insert plug (→ Fig. 9-1) of the Module LED Hi-Power spots, 2-arm, into socket (→ Fig. 9-2) at the Module Hi-Power spot, LED 1000.

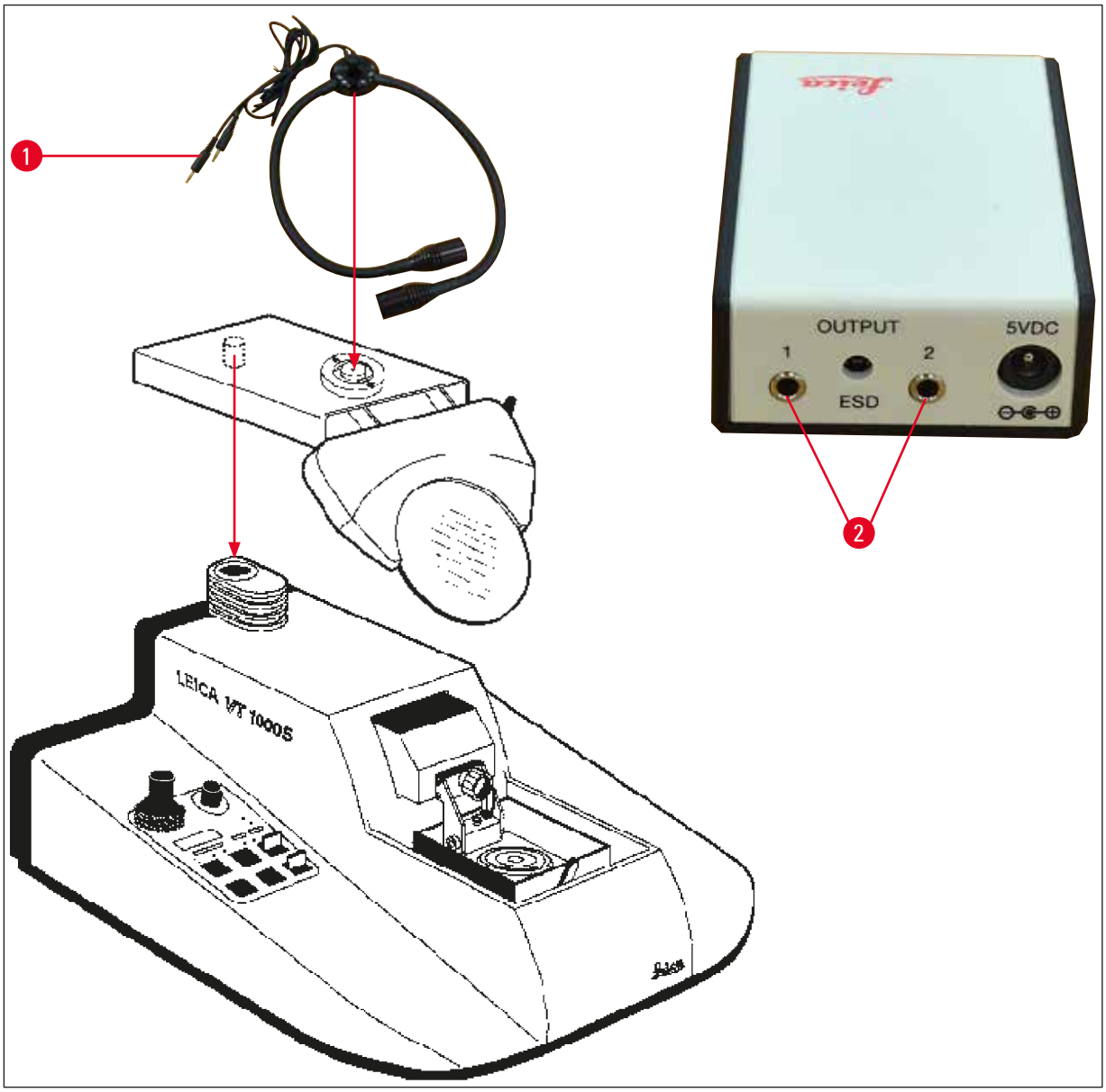


Fig. 9

8. Connect the optional foot switch at the rear of the instrument.
9. Plug the power cable into the wall socket.
10. Switch the instrument on (main switch).

5.3 The operating elements and their function - Leica VT1000 S

Caution

Practice working with the controls without a blade holder inserted. Only insert the knife holder when you are completely familiar with all control functions.

