



Leica VT1000 S

**Microtome with
Vibrating Blade**



Instructions for Use

Leica VT1000 S, V1.9, English - 10/2012

Order No. 14 0472 80101 RevC

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

Leica
BIOSYSTEMS

Note

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Published by:

Leica Biosystems Nussloch GmbH
Heidelberger Str. 17 - 19
D-69226 Nussloch
Germany

Phone: +49 6224 143-0

Fax: +49 6224 143-268

Internet: <http://www.LeicaBiosystems.com>

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


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Symbols in the text and their meanings



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



Useful tips, i.e. important user information, appear in a gray box and are marked by an .

(5) Numbers in parentheses refer to item (Fig. 5) numbers in illustrations.

Qualification of personnel

The Leica VT1000 S should be operated by trained laboratory personnel 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.



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 for labeling electrical and electronic equipment in accordance with Section 7 of the German Electrical and Electronic Equipment Act (ElektroG). ElektroG is the law on the bringing into circulation, return and environmentally compatible disposal of electrical and electronic equipment.



Caution! Follow the accompanying documentation!



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

Intended use/impermissible operating modes

The 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.



The VT1000 S may be used for research purposes only. Sections made using the 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.

Instrument type:

All information given in these Instructions for Use applies only to the VT1000 S.

A nameplate with the serial number is fastened to the left side of the instrument (the one shown here is intended as an example only!).



Information:

When making inquiries, please specify correctly:

- Instrument type
- Serial number

2. Safety



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

2.1 Safety notes

These Instructions for Use include important 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.



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.

For current information about applicable standards, please refer to the CE Declaration of Conformity on our Internet site:

www.LeicaBiosystems.com



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: risk of injury when touching the knives and blades as these are extremely sharp.



Warning: risk of infection when working with fresh tissue or with material where an infection cannot be excluded.



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



Warning: Avoid touching live parts under any circumstances!

Correct behavior

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 clothes 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

General data:

Sectioning frequency ($\pm 10\%$)	0 - 100 Hz
Amplitude	adjustable in 5 steps: 0.2; 0.4; 0.6; 0.8; 1 mm
Cutting speed ($\pm 10\%$)	0.025 - 2.5 mm/s
Return speed ($\pm 10\%$)	5 mm/s
Total vertical specimen stroke	15 mm (motorized)
Cutting range	1 - 40 mm (adjustable)
Specimen retraction	0 - 999 μm (adjustable; can be deactivated)
Maximum specimen size:	
with standard knife holder	33 x 40 mm
with knife holder L	70 x 40 mm
Specimen orientation	330°
Sectioning thickness setting	1 - 999 μm , in 1 μm increments
Magnifier assembly (standard accessories)	2 x magnification

Ambient conditions:

Operating temperature range	min. 5°C - max. 40°C
Relative humidity	max. 80%
Elevation:	up to 2000 m above sea level

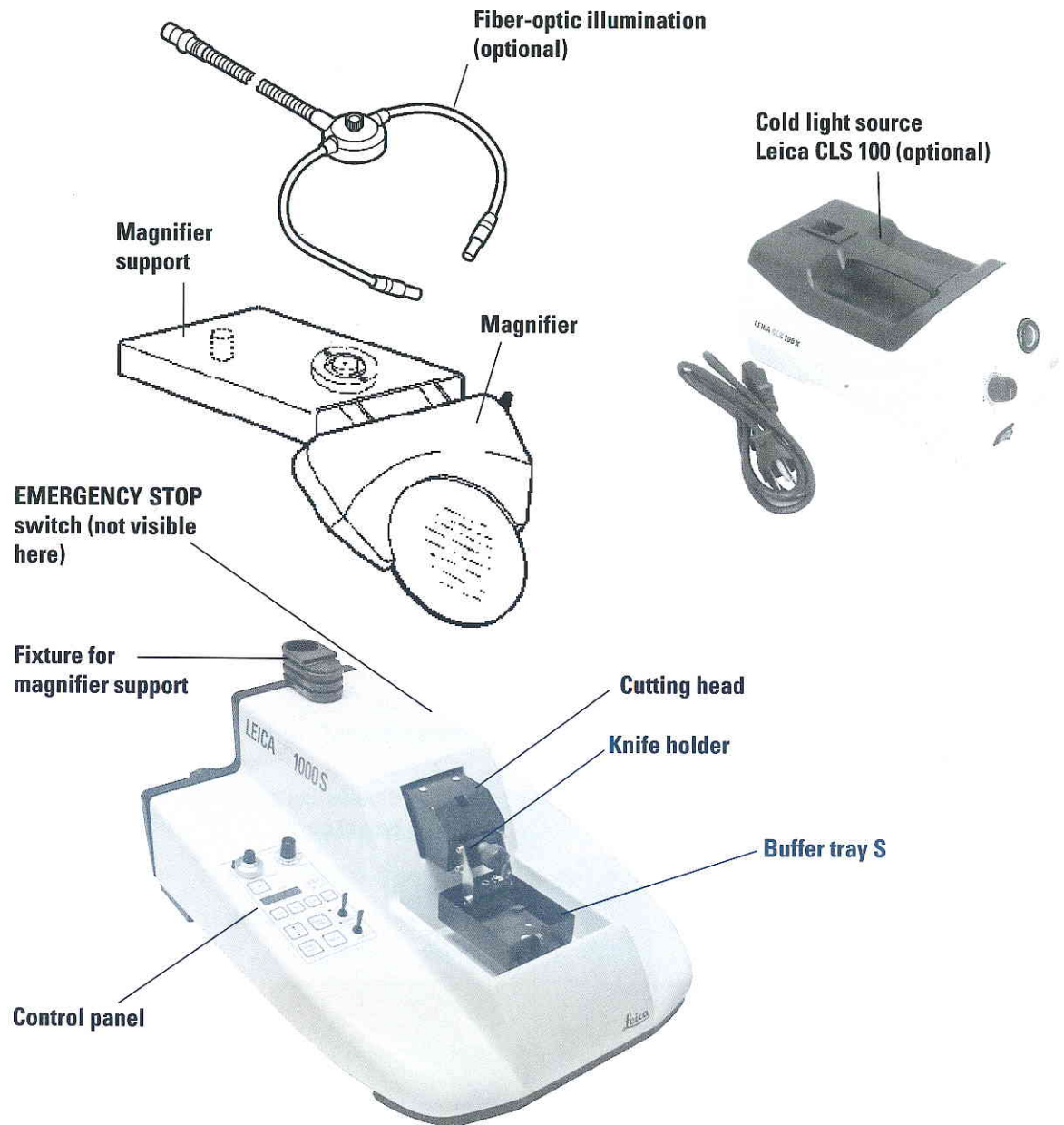
Electrical data:

