Leica SM2500E



Operating Manual



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General description



The Polycut E is a motor driven, microprocessor controlled sledge microtome for sectioning large and hard specimens.

The controls are housed in a separate control unit which may be conveniently placed on either side of the microtome. It may be operated manually and automatically. A choice of three knives and knife holders are available to meet the requirements of every application. The knife height is positioned under motor control and the section thickness can be selected between 1 μ m and 999 μ m in 1 μ m increments. The knife holder is retracted during the return stroke to prevent damages to the specimen and knife.

A wide range of specimen holders are available for large and small and both hard and soft specimens. The motor driven specimen holder can be orientated – which is particularly important with biological samples. The cutting speed and length of the stroke can be selected to suit the application.

A wide range of accessories are available to meet specific application requirements. A stereo-zoom microscope with an optional camera attachment for microscopic work can be mounted on the knife holder. The Reichert-Jung Frigomobil can be adapted to the Polycut to provide specimen cooling down to -40 degrees C. An optional device is available for cooling the specimen with liquid nitrogen.

The microtome has two retractable carrying handles by which it can be transported or repositioned.

The Polycut E can be fitted with an optional ultramilling attachment. Ultramilling is a new technique for specimen preparation and is described in detail in a separate manual.

Technical specification

Section thickness selectable in

Knife motion

Knife retraction during return stroke

Knife clearance angle adjustment

Oblique positioning of knife fixed variable

Maximum specimen size

Specimen stages for paraffin

for celloidin

Specimen clamp

Round specimen holder

Specimen orientation

Specimen rotation

Cutting speed

Return speed

Motor drive for knife motion

Power supply

Frequency

Dimension: Microtome (HxWxD)

Control unit

Weight: Microtome Control unit Power suplly 1-999 μm 1 μm increments

70 mm, vertical

0-999 µm

0-17 degrees

45 degrees 45-68 degrees

25x20x7 cm

25x20 cm 16x12 cm 12x 8 cm 8x 6,5 cm

25x19 cm 20x12 cm

44x58 mm

Ø: 6, 15, 25 mm

 \pm 4.8 degrees

approx. \pm 3 and 90 degrees

0.1 mm/s - 100 mm/s

up to 100 mm/s

rapid/slow

110V/240V

50 Hz and 60 Hz

37x42x75 cm

14.5x35.5x29.5 cm

approx. 96 kg approx. 6 kg 54 kg

Installation



The microtome should be lifted and carried using the retractable handles provided.

For optimal results the microtome should be placed on a stable, vibration-free table.

The control unit should be installed to the right of the microtome, especially when working with the ultramilling attachment, to avoid contamination with chips.

The separate power supply should be placed on the floor ensuring that the big red-yellow switch (8) is within reach. The ventilation slits must not be covered.

The power supply may be opened with a special wrench. It includes the transformers, relays and fuses. The maximum intensity of current is indicated under each fuse carrier (7). The two sockets with the lamp symbol (3, 4) are generally supplied with 220 Volts - even if the unit as a whole is designed for 110 Volts. The socket to connect the suction unit (5) has the same voltage as the instrument itself.

Please note that the values of the fuses on 110 Volt and 220 Volt units are different.

Cables from the power supply are connected to the microtome, footswitch and the rear of the control unit as shown in the diagram. To connect the round angular plug to the microtome, it is necessary to push the plug into the socket and secure the knurled ring. This has to be repeated several times. The sockets (3, 4, 5) and the connection left of the footswitch socket are designed for the ultramiller. The connections (2) on the rear of the control unit are designed as plug and socket. Before connecting the plug of the power supply, the red-yellow main switch (8) must be relocated to 0 (zero).

The small switch (1) on the rear of the microtome is used in conjunction with the program mode (c6) and the ultramiller.

Тор:	The specimen carrier speed in program I is three times the speed in program II.
Middle:	The specimen carrier speed in program I is twice the speed in program II.
Bottom:	The specimen carrier speed is the same in both programs.

In program II the speed of the specimen carrier cannot be influenced with the switch (1). The speed will always correspond to the value selected with the speed control potentiometer (c11) on the control unit (see page 20).

Once the equipment is installed and all connections are made and checked, first switch on the power supply relocating the red switch from 0 to 1 and then the microtome depressing d5 on the control unit (see page 18, 21).



Safety precautions



Whenever possible the specimen should be mounted before the knife.

Always use the knife guard to cover the cutting edge when changing the specimen.