Fig. 10

SPEED

Scale setting	mm/s
0	0.00
0.5	0.025
1	0.050
2	0.075
3	0.125
4	0.175
5	0.225
6	0.40
7	0.65
8	0.90
9	1.30
10	2.50

10-speed rotating potentiometer with scale

Function:

Continuous knife feed adjustment from 0.05 - 2.5 mm/s:

Knife return stroke is performed at constant speed of 5 mm/s.

The additional locking lever (→ Fig. 10-1) (lever in 12 o'clock position) prevents the speed setting from being accidentally changed while sectioning is in progress.

Fig. 11

FREQ

Scale setting	Hz
0	0
0.5	8
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100

Rotary knob with scale from 0 to 10

Function:

Continuous adjustment of knife sectioning frequency (vibration) from 8 - 100 Hz.

Button with LED

Function:

- When the V-Max button is activated in manual mode (LED on - red light) and the REV/FORW button is pressed, the knife moves towards the specimen at maximum speed.
- When the START button is pressed, the LED in the V-Max button is extinguished. Sectioning starts at the speed previously selected.

Setting a sectioning window:

Warning

If - accidentally - only one limit stop of the sectioning window is set, the knife covers the maximum sectioning range!

Button with LED

- Activate the V-Max button. Press REV/FORW toggle switch for fast movement of the blade towards the specimen. Press the button to set the first limit of the sectioning window.
- Press REV/FORW once again, moving the blade edge past the specimen block and press once more to set the second sectioning window limit.
- Press START to deactivate V-Max. The knife edge moves back to the first sectioning window limit and resumes sectioning at the previously selected speed (10-speed rotary potentiometer).

Function:

- Start single or continuous sectioning stroke – according to whether SINGLE or CONT mode has previously been selected (→ p. 24 – LED indication with -/+ adjusting button, DISP and CLR function keys).
- Specimen feed (section thickness) takes place prior to each section.
- Retraction (specimen is lowered) takes place when the knife reaches the rear inversive point.
- In SINGLE mode, the knife stops automatically in the rear end position.
- In CONT mode, START/STOP has to be pressed again to stop the sectioning movement. The knife stops in the rear end position.
- A sectioning process, once started, will continue.

Function:

Immediate interruption of knife movement.

- Press PAUSE once again to continue sectioning.

Fig. 12

Toggle switch

Function:

To move the knife towards the specimen.

Can also be used for manual sectioning.

Because of safety aspects the FORW movement is carried out only while the toggle switch is pressed and held; the REV movement is carried out completely once the switch has been locked into place.

To stop the REV movement before reaching the rear end position, switch the toggle switch manually back into its center position.

The REV/FORW switch can also be used to stop a sectioning stroke which has been activated by pressing the START/STOP button.

Fig. 13

LED indication with -/+ adjusting button, DISP and CLR function keys

Function of LED indication:

Indicates the selected sectioning thickness or totalized section thickness.

Function of the -/+ button:

Selection of section thickness in 1-µm steps from 0 to 999 µm.

The specimen feed (in the preselected section thickness) takes place at the beginning of each sectioning stroke.

Function of the DISP button:

To select between two modes of operation:

"∑µm"= section thickness totalizing

"µm" = section thickness

Function of the CLR button in section thickness totalizing mode:

Sets the value indicated in the section thickness totalizing mode (∑µm) to zero.

Button with LED

Function:

Switch between

- Single stroke (1 sectioning stroke / 1 return stroke of the blade) and continuous stroke (continuous sectioning until the START/STOP button is pressed).
- To stop the blade at the rear end position in CONT mode press the START/STOP button.
- The sectioning stroke in progress will be completed and the blade will then stop at the selected end position of the sectioning range.

Fig. 14

Toggle switch

Function:

- Motorized height adjustment of buffer tray. Maximum travel: 15 mm (= total vertical specimen stroke).

  The upper and lower end positions of the buffer tray are indicated each by an audible warning signal and a red LED.

  While the knife is in motion the UP/DOWN toggle switch is inoperational.

  For the DOWN motion, the toggle switch can be locked in the DOWN position; For the UP motion, the switch must be pressed and held in the UP position.

  When the lowest possible position is reached with the toggle switch being locked in DOWN there will be both an audible and a visible signal. Once the switch is unlocked, the buffer tray is automatically raised until both signals switch off.
- To select the retraction thickness, to deactivate retraction or to set the volume of the Leica VT1000 S warning signal, press the following function key combinations:

Fig. 15

Volume adjustment:

- Select section thickness mode ("µm") by pressing the DISP button.
- Press the CLR and + buttons simultaneously. Display: "BE 15". The volume can now be adjusted via the -/+ button. "0" is equivalent to no sound signal.
- To quit the programming mode, press CLR.