Rated voltage range ($\pm 10\%$):	100 V - 240 V
Nominal frequency ($\pm 10\%$):	50 - 60 Hz
Power consumption	50 VA
Power fuse	T 1.25 A
Pollution degree	2
Overvoltage category	II
Electrical overload protection	Yes
Internal current limiter of electronics	Yes

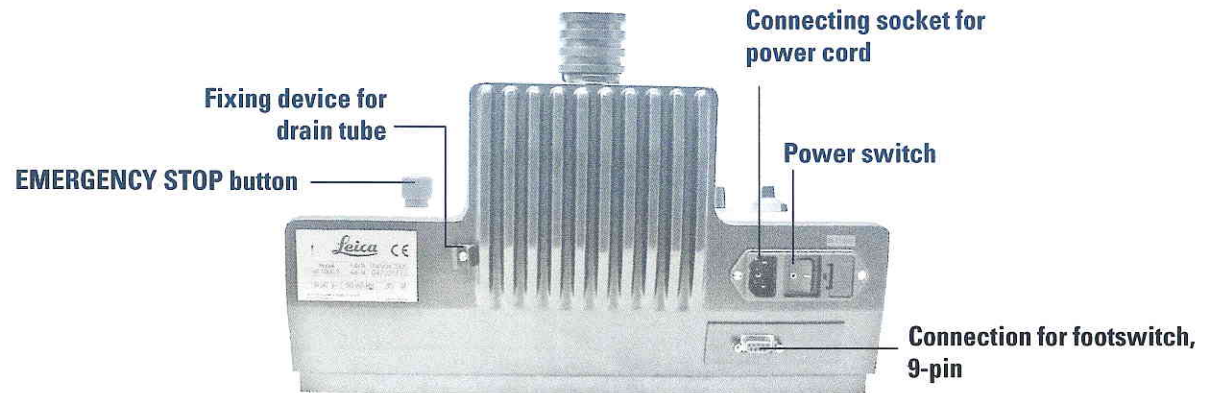
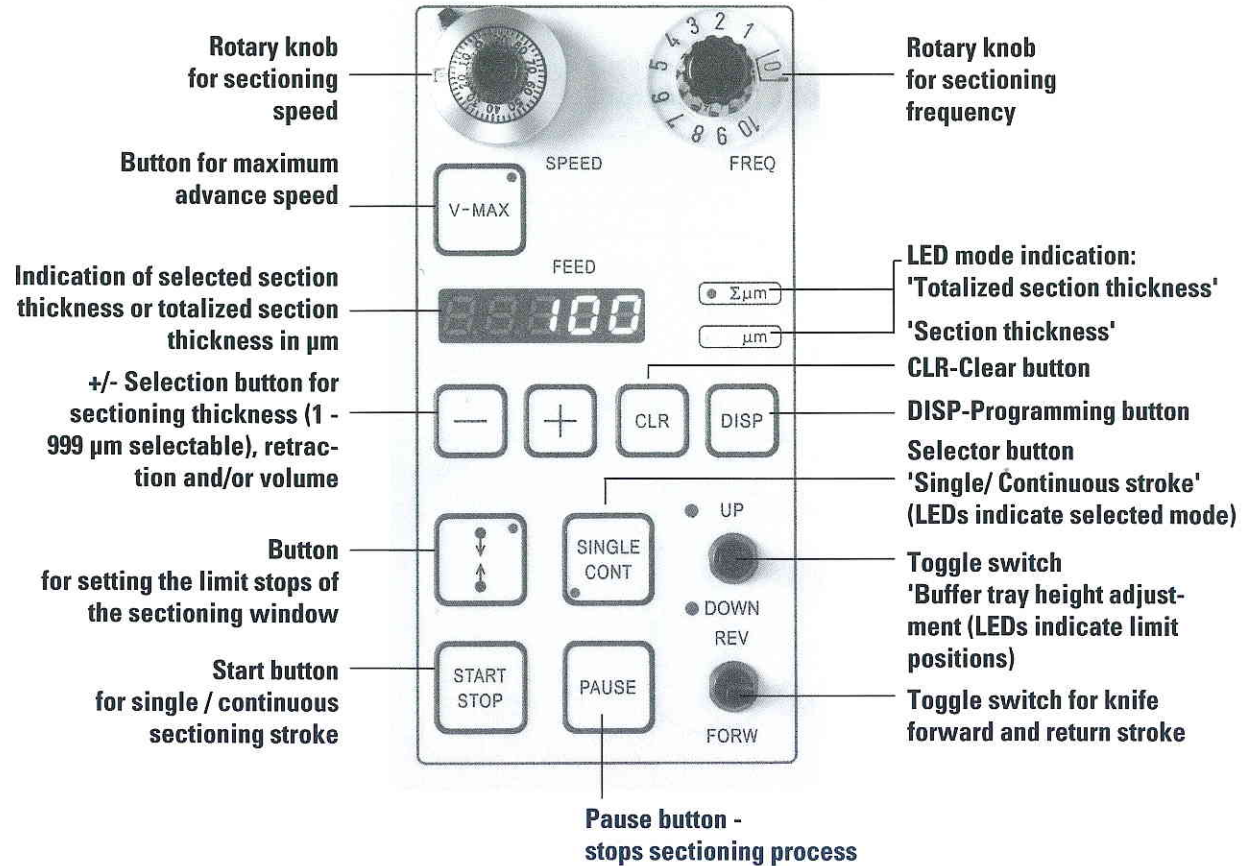
Dimensions:

L x W x H	480 mm x 360 mm x 200 mm
Height with magnifier support	285 mm
Weight:	
without magnifier support	17 kg
magnifier support only	2 kg
total	19 kg

3.2 Overview - VT1000 S



3. Instrument characteristics



4.1 Standard delivery – packing list

Basic instrument	14 0472 35612
1 silicone hose	14 0462 27513
1 set of power cables:	
- 1 power cable for Germany	14 0411 13558
- 1 power cable for USA/Canada/Japan	14 0411 13559
- 1 power cable for UK ST/BU F-5A	14 0411 27822
1 set of replacement fuses 2 x T 1.25 A	14 6943 01251
1 toolset:	
- 1 Allen key, size 2.5	14 0194 13195
- 1 Allen key, size 8.0	14 0194 04792
- 1 manipulator	14 0462 28930
1 dust cover	14 0212 04091
1 Instructions for Use for Leica VT1000 S	14 0472 80001
1 CE Declaration of Conformity (engl.)	14 0472 80011
VT1000 S complete configuration	14 0472 35613
- VT1000 S basic instrument	14 0472 35612
- 3 specimen discs S, non-directional	14 0463 27404
- Buffer tray S	14 0462 30132
- 5 countersunk screws M 5x8	14 2101 77121
- 2 hose clamps	14 0481 41952
- Knife holder S – for injector and razor blades	14 0462 30131
- Allen key, size 3 – with handle	14 0194 04764
- 1 bottle of Cyanoacrylate adhesive	14 0371 27414
- Magnifier assembly (magnifier glass & support)	14 0462 31191
VT1000 S complete configuration with sapphire blade	14 9010 00001
- Accessories as for complete configuration above	14 0472 35613
plus:	
- 1 sapphire blade	14 0216 35654



If you ordered additional accessories, please compare the delivered parts with your order form. Should there be any discrepancies, please contact your local Leica sales office immediately.

4. Installation

4.2 Unpacking and setting up the instrument



Fig. 12.1

1. Cut through the iron strap (1) and adhesive tape (2) using a suitable tool and remove them.

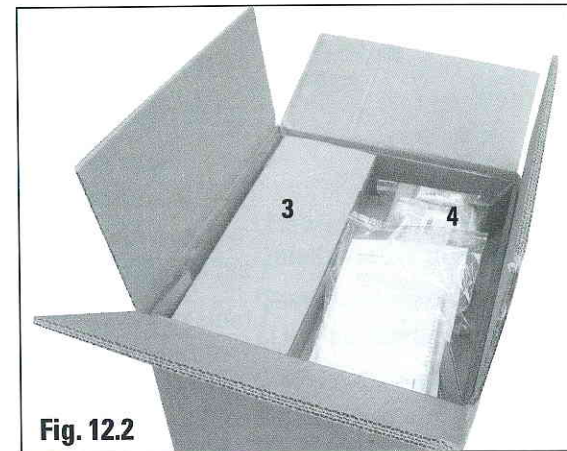


Fig. 12.2

2. Check the accessory cartons (3) and separate accessories provided (standard scope of delivery - in transparent bag (4) and check to ensure that they are complete.

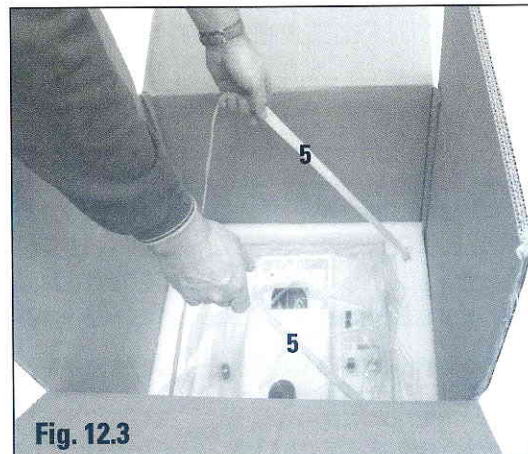


Fig. 12.3

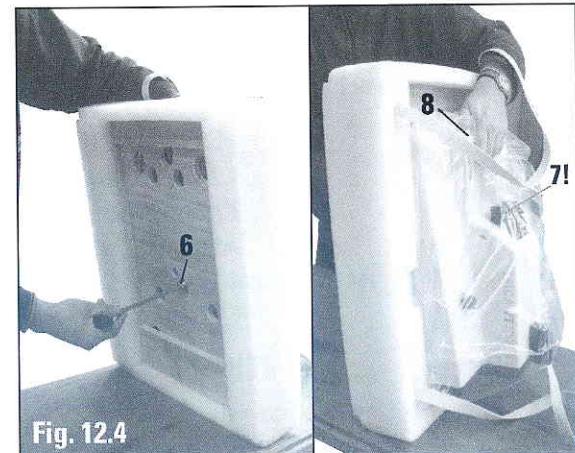


Fig. 12.4

3. Lift the instrument out of the transport carton by the carrying straps (5) and place it on a suitable stable laboratory table. The instrument is securely fastened to the baseplate (6) using a screw. Tilt the instrument including the baseplate (Fig. 12.4) - hold the instrument with one hand on the recess (8) for the buffer tray! **NEVER** lift or hold it by the cutting head (7)! Unscrew the screw (6) using the size 8 Allen key provided and remove the base plate.

4. Installation

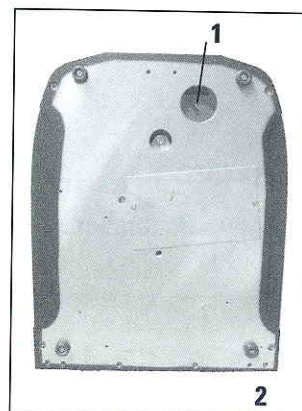


Fig. 13.1



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

5. Using both hands at the sides (Fig. 13.1), grasp the bottom of the instrument and carefully place it on a suitable laboratory table.