The knife should be stored in the case provided when not in use. Never place a knife with its cutting edge facing upwards. Extreme care should be taken when removing the section.

Never try to catch a falling knife.

The knife height relative to the specimen should be meticulously checked before trimming or cutting. Never cut or trim hard specimens at high cutting speeds – always start slowly.

The automatic modes should only be used when the user is confident with the set-up and manual modes.









Cleaning and maintenance



Debris is collected in a receptacle which should be periodically removed for cleaning. The receptable should be emptied before it is entirely full since otherwise the cover band will be contaminated. Most debris can be removed using a dry brush or a vacuum cleaner. The surface of the microtome and the cover band can be wiped with a mild detergent. Aggressive chemicals - particularly alkaline solutions - should only be used with caution.

The cover band should be cleaned preferably in the area of the deflection rollers and in its vertical positions where it is supported by the microtome body. The horizontal part of the band should be cleaned with caution. Even moderate pressure would make the band slip off the guidance.

Under normal conditions of use, the bearing and locating spindle of the specimen base plate holder requires lubrication after 250 hours of operation or every 6 months.

The specimen holder is positioned at the rear limit - see set-up mode. The holder and base plate are removed exposing two lubrication points (1) und (2). A grease gun is provided with the standard accessories. The bearings are lubricated sufficiently by pressing the gun just once or twice.

Specimen holder – base plate



Parcur III Rearcur III Rearcur III The various specimen holding devices are mounted on the microtome with a universal base plate. A special tool is provided for securing the base plate - the torque wrench is set at 45 Nm to avoid overtightening the threads on the eccentric bush. When tightening the bush holding the base plate, the scale on the torque wrench must face the user.

Access to the eccentric bush is gained by pulling the cover plate upwards, towards the front of the instrument.

Removal: the eccentric bush is released using the wrench and turned until the red longitudinal mark on the bush (1) is facing upwards. The bush is carefully retracted until the red ring (2) becomes visible. The base plate can then be removed. The clip on the base plate (3) can be rotated through 90 degrees.

Replacement: the base plate is replaced in reverse order. The base plate can be located on the pin by slightly rocking it. Extreme care should be taken not to dislocate the brass pin (4).

With the red mark facing upwards, the eccentric bush can be relocated. The specimen can be orientated and the bush tightened with the torque wrench as described.

Specimen orientation

Clamp and holder for round specimens





Smaller specimens can be securely mounted using a smaller clamp 44 x 58 mm and base plate adapter.

The eccentric ring shown above enables to adjust the base plate surface to be parallel with the surface of the microtome. Orienting is not possible. The eccentric ring is mounted on the tension bracket as shown in the diagram.

Access to the orientation mechanism is gained by pulling the cover plate forwards.

The specimen may be orientated by 4.8 degrees about any axis. The eccentric bush (1) in the centre holding the base plate must be released before orientation, as described on page 10. The left-hand knob changes the tilt angle of the base plate; knob and base plate move in the same direction.

The right-hand knob changes the pitch angle. Rotating in a clockwise direction will lift the base plate at the front. Tighten the bush after orientation.



A round specimen holder for specimens of 6 mm, 15 mm or 25 mm diameter can also be attached to the base plate using this plate.

These specimen holders can be relocated on the plate laterally to ensure full use of the cutting edge of the knife.

Specimen stages







Special specimen stages made of a corrosion resistant aluminium alloy may be clamped in the vice. The profile of the stages surfaces is designed for firmly securing paraffin or similarly embedded sections.

Stages of various sizes are available (see accessories). All stages are colour marked on the front, which facilitates the orientation should the sectioning be interrupted. Embedding frames may be placed around the specimen to optimise the use of paraffin.

PVC specimen stages are available for celloidin embedded specimens. The surface of these stages has concentric circular grooves, which ensure firm contact with the specimen.



The vice and base plate form a unit for securing specimens up to a size of 100×80 mm by clamping parallel surfaces. Cylindrical specimens of diameter 10 mm to 80 mm may be clamped using the V notches.

The vice features two jaws (1) which may be set to suit the length of the specimen. The jaw in the rear is fixed, whilst the jaw in the front is loosely mounted in the lateral V grooves. The clamping forces produced by the V-groove design pull the specimen down, thus providing additional stability.

Before mounting the jaw, the screw (3) must be fully loosened turning it in a counterclockwise direction. The distance between the front edge of the rank and the mark (4) corresponds to the maximum range of adjustment. Ideal clamping is guaranteed when the front jaw (1) is mounted as closely to the specimen as possible.