Fig. 16

Adjusting the retraction

- In programming mode, press DISP to display the specimen retraction menu.
- Display: "LO".
- Set specimen retraction between 1 and 999 µm via the -/+ button; or disable by selecting "0".
- The selected value will be displayed in the FEED window.
- Press CLR to quit the menu function.

5.4 Adjusting the amplitude

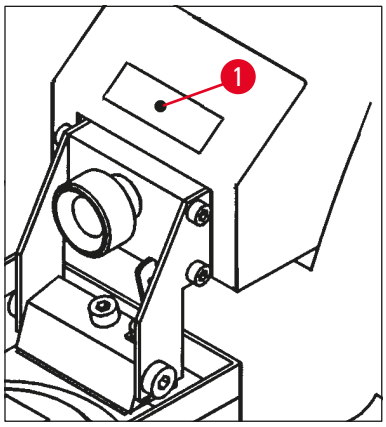


Fig. 17

- To obtain excellent sectioning results, the amplitude requires adjustment according to the specimen type being sectioned.

To this end:

- With a No. 2.5 Allen key loosen the clamping screw (→ Fig. 17-1) and secure the eccentric on the bottom with your finger. Selectable amplitude positions are, from left to right: 0.2 mm; 0.4 mm; 0.6 mm; 0.8 mm; 1 mm.
- Slide the amplitude clamping screw to the desired amplitude position and retighten.

Note

When adjusting the amplitude setting, do not remove the clamping screw, simply loosen it.
The instrument is shipped with the amplitude set to 0.6 mm.

5.5 Working with the Leica VT1000 S on a daily basis

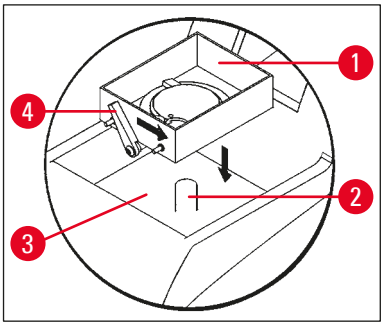


Fig. 18

- Mount the buffer tray (→ Fig. 18-1) onto the bolt (→ Fig. 18-2) inside the cooling bath (→ Fig. 18-3).
- Secure the buffer tray by relocating the clamping lever (→ Fig. 18-4) to the right (in the direction of the arrow).
- Via the UP/DOWN toggle switch lower the buffer tray to its lowest position (indicated by audible signal and red LED).
- Move the toggle switch back to the mid-position - the audible signal stops.
- If necessary, fill crushed ice into the cooling bath (→ Fig. 18-3).
- Fill the buffer tray (→ Fig. 18-1) with cooled buffer solution.

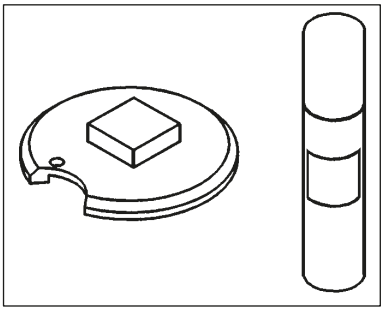


Fig. 19

- Fix the specimen onto the specimen disc with cyanoacrylate adhesive (→ Fig. 19).

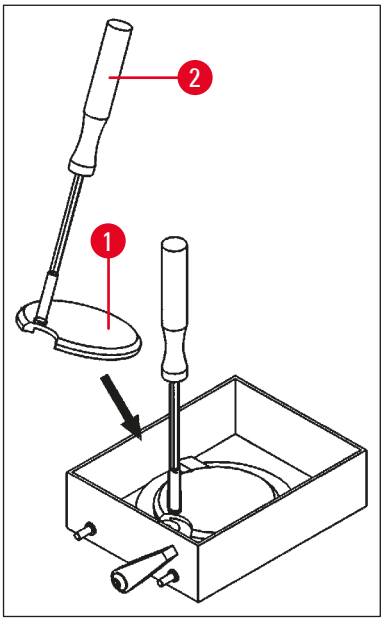


Fig. 20

- Insert the specimen disc (→ Fig. 20-1) with the specimen into the buffer tray using the manipulator (→ Fig. 20-2).

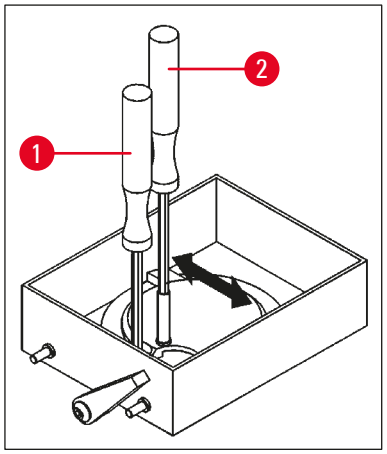


Fig. 21

- Use the manipulator (→ Fig. 21-2) to rotate the specimen disc into the desired position. Tighten with a No. 3 Allen key (→ Fig. 21-1).
- The clamping screw or one of the clamping devices must not be located over the gap in the specimen disc, as in these positions clamping the specimen disc is not possible.
- Remove the manipulator (→ Fig. 21-2).