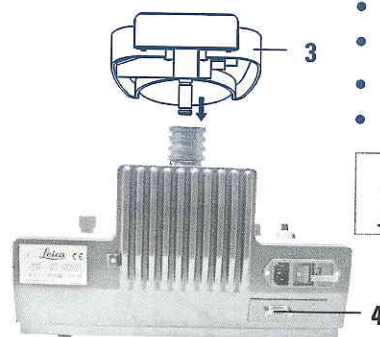


Assembling the drain tube

- Connect the drain tube (Fig. 13.2) to the bottom of the instrument (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 (2).

Fig. 13.2 - Bottom of the instrument

Assembling the magnifier support and footswitch (optional)



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

Fig. 13.3

- The magnifier support (3) is packaged separately.
- Set it on the instrument as shown in Fig. 13.3.
- Attach the optional footswitch.
- Securely plug the footswitch into the 9-pin socket (4).

5. Operation

5.1 Installation site requirements

The place of installation must meet the following requirements:



Do not operate the instrument in rooms with an explosion hazard!

- 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!



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

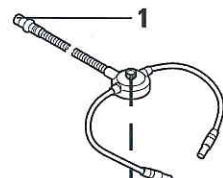
5.2 Before setting up the instrument

1. Put the main switch at the back of the instrument to the **OFF** position.



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

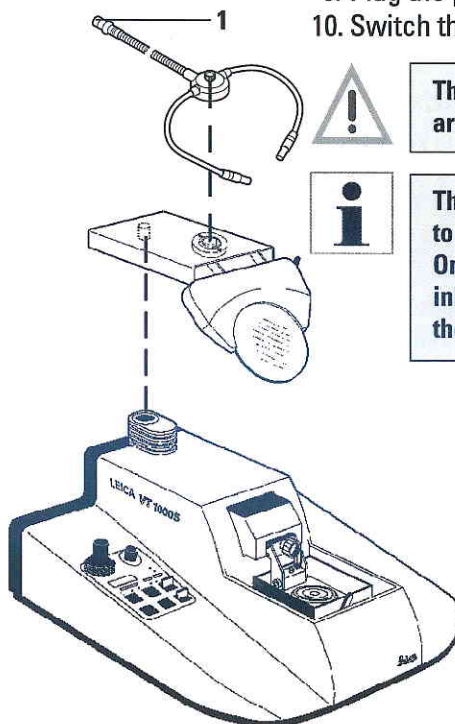
2. Make sure the power cable is connected correctly to the instrument.
3. Attach the magnifier support.
4. Insert the buffer tray.
5. Insert the knife holder.
6. Insert a blade into the knife holder.
7. Connect the magnifier support with optional fiber-optic illumination as shown in Fig. 13.3. Insert plug (1) of the fiber-optic illumination into socket (2) at the cold light source.
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).



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



The Leica VT1000 S is equipped with an autoranging power supply to cover voltages from 100 V to 240 V. Once the main switch is turned on, the instrument carries out an initialization process: after performing a slight forward movement, the knife moves to the final rear position.

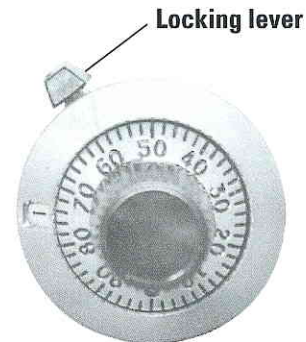


5. Operation

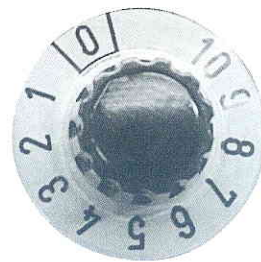
5.3 The VT1000 S controls and their function



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



SPEED		10-speed rotating potentiometer with scale
Scale value	mm/s	Function:
0	0.00	Continuous knife feed adjustment from 0.05 - 2.5 mm/s:
0.5	0.025	
1	0.050	Knife return stroke is performed at constant speed of 5 mm/s.
2	0.075	
3	0.125	The additional locking lever (lever in 12 o'clock position) prevents the speed setting from being accidentally changed while sectioning is in progress.
4	0.175	
5	0.225	
6	0.40	
7	0.65	
8	0.90	
9	1.30	
10	2.50	



FREQ

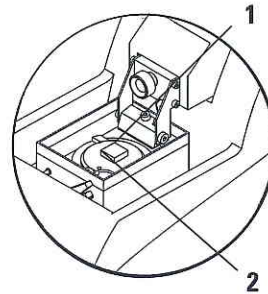
FREQ		Rotary knob with scale from 0 to 10
Scale value	Hz	Function:
0	0	Continuous adjustment of knife sectioning frequency (vibration) from 8 - 100 Hz.
0.5	8	
1	10	
2	20	
3	30	
4	40	
5	50	
6	60	
7	70	
8	80	
9	90	
10	100	



Button with LED





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:

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

- Activate the **V-Max** button. Press **REV/FORW** toggle switch for fast movement of the knife towards the specimen. Press the  button to set the first limit of the sectioning window.
- Press **REV/FORW** once again, moving the knife 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 (see description of Single/Cont mode for further details).
- Specimen feed (section thickness) takes place prior to each section.
- Retraction (specimen is lowered) takes place when the knife reaches the rear inverse 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.

5. Operation



Function:

Immediate interruption of knife movement.

- Press **PAUSE** once again to continue sectioning.



Toggle switch

Function:

To move the knife towards the specimen.

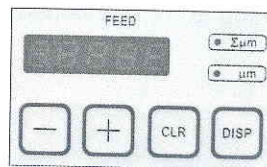
Can also be used for manual sectioning.