Cylindrical specimens may be clamped by turning the jaw (1) and using the V notch. The fixed jaw may be turned after removing the two retaining screws:

All specimen stages are of the same length for clamping purposes. When using large specimen stages, the clamping screw (3) can be tightened or released with a 8 mm socket wrench, or a 13 mm fork wrench, depending on the position and alignment in the vice.

Accessories

Low profile specimens may be clamped using special mountable jaws (2) which are mounted on the vice.

Knife holder clamping blocks – knife holder – A

2

0

9

 \bigcirc

0

 \bigcirc

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The knife holders are secured on the microtome by means of clamping blocks, which allow the knife to be pivoted about its horizontal axis thus changing the clearance angle. The standard clamping blocks hold the knife at right angles to the cutting direction.

5



Clamping blocks which hold the knife at a fixed 45 degree angle to the cutting stroke can be used. Declination blocks are available with an adjustable knife angle between 45 and 68 degrees. These declination blocks were particularly designed for use with the knife holder -C which is described later. The heavy-duty knife holder -A is designed for specimens of particularly hard consistency involving high cutting forces. Only special knives can be used with this knife holder. The knife holder can be used with the various clamping blocks. The knife holder is preassembled with the clamping blocks as shown in the diagram. The knife holder and mounting blocks are mounted on the microtome as shown in the diagram.

4

6

First place the knife holder with the blocks on the microtome. The slits (8) should point to the rear. Then lightly tighten the screws (3) to (6) in numerical sequence. To mount the knife, the holder has to be positioned that the slot (9) faces upwards. Secure by tightening screw (1a) to hold the knife holder in position. Insert the knife as shown in the diagram and secure. The screws that would not secure the knife should not be tightened. Loosen the screw (1a). Use the scale (7) to adjust the clearance angle. First tighten the screws (1a) and (2a) and then (1) and (2).

Finally the screws (3-6) must be tightened to firmly secure the clamping blocks.

To readjust the clearance angle or turn the knife holder for exchanging the knife, just the screws (1, 1a) and (2, 2a) have to be loosened.

1a

8







This knife holder is suitable for standard knives of b, c or d profile.

First mount the clamping blocks and secure by lightly tightening the screws (3). The slits (4) must point to the front. The scale of the clearance angle setting (5) is located on the left. Push the nipples (1) to insert the cylindrical holders with the knife guards (2) through the clamping blocks from the outside.

On inserting the knife, the slots should be vertical (cutting edge up). First the knife has to be screwed with the holders and secured with the rear screws (6). Retighten the screws (7) on the front. Finally the screws (3) must fully be tightened to firmly secure the clamping blocks.

Care should be taken not to damage the knife by tightening the screws.

Knife holder – C



Knife holder -C is primarily designed for biological specimens. The knife is secured over its whole length thus preventing vibration during cutting. The small angle of the knife pressure plate facilitates the removal of sections without tearing.

The procedure for mounting and tightening the knife holder is similar to knife holder -A, described on page 14.

The knife holder must however be secured by tightening the screw (1a) and rotated to gain access to the screws holding the knife. The knife must be firmly secured before the clearance angle is set and the holder tightened on the mounting blocks.

Microtome knives





F remains constant

1A

The drawing illustrates the cutting edge geometry of a knife schematically.

- α = clearance angle (setting on knife holder)
- β = wedge angle
- v = upper exterior facet angle
- $\sqrt{}$ = lower exterior facet angle
- $\sqrt{\prime} = \sqrt{\prime} =$ alternative angle to $\sqrt{\prime}$
- $\varepsilon = facet angle$
- λ = inclination angle ($\alpha + \sqrt{2}$)

Side forces (F1 und F2) depending on wedge angle β : At a small wedge angle (e.g. 30°) great side forces are produced that act on the object.

At a large wedge angle (e.g. 60°) the side forces are lower. However, the stability of the cutting edge is increased. F remains constant.

Interrelationship between wedge angle and side forces:

The formula for calculating the side force is as follows:

If the inclination angle λ or wedge angle β is very large the sec-

 $F1 = F0 \quad \frac{1}{2 \sin \frac{\beta}{2}}$

tions will tear.



F1. F2

1 = wedge-shaped standard knife for knife holder B $\epsilon = 27^{\circ}$ - profile c

 $\epsilon = 45^{\circ}$ - profile d

2 = special knife for knife holder A or C $\beta = \alpha$; $\varepsilon = 40^{\circ}$, 50°, 60°, 70° for knife holder A, or

 $\epsilon=27^{\circ}$ and 45° for knife holder C

Control unit



All parameters for sectioning are selectable on the separate control unit. The controls on the front are divided into four sections which are labelled alphabetically from A-D.