Adjusting the clearance angle

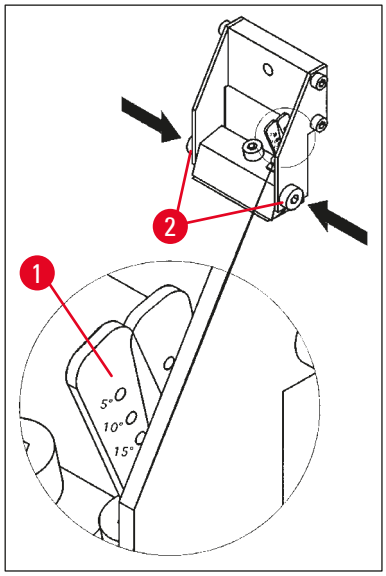


Fig. 22

- Adjust the clearance angle (→ Fig. 22-1) of the knife holder.

To this end:

- Loosen the two lateral screws (→ Fig. 22-2) (Allen key, No. 3).
- Use the adjusting lever (→ Fig. 17-1) to select the desired clearance angle.
- Secure the selected clearance angle by tightening the two screws (→ Fig. 22-2).

Note

The Leica VT1000 S does not require the readjustment of the clearance angle every time you change the blade. Make an adjustment only if required by an application for technical reasons (e.g. different type of tissue).

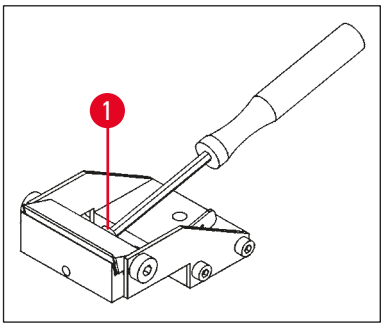


Fig. 23

- To insert the blade, loosen the clamping screw (→ Fig. 23-1) located on the knife holder.
- Clean the blade.

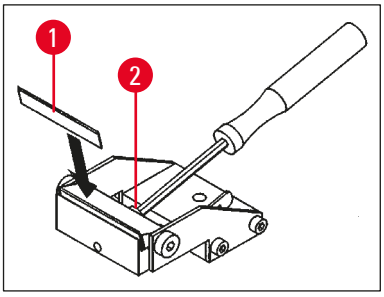


Fig. 24

- Insert the blade into the knife holder (→ Fig. 24-1).
- Secure the blade with clamping screw (→ Fig. 24-2).

Warning

The blade must fit tightly against the entire length of the inner limit stop of the knife holder.

The blade must be clamped parallel to the front edge of both knife holder clamping jaws.

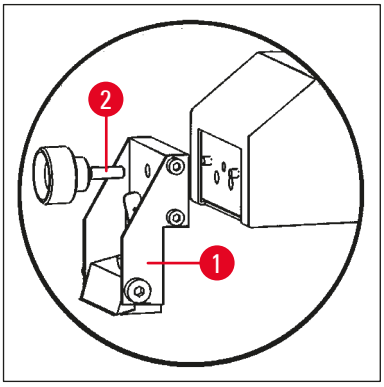


Fig. 25

- Fix the knife holder (→ Fig. 25-1) with the knife holder clamping screw (→ Fig. 25-2).
- Use the REV/FORW rocker button to place the blade edge right behind the rear edge (from user's view) of the specimen.
- Pull the UP/DOWN rocker button into the UP direction and keep it in the UP position until the specimen surface is shortly below the level of the blade edge (see arrow (→ Fig. 26-1)).

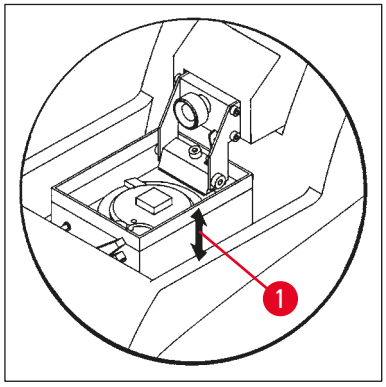


Fig. 26

- Select sectioning speed and sectioning frequency with the rotary knobs SPEED and FREQ.
- Use the +/- button to select a sectioning thickness for trimming.
- Select a sectioning range appropriate to the size of the specimen with the SECTIONING WINDOW button.
- Switch the SINGLE/CONT button to CONT.
  Push the START/STOP button.
  The instrument will now trim the specimen at the selected trimming thickness until you push the START/STOP button once more.
- Once you have reached the desired specimen plane for sectioning, use the +/- button to select the desired thickness for sectioning.