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.



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:

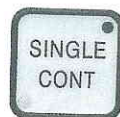
To select between two modes of operation:

' $\Sigma\mu\text{m}$ ' = section thickness totalizing

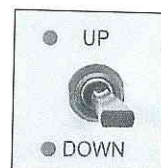
' μm ' = section thickness

Function of the CLR button in section thickness totalizing mode:

Sets the value indicated in the section thickness totalizer mode ($\Sigma \mu\text{m}$) to zero.



Button with LED

**Function:**

Switch between

single stroke (1 sectioning stroke / 1 return stroke of the knife) and continuous stroke (continuous sectioning until the **START/STOP** button is pressed).

- To stop the knife at the rear end position in **CONT** mode press the **START/STOP** button.

The sectioning stroke in progress will be completed and the knife will then stop at the selected end position of the sectioning range.

Toggle switch

- **Function:**

Motorized height adjustment of buffer tray within a total vertical range of 15 mm (= total vertical specimen stroke).

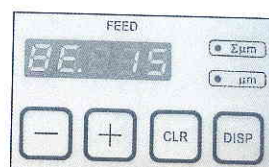
The upper and lower end positions of the buffer tray are indicated each by an audible warning signal and a red LED.

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 VT1000 S warning signal, press the following function key combinations:

**Volume adjustment:**

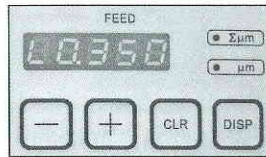
- Select section thickness mode ('µm') pressing the **DISP** button.
- Press the **CLR** and **+** buttons simultaneously. The indication 'BE 15' will be displayed.

The volume can now be adjusted via the **-/+** button.

'0' is equivalent to no sound signal.

- To quit the programming mode, press **CLR**.

5. Operation



Adjusting the retraction

- In programming mode, press **DISP** to display the specimen retraction menu.
- The indication 'LO' will be displayed.
- Press the **-/+** button to set a specimen retraction value between 1 and 999 μm . Or to turn off the retraction by selecting '0'.
- The selected value will be displayed in the FEED window.
- Press CLR to quit the menu function.

5.4 Setting the amplitude

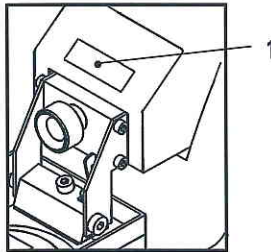


Fig. 20

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

To this end:

- With a 2.5 mm Allen key loosen the clamping screw (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.



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 VT1000 S on a daily basis

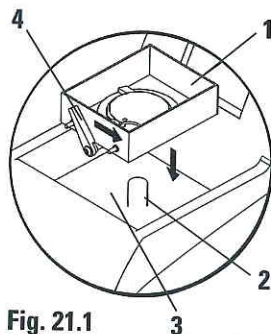


Fig. 21.1

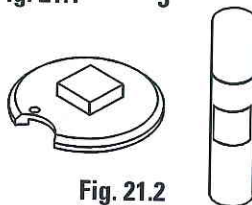


Fig. 21.2

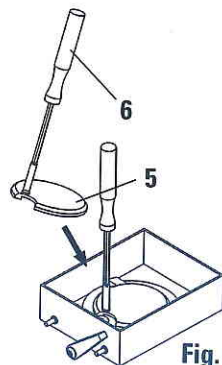


Fig. 21.3

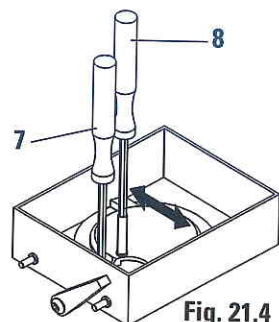


Fig. 21.4

- Mount the buffer tray (1) onto the bolt (2) inside the cooling bath (3).
- Secure the buffer tray by relocating the clamping lever (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 (3).
- Fill the buffer tray (1) with cooled buffer solution.
- Fix the specimen onto the specimen disc with cyanoacrylate adhesive (21.2).
- Insert the specimen disc (5) with the specimen into the buffer tray using the manipulator (6).
- Use the manipulator (8) to rotate the specimen disc into the desired position. Tighten with a 3 mm Allen key (7).
- 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 (8).

5. Operation

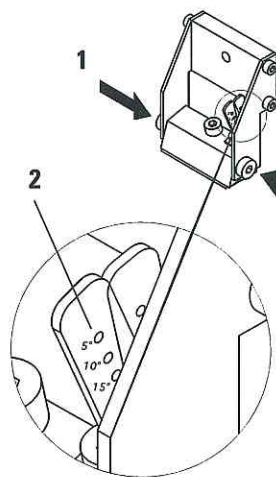


Fig. 22.1

Adjusting the clearance angle

- Adjust the clearance angle (2) of the knife holder.

To this end:

- Loosen the two lateral screws (1) with a 3-mm Allen key (size 3).
- Use the adjusting lever (2) to select the desired clearance angle.
- Secure the selected clearance angle by tightening the two screws (1).



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

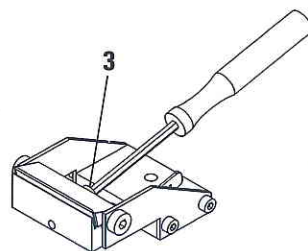


Fig. 22.2

- To insert the blade, loosen the clamping screw (3) located on the knife holder.
- Clean the blade.
- Insert the blade into the knife holder (4).
- Secure the blade with clamping screw (5).



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.