The connections are located on the rear of the control unit. The power for the control unit is supplied from the separate power supply. To switch on relocate the red switch from 0 to 1.

The green switches can be operated only in the manual mode c8 (blue button).

The Polycut E may also be fitted with an optional ultramilling attachment. Several of the switches in -D are used only with this option.

The microtome is switched on depressing the switch d5.

a1- Selects the number of strokes in program I.

a2- Selects the number of strokes in program II.

- a3- Selects the section thickness 10x in micrometres in program I.
- a4- Selects the section thickness in micrometres in program II.
- a5- Control lamp illuminates while operating program I.
- a6- Control lamp illuminates while operating program II.
- c1- Program interruption The program mode c6 may be interrupted depressing the yellow button c1. The programs cannot be interrupted with the footswitch. To restart depress c1 and then the footswitch. The program will be continued where interrupted.
- c-6 Program mode selection of automatic program I or II, as selected in section A. The selected program can then be started with the footswitch.

On completion of the program the specimen carrier travels to the front independent of the selected cutting window (c14/ c15).

Modes of operation



- a8- Stroke counter counts the number of the sections cut.
- b3- The yellow control lamp indicates the interrupt condition of the digital displays a8 and b11. To interrupt and restart depress button b10.
- **b10-** This is the interrupt button for the numerical stroke counter a8 and the section thickness totaliser b11. The counter and the totaliser may be restarted where interrupted by depressing b10. The interrupt condition is indicated by the yellow control lamp b3.
- b11- Numerical display of the totalised section thickness indicates the sum of the section thicknesses that have been cut.
- **b1-** In conjunction with c7 automatic mode selection of the knife retraction on the return stroke in micrometres.
- **b2-** In conjunction with c7 automatic mode selection of the section thickness in micrometres.
- b6- The control lamp illuminates whilst the knife is retracted.





- a7- In conjunction with c8 manual mode this is the reset button for the stroke counter.
- b4- In conjunction with c8 manual mode the knife is raised slowly; in 1-micrometre increments when depressed shortly.
- b5- In conjunction with c8 manual mode the knife is lowered slowly; in 1-micrometre increments when depressed shortly.
- b7- In conjunction with c8 manual mode the knife is raised rapidly.
- b8- In conjunction with c8 manual mode the knife is lowered rapidly.

The zero position of the knife height may be arbitrarily selected with b9. Raising the knife above the zero position will be indicated by a decimal point on the extreme left of the display. The display will then indicate the distance to the selected zero position in micrometres. The decimal point will extinguish when the knife height is zero and below. Lowering below the selected zero position, will be shown as posivitve values.

b4/b5/b7/b8:

- These switches illuminate when the knife reaches the highest or lowest position. At this stage, it is not possible to select c7 automatic mode or c6 program mode. The knife must be moved out of this position in the manual mode (c8) until the lamp in the switch extinguishes.
- b9- In conjunction with c8 manual mode the numerical section thickness totaliser b11 may be reset to zero.
- c8- Manual mode must be selected to complete the following operations: Reset of the stroke counter (a7), repositioning of the knife height upwards/downwards (b4, b5, b7, b8), reset of the section thickness totalising (b9), repositioning of the specimen carrier in the manual mode (c9, c10). These switches are green and blue for easy identification.
- c9- In conjunction with c8 manual mode the specimen carrier is repositioned backwards and will stop in the rear. The speed cannot be controlled.
- c10- In conjunction with c8 manual mode the specimen carrier is repositioned forwards and will stop in the front. The speed cannot be controlled.

c9/c10

These switches will illuminate when the specimen carrier reaches the front or rear stroke limit. At this stage, it is not possible to select c7 - automatic mode - or c6 - program mode. The carrier must be moved out of the rear/front position in the manual mode (c8) until the lamp in the switch extinguishes.

Modes of operation





c2/c3 - c4/c5

NOTE: The switches c2/c3 and c4/c5 cannot be depressed simultaneously.

When c2 is activated it is necessary to deactivate it before depressing c3 and vice versa.

When c5 is activated it is necessary to deactivate it before depressing c4.