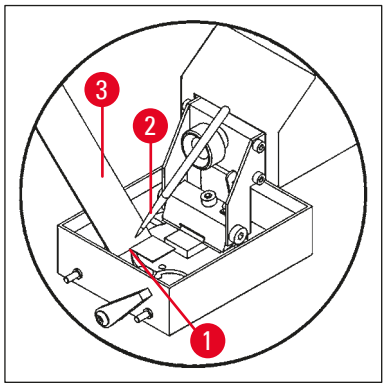


Fig. 27

- For sectioning proceed as follows:
- Select the desired section thickness via the +/- button.
- Switch the SINGLE/CONT button to SINGLE.
- Push the START/STOP button.
  The instrument will now produce a section (→ Fig. 27-1). When the section is finished, the knife will automatically stop at the rear end position behind the specimen (from the user's view).
- Pick up the section as shown on the left using a brush (→ Fig. 27-2) to mount it on a glass slide (→ Fig. 27-3).

5.6 Routine daily maintenance and switching off the instrument - Leica VT1000 S

After all daily procedures have been finished, perform the following:

- Switch off the main switch at the back of the instrument.
- Place the magnifier cover on the magnifier.
- Remove the knife holder.
- Take the blade out of the knife holder and dispose it properly and safely.
- Remove the specimen disc and lay it flat on the stage.
- Remove the specimen using a single-edge blade. Then, remove remains of cyanoacrylate adhesive from the specimen disc.
- Remove and empty out the buffer tray. Dispose of the contents of the buffer tray properly.
- Drain the cooling bath.
  To do so, release the tube from its holder at the rear of the instrument and dispose of the contents of the ice bath into a suitable vessel. Then wipe off with a dry cloth.

Caution

The contents of the ice bath can become contaminated if buffer solution is spilled over it.

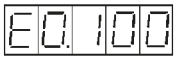
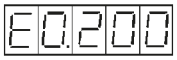
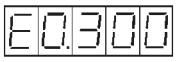
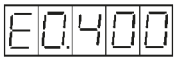
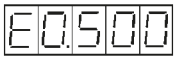
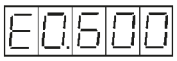
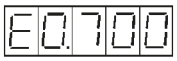
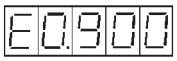
6. Malfunctions: Meaning and Troubleshooting

Warning

When working with directional specimen discs, move the buffer tray to its lowest position directly after switching on the instrument!

Error messages/symptoms	Sources of error	Troubleshooting
Collision of knife and specimen disc.	**Clearance angle adjustment:** • If a clearance angle wider than 5° is selected, specimen disc and knife edge can potentially collide with each other.	• Lower the specimen disc sufficiently to prevent collision.
	• When working with directional specimen holders, knife edge and specimen holder can collide at any selected clearance angle.	• Lower the specimen disc sufficiently to prevent collision.
Audible warning signal. Return stroke is not completed.	**Operating error due to locking function of the REV/FORW button:** • With the REV/FORW button locked the instrument is switched off via the power switch at the rear of the instrument and is switched on again without releasing the REV/ FORW button to its center position	• Unlock the REV/FORW button by pulling it back to the center position. • To reactivate the return stroke movement, lock the REV/FORW button again (to REV position).
	• With the REV/FORW button locked, the instrument was switched off via the emergency stop and after that, the emergency stop was released again without releasing the REV/FORW button to its center position.	• Unlock the REV/FORW-button by pulling it back to the center position. • To reactivate the return stroke movement, lock the REV/ FORW-button again (to REV position).

Error messages/symptoms	Sources of error	Troubleshooting
Audible warning signal. Downward stroke is not completed.	**Operating error due to locking function of the UP/DOWN button:** • With the UP/DOWN button locked in the DOWN position the instrument was switched off via the power switch at the rear of the instrument switched on again without releasing the UP/DOWN button to its center position.	• Release the UP/DOWN button to its center position. • To reactivate the downward motion, activate the UP/DOWN button again (DOWN).
	• With the UP/DOWN button locked the instrument was switched off via the EMERGENCY STOP (foot switch or Emergency stop button) and after that the EMERGENCY STOP was released without unlocking the UP/DOWN button.	• Release the UP/DOWN button to its center position. • To reactivate the downward motion, activate the UP/DOWN button again (DOWN).
The feed motor stops. Any processing step (sectioning stroke etc.) is interrupted immediately. Any UP/DOWN motion of the buffer tray is interrupted immediately. Any locked buttons are indicated by an audible warning signal. When pressing any key, the instrument gives an audible warning signal. In case the EMERGENCY STOP function has been activated, the instrument will remain inoperational when pressing the foot switch. The indication SP is displayed.	**The EMERGENCY STOP function has been activated.**	• Release the EMERGENCY STOP button. • Select an operating mode and continue working.