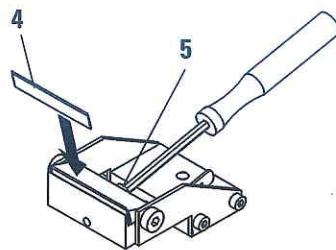


Fig. 22.3

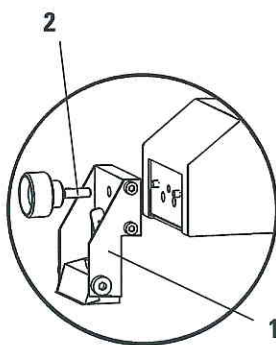


Fig. 23.1

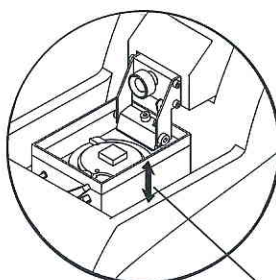


Fig. 23.2

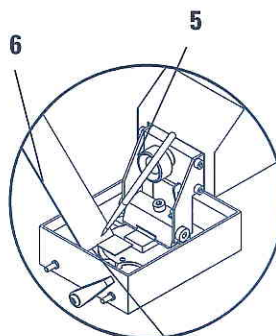


Fig. 23.3

- Fix the knife holder (1) with the knife holder clamping screw (2).
- Use the **REV/FORW** rocker button to place the knife 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 knife edge (see arrow (3)).

- Select sectioning speed and sectioning frequency with the control 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.

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 (4). 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 (5) to mount it on a glass slide (6).

5. Operation

5.6 Daily routine maintenance and switching off the VT1000 S


After you finish working, proceed as follows:

- Switch off the main switch at the back of the instrument.
- Place the magnifier cover on the magnifier.
- Remove the knife holder.
- Take the knife out of the knife holder and dispose it properly and safely.
- Remove the specimen plate 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.


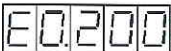
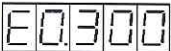
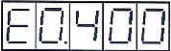

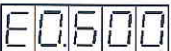
6. Malfunctions: meanings and troubleshooting

Error messages/symptoms	Sources of error	Troubleshooting
<ul style="list-style-type: none"> - Collision of knife and specimen holder. 	<ul style="list-style-type: none"> - Clearance angle adjustment: - If a clearance angle wider than 5° is selected, specimen disc and knife edge can potentially collide with each other. 	<ul style="list-style-type: none"> - Lower the specimen disc sufficiently to prevent collision.
	<ul style="list-style-type: none"> - When working with directional specimen holders, knife edge and specimen holder can collide at any selected clearance angle. 	<ul style="list-style-type: none"> - Lower the specimen disc sufficiently to prevent collision. <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>When working with directional specimen discs, move the buffer tray to its lowest position directly after switching on the instrument!</p> </div>
<ul style="list-style-type: none"> - Audible warning signal. - Return stroke is not completed. 	<ul style="list-style-type: none"> - Operating error due to locking function of the REV/FORW button: - With the REV/FORW button locked the instrument is switched off via the main switch at the rear of the instrument and is switched on again without releasing the REV/FORW button to its center position. 	<ul style="list-style-type: none"> - 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).
<ul style="list-style-type: none"> - Audible warning signal. - Return stroke is not completed. 	<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - 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).

6. Malfunctions: meanings and troubleshooting

Error messages/symptoms	Sources of error	Troubleshooting
<ul style="list-style-type: none"> - Audible warning signal. - Downward stroke is not completed. 	<ul style="list-style-type: none"> - 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 main switch at the rear of the instrument switched on again without releasing the UP/DOWN button to its center position. 	<ul style="list-style-type: none"> - Release the UP/DOWN button to its center position. - To reactivate the downward motion, activate the UP/DOWN button again (DOWN).
<ul style="list-style-type: none"> - Audible warning signal. - Downward stroke is not completed. 	<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - Release the UP/DOWN button to its center position. - To reactivate the downward motion, activate the UP/DOWN button again (DOWN).
<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - The EMERGENCY STOP function has been activated. 	<ul style="list-style-type: none"> - Release the EMERGENCY STOP button. - Select an operating mode and continue working.

6. Malfunctions: meanings and troubleshooting

Error messages/symptoms	Sources of error	Troubleshooting
<ul style="list-style-type: none"> - Audible warning signal. - Error code E0.1xx is displayed. <div style="text-align: center;">  </div> <p>xx - there are several error codes, 00 - there is only one error code.</p>	<ul style="list-style-type: none"> - Button(s) jammed or defective. - Locking function /REV or REV/ FORW button defective. - Error on the UP/DOWN button; DOWN locking function. 	<ul style="list-style-type: none"> - Push the button several times to unlock; have defective button replaced by the Technical Service.
<ul style="list-style-type: none"> - Error code E0.200 is displayed. <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> - Feed mechanism defective. 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.
<ul style="list-style-type: none"> - Error code E0.300 is displayed. <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> - Important electronic component defective. 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.
<ul style="list-style-type: none"> - Error code E0.400 is displayed. <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> - Feed motor defective. 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.
<ul style="list-style-type: none"> - Error code E0.5xx is displayed. <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> - Light barrier error (forward feed) 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.
<ul style="list-style-type: none"> - Audible warning signal. - Error code E0.600 is displayed. <div style="text-align: center;">  </div>	<ul style="list-style-type: none"> - Light barrier error (section thickness feed) 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.

6. Malfunctions: meanings and troubleshooting

Error messages/symptoms	Sources of error	Troubleshooting
<ul style="list-style-type: none"> - Audible warning signal. - Error code E0.700 is displayed for approx. 2 secs. 	<ul style="list-style-type: none"> - Software detected severe hardware fault. 	<ul style="list-style-type: none"> - Switch the instrument off; call the Technical Service.
<div style="border: 1px solid black; padding: 2px; display: inline-block; font-family: monospace; font-size: 1.2em;">E0.700</div>		
<ul style="list-style-type: none"> - Audible warning signal. - Error code E0.8xx is displayed. 	<ul style="list-style-type: none"> - E-EPROM defective. 	<ul style="list-style-type: none"> - Instrument can still be used, though there will be certain limitations: all values will be set to default values. New values (sectioning window, feed, lowering) cannot be saved. - Call the Technical Service.
<div style="border: 1px solid black; padding: 2px; display: inline-block; font-family: monospace; font-size: 1.2em;">E0.800</div>		
<ul style="list-style-type: none"> - Audible warning signal. - Optical signal via red LED. 	<ul style="list-style-type: none"> - The upper limit of the specimen feed has been reached. 	<ul style="list-style-type: none"> - Leave the upper limit position (Switch the UP/DOWN button in DOWN direction). - Mount a new specimen onto the specimen holder and start again.
<ul style="list-style-type: none"> - Audible warning signal. - Optical signal via red LED. 	<ul style="list-style-type: none"> - The lower limit of the specimen level has been reached (height adjustment of specimen via buffer tray). 	<ul style="list-style-type: none"> - After unlocking the DOWN position the buffer tray is automatically raised until the audible and optical signals turn off.
<ul style="list-style-type: none"> - Audible warning signal. 	<ul style="list-style-type: none"> - 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). 	<ul style="list-style-type: none"> - Release the "+/-"button.