Error messages/symptoms	Sources of error	Troubleshooting
Audible warning signal. Error code E0.1xx is displayed.  xx - there are several error codes, 00 - there is only one error code.	• Button(s) jammed or defective. • Locking function /REV or REV/FORW button defective. • Error on the UP/DOWN button; DOWN locking function.	• Push the button several times to unlock; have defective button replaced by the Technical Service.
Error code E0.200 is displayed. 	• Feed mechanism defective.	• Switch off the instrument; call the Technical Service.
Error code E0.300 is displayed. 	• Important electronic component defective.	• Switch off the instrument; call the Technical Service.
Error code E0.400 is displayed. 	• Feed motor defective.	• Switch off the instrument; call the Technical Service.
Error code E.05xx is displayed. 	• Light barrier error (forward feed)	• Switch off the instrument; call the Technical Service.
Audible warning signal. Error code E0.600 is displayed. 	• Light barrier error (section thickness feed)	• Switch off the instrument; call the Technical Service.
Audible warning signal. Error code E0.700 is displayed for approx. 2 secs. 	• Software detected severe hardware fault.	• Switch off the instrument; call the Technical Service.
Audible warning signal. Error code E0.9xx is displayed. 	• STM32 Watch dog reset.	• Instrument can be used as normal after restart. • In case of further problems, call the Technical Service.
Audible warning signal. Optical signal via red LED.	• The upper limit of the specimen feed has been reached.	• Leave the upper limit position (Switch the UP/DOWN button in DOWN direction). • Mount a new specimen onto the specimen holder and start again.
	• The lower limit of the specimen level has been reached (height adjustment of specimen via buffer tray).	• After unlocking the DOWN position the buffer tray is automatically raised until the audible and optical signals turn off.

Error messages/symptoms	Sources of error	Troubleshooting
Audible warning signal.	• User has tried to select a specimen thickness via the +/- button that is below the minimum value (0 µm) or above the maximum value (999 µm).	• Release the +/- button.
Audible warning signal. (When operating the instrument for the first time or after the E-EPROM has been exchanged.)		• The warning signal will cease automatically after the initialization phase.
A clattering sound can be heard.	• The visible clamping screws have become loose during sectioning.	• Retighten the loose clamping screws.

Note

These symptoms may occur from time to time and are unavoidable, as the clamping screws which have to be operated by the user cannot be sealed.

Warning

If the clattering sound does not cease once the clamping screws have been retightened, do not hesitate to call the Technical Service immediately.

Do not use the instrument when in this condition.

7. Cleaning and Maintenance

7.1 Cleaning the instrument

Warning

Always remove the knife / blade before detaching the knife holder from the instrument. Always put the knife (blade) back into the knife case or blade dispenser when not in use!

When using cleaners, comply with the safety instructions from the manufacturer and the labor-safety regulations at your laboratory.

When cleaning the outer surfaces, do not use xylene or solvents containing acetone or xylene. The finished surfaces are not resistant to xylene or acetone!

Ensure that liquids do not enter the interior of the instrument during cleaning.

Before each cleaning, carry out the following preparatory steps:

- Switch off the instrument and disconnect the power plug.
- Remove the blade from the knife holder and insert it in the receptacle at the bottom of the blade dispenser.
- Remove the knife holder for cleaning.
- Remove the specimen plate from the buffer tray and lay it flat on the stage. Carefully remove the specimen with a single-edge blade.
- Remove section waste using tweezers or a brush.
- Remove the buffer tray, empty it and rinse it separately with water (→ p. 30 – 5.6 Routine daily maintenance and switching off the instrument - Leica VT1000 S).

Instrument and outside surfaces

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

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

Cleaning the knife

Warning

When cleaning the knife/blade, always wipe from the knife or blade back towards the cutting edge, NEVER wipe in the opposite direction - risk of injury!

Clean using an alcohol-based solution or acetone.

7.2 Changing the fuse

Warning

Before changing a fuse, always switch off the instrument first and remove the instrument cable completely. The instrument must have cooled down and the paraffin tank must be empty.

When changing a fuse, do NOT use any fuses other than the spare fuses supplied with the instrument.

If the instrument fails completely, first check the power supply at the power socket.

Then check the fuses at the rear side of the instrument.

To do so, proceed as follows:

- Using a screwdriver (→ Fig. 28-1), carefully push out the fuse insert (→ Fig. 28-2).
- Remove the fuse insert - it contains two fuses (→ Fig. 28-3).
- Check that the thin wire (→ Fig. 28-4) in the glass capillary of a fuse is intact. If not, replace the fuse (the standard scope of delivery includes two replacement fuses).

Warning

Before plugging the power cable back in and switching on the instrument, you must have identified and corrected the cause of the burned-out fuse.

- Insert the fuse insert with the two fuses and start up the instrument again.

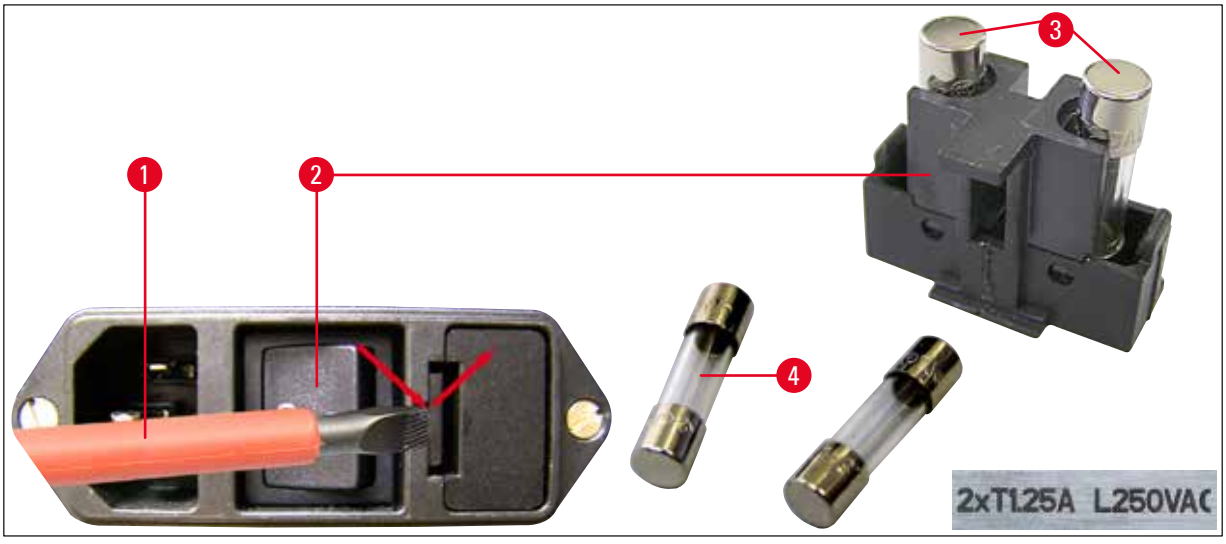


Fig. 28

8. Ordering Information: Spare Parts, Accessory, Consumables

8.1 Ordering information

Designation	Order No.
Knife holder S	14 0462 30131
Buffer tray S	14 0462 30132
Buffer tray S, double-walled	14 0463 46423
Specimen disc S, Ø 50 mm, non-directional	14 0463 27404
Magnetic specimen holder, directional	14 0462 32060
Foot switch with protective housing	14 0463 27415
Magnifier, complete	14 0462 31191
Module LED Hi-Power spots, 2-arm	14 6000 04826
Module Hi-Power Spot, LED 1000	14 6000 04825
Sapphire knife	14 0216 39372
Cyanoacrylate glue	14 0371 27414
Julabo FL300, recirculating cooler/chiller	
100 V/50/60 Hz	14 0481 48439
115 V/50 Hz	14 0481 48437
230 V/50-60 Hz	14 0481 48436
230 V/60 Hz	14 0481 48438
Antifrogen N	14 0481 45443

8.2 Foot switch

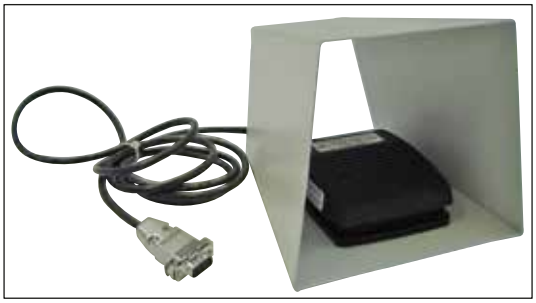


Fig. 29

Foot switch

The foot switch is an optional accessory which can be used instead of the START/STOP button.

Order No.: **14 0463 27415**

8.3 Buffer tray

8.3.1 Double-walled buffer tray S

Note

When using the double-walled buffer tray, the flow cooler must be installed according to the assembly instructions prior to working with specimens.