6. Malfunctions: meanings and troubleshooting

Error messages/symptoms	Sources of error	Troubleshooting
<ul style="list-style-type: none">- Audible warning signal. (When operating the instrument for the first time or after the E-EPROM has been exchanged.)		<ul style="list-style-type: none">- The warning signal will cease automatically after the initialization phase.
<ul style="list-style-type: none">- A clattering sound can be heard.	<ul style="list-style-type: none">- The visible clamping screws have become loose during sectioning. <div></div> <div><p>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.</p></div>	<ul style="list-style-type: none">- Retighten the loose clamping screws. <div></div> <div><p>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.</p></div>

7. Cleaning and maintenance

7.1 Cleaning the instrument



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 cleaning agents, observe the manufacturer's safety instructions and the laboratory regulations valid in the country of use.
When cleaning the outer surfaces, do not use xylene 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 (see also page 23).

Instrument and outside surfaces

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

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

Cleaning the knife



When cleaning the knife/blade, always wipe from the knife or blade back towards the cutting edge, NEVER the other way around. Risk of injury!

Clean using an alcohol-based solution or acetone.

7.2 Changing the fuse



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.

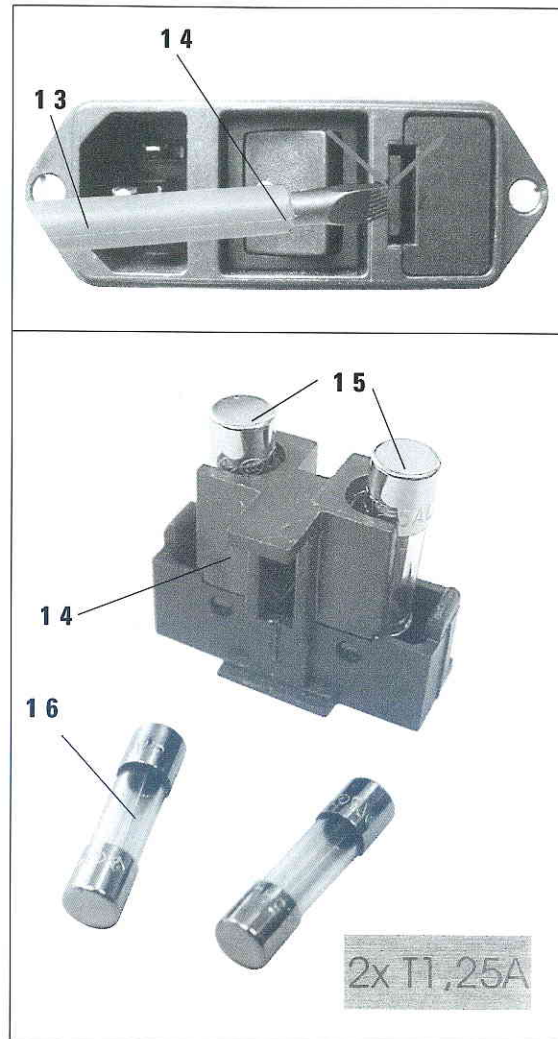


Fig. 31

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 (13), carefully push out the fuse insert (14) (Fig. 31).
- Remove the fuse insert - it contains two fuses (15).
- Check that the thin wire (16) in the glass capillary of a fuse is intact. If not, replace the fuse (the standard scope of delivery includes two replacement fuses).



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.

8. Ordering information: spare parts, accessories, consumables

Knife holder S	14 0462 30131
Buffer tray S	14 0462 30132
Buffer tray S, double-walled	14 0463 46423
Specimen plate S, Ø 50 mm, non-directional*	14 0463 27404
Specimen disc S, directional*	14 0463 27406
Magnetic specimen holder, directional	14 0462 32060
Footswitch with protective housing	14 0463 27415
Magnifying lens assembly	14 0462 31191
Fiber optic light guides	14 0502 30028
Cold light sources	
Leica CLS100X 100-120 V/ 50-60 Hz	14 0502 30214
Leica CLS100X 230-240 V/50-60 Hz	14 0502 30215
Leica CLS100X 240 V/ 50-60 Hz	14 0502 30216
Knife holder L, for standard low-profile blades, 70x50 mm	14 0463 27402
Buffer tray L**	14 0463 27408
Buffer tray L**, double-walled	14 0463 46424
Specimen plate L***, non-directional*	14 0463 27405
Knife holder S, for specimens with a max. height of 20 mm	14 0462 31950
Knife holder L, for specimens with a height of 20 mm	14 0462 31949
Injector blades, 1 dispenser with 20 blades	39053250
Sapphire blade	14 0216 39372
Cyanoacrylate adhesive	14 0371 27414
Julabo FL300, Recirculating Cooler/Chiller	
100 V/50/60 Hz	14 0481 48439
115 V/50 Hz	14 0481 48437
230/50-60 Hz	14 0481 48436
230 V/60 Hz	14 0481 48438
Antifrogen N	14 0481 45443



***) Directional specimen discs S can be rotated around their center as well as tilted on one axis. Non-directional specimen discs S can be rotated but not tilted.**

Directional specimen discs L can be tilted on one axis - they can, however, not be rotated.