Fig. 30

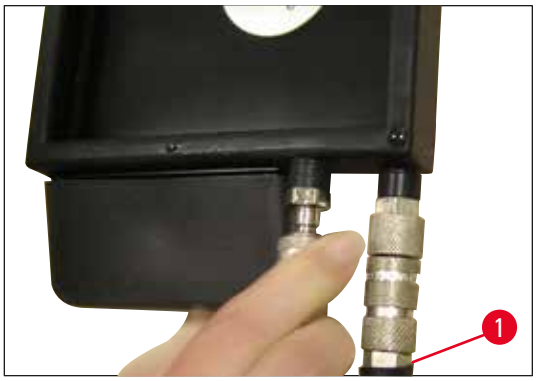


Fig. 31

A clamp for holding the gassing hose for the buffer in the proper position can be added to the double-walled buffer tray.

First connect the hoses ((→ Fig. 31-1), included in the standard delivery of the double-walled buffer tray) to the rear of the Julabo Recirculating Cooler/Chiller FL300, then connect the other end to the empty buffer tray. Access is easier if you make the left connection first. To do so, pull back the lock coupling, attach the hose, and release the coupling until you hear it click into position.

- Hose set for connecting a recirculating cooler/ chiller included.

Order No.: **14 0463 46423**

8.4 Magnifier, LED illumination

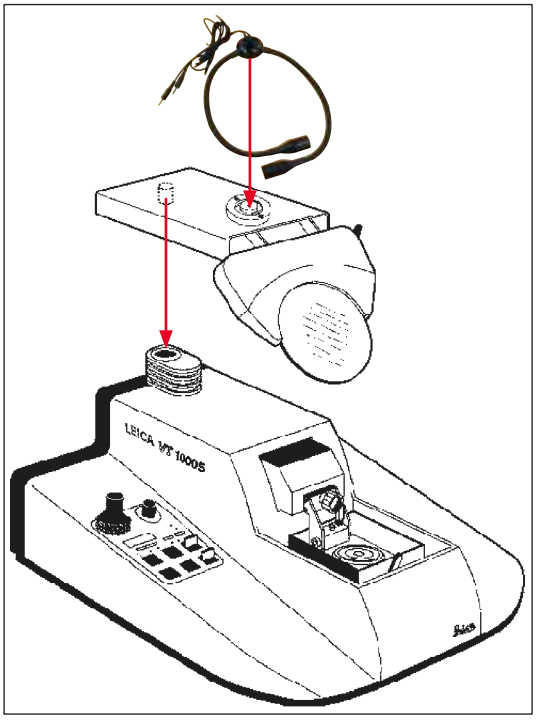


Fig. 32

Magnifier

- To be inserted into the fixture.

Order No.: **14 0462 31191**

Module LED Hi-Power spots, 2-arm

- To be mounted onto the magnifier after the magnifier has been mounted into the fixture. Then, connect the module LED Hi-Power spots, 2-arm, to the Module Hi-Power spot, LED 1000.

Order No.: **14 6000 04826**

Fig. 33

Module Hi-Power spot, LED 1000

- Serves as a light source for the module LED Hi-Power spots, 2-arm.

Order No.: **14 6000 04825**

8.5 Julabo recirculating cooler/chiller FL300

Fig. 34

Recirculating cooler/chiller for connection to the double-walled buffer tray in the Leica VT1000 S and VT1200/VT1200 S.

Selectable temperature range: –20 °C to +40 °C.

Recommended cooling medium:
Antifrogen N **14 0481 45443**
Mixture with water (50 %/50 %)

Application example:

If (at an ambient temperature of 20 - 22 °C) a temperature of 4 °C is to be reached in the buffer trough, the setting value of 0.5 - 2 °C must be selected.

Note

For additional information, refer to the Instructions for Use provided with this instrument.

9. Warranty and Service

Warranty

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

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

Service information

If you are in need of technical customer 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 the person to contact.
- Reason for the service call.
- Delivery date

Decommissioning and disposal

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

10. Decontamination Confirmation

Every product that is returned to Leica Biosystems or that requires on-site maintenance must be properly cleaned and decontaminated. You can find the dedicated template of the decontamination confirmation on our website www.LeicaBiosystems.com within the product menu. This template has to be used for gathering all required data.

When returning a product, a copy of the filled and signed confirmation has to be enclosed or passed on to the service technician. The responsibility for products that are sent back without this confirmation or with an incomplete confirmation lies with the sender. Returned goods that are considered to be a potential source of danger by the company will be sent back at the expense and risk of the sender.

www.LeicaBiosystems.com

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