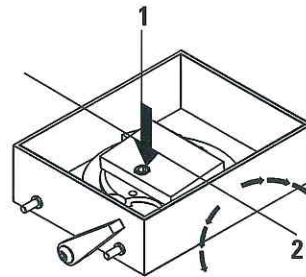
Non directional specimen discs L are laterally adjustable but not tiltable.

For sectioning large specimens, all three accessories marked with two asterisks () have to be ordered, as knife holder L can only be used together with buffer tray L and low-profile disposable blades.**

In addition, at least one of the specimen holding devices marked (*) is needed for sectioning large specimens.**

8. Ordering information: spare parts, accessories, consumables

8.1 Additional accessories for standard size specimens (functional description)



Specimen disc S, directional

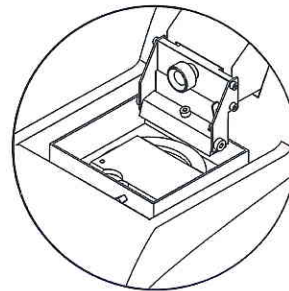
- The specimen plate can be tilted on the x-axis by turning the screw (1) (arrow 2).

The directional specimen disc S can be rotated by 330°.

Order No. 14 0463 27406

Fig. 33.1

8.2 Additional accessories for large specimens (functional description)



- Fig. (33.3) shows a configuration for large specimens, consisting of knife holder L, buffer tray L and specimen disc L, non-directional.

Order No. 14 0463 27402 (Knife holder L)

Order No. 14 0463 27408 (Buffer tray L)

Order No. 14 0463 27405 (Specimen disc L, non-directional)

Fig. 33.2

8.3 Footswitch (functional description)



Footswitch

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

Order No. 14 0463 27415

Fig. 33.3

8. Ordering information: spare parts, accessories, consumables

8.4 Buffer tray

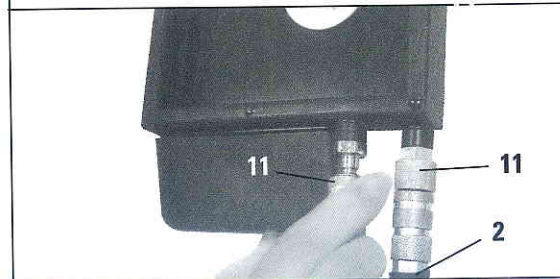
8.4.1 Double-walled buffer tray S



When using the double-walled buffer tray, the recirculating cooler must be attached according to the installation instructions **BEFORE** working with the specimens (see the Short Instructions for Use for the minichiller).



Fig. 34.1



The double-walled buffer trays can be equipped with clamps that hold the hose (provided) in the correct position for gassing the buffer.

First connect the hoses (2, 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

8.4.2 Double-walled buffer tray L



Fig. 34.2

Order No. 14 0463 46424

8. Ordering information: spare parts, accessories, consumables

8.5 Magnifier, fiber-optic illumination, cold light source

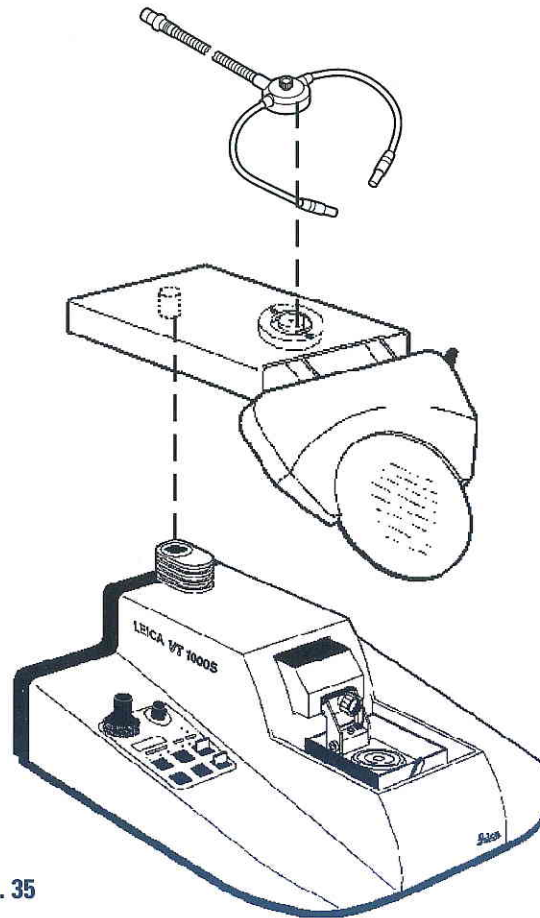


Fig. 35

Fiber-optic illumination

- To be mounted onto the magnifier after the magnifier has been mounted into the fixture. Then, connect the fiber optics to the cold light source.

Order No. 14 0502 30028

Magnifier

- To be inserted into the fixture.

Order No. 14 0462 31191

Leica CLS 100 cold light source

- Serves as a light source for the fiber-optic illumination.

100-120 V, 50/60 Hz, Order No. 14 0502 30214

230 V, 50/60 Hz, Order No. 14 0502 30215

240 V, 50/60 Hz, Order No. 14 0502 30216



Fig. 35.1

8. Ordering information: spare parts, accessories, consumables

8.6 Julabo recirculating cooler/chiller FL300

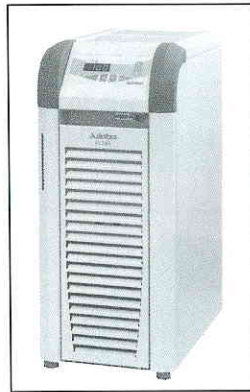


Fig. 36

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 $+40^{\circ}\text{C}$.

Recommended cooling medium: Antifrogen N (14 0481 45443)

Mixture with water (50%/50%)

Application example:

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



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

Warranty

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

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

Service information

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

Please provide the following information:

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

Decommissioning and disposal

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