- c2- Continuous stroke used in conjunction with the automatic mode c7. In the automatic mode the specimen carrier is controlled by the footswitch. Depressing the footswitch will set the carrier in motion. Releasing the footswitch will stop the carrier.
- c3- Single stroke used in conjunction with the automatic mode c7. Depressing the footswitch will initiate a single stroke. The specimen carrier may stop at the end of the cutting stroke or at the end of the return stroke, depending on c4 or c5.
- c4- Stop rear used in conjunction with the automatic mode c7, the specimen carrier will stop upon completion of the cutting stroke, i.e. behind the knife.
- c5- Stop front used in conjunction with the automatic mode c7, the specimen carrier will stop upon completion of the next return stroke, i.e. in front of the knife.

CAUTION: When either c4 or c5 is depressed in conjunction with the automatic mode c7, the specimen carrier will not stop immediately, but in the rear or front as selected.

- c7- Automatic mode must be selected to operate the continuous stroke (c2) or single stroke (c3) mode. When neither c2 nor c3 is depressed, the instrument will operate in the step mode, i.e. the specimen carrier moves on depressing the footswitch. Releasing the footswitch will stop the carrier motion immediately.
- c11- The speed of the cutting stroke may be freely selected in the range 0-100 mm/s with the potentiometer c11.

CAUTION: Ensure the specimen has sufficient clearance under the knife before setting the cutting and return speeds.

c12- The speed of the return stroke may be freely selected in the range 0-100 mm/s with the potentiometer c12.

c11/c12

NOTE: These controls cannot be operated in the manual mode c8.

- c13- Control lamp illuminates when the specimen carrier reaches the REAR stroke limit as selected with c14.
- c14- Cutting window REAR stroke limit. The cutting stroke may be limited with the potentiometer c14.
- c15- Cutting window FRONT stroke limit. The return stroke may be limited with the potentiometer c15.
- c14/15

NOTE: The potentiometers c14 and c15 cannot be operated in the manual mode c8.

c16- Control lamp - illuminates when the specimen carrier reaches the FRONT stroke limit as selected with c15.

Modes of operation



d1- Emergency stop - Depressing this button the specimen carrier will stop immediately.

The emergency stop is reset by turning the red button in a clockwise direction.



- d2- On/off switch for the optional ultramilling attachment
- d3- On/off switch for optional suction unit (ultramiller only)
- d4- On/off switch for optional light source
- d5- On/off switch for the control unit



The following controls refer to the optional ultramilling attachment only:

- d6- Milling speed control increase
- d7- Milling speed indicator
- d8- Milling speed control decrease

Cutting

Trimming and sectioning can be practised once the user is familiar with the microtome. The functions of the individual controls can be identified easily using the separate operating card provided.

The specimen should be mounted before the knife. Select manual mode c8 (blue switch). This will activate the green switches. To mount the knife and the specimen, drive the specimen carrier to the front of the Polycut depressing c10. Once the knife and specimen are mounted (see page 11, 13 and page 14-16), position the specimen within 1-2 centimetres of the knife using c9. Then carefully reposition the knife height with b7 or b8 right above the highest point of the specimen. If necessary, fine adjustments can be made with b4 and b5. Take care when driving the carrier to the rear shortly depressing c9. The knife should just clear the specimen.

If necessary, reorientate the specimen as described in the appropriate section (see page 10, 11). After reorientation, the eccentric bush must be retightened with the torque wrench. It may also be necessary to reposition the knife height with b7 or b8.

When cutting small specimens, it is advisable to adapt the carrier motion to the specimen size, i.e. select a cutting window.

First adjust the potentiometer c14 up and c15 down. The cutting window is adjusted by positioning the specimen about 10 millimetres in front of the knife depressing c9 or c10. Adjust c15 slowly until the lamp c16 illuminates. The procedure is repeated with the specimen about 10 millimetres behind the knife depressing c9 and adjusting c14 whilst monitoring the lamp c13. In the automatic and program modes the movement of the specimen is limited by this window.

Before selecting c6 - program mode - or c7 - automatic mode - the following should be noted:

- The ideal knife position is about 100 micrometres above the highest point of the specimen. To reposition use b4 and b5.

- Care should be taken that the potentiometer c11 for speed selection is suitably adjusted. Hard specimens should be cut at low speeds.

- The knife retraction on the return stroke should be selected with b1. The control lamp b6 will illuminate whilst the knife is retracted.

For cutting at small thicknesses, the knife retraction in micrometres should be twice the selected section thickness. If knife retraction is not required, it may be switched off using b1.

- Ensure that all screws of the knife holder and specimen carrier are fully tightened. The eccentric bush (see page 10) must always be secured.

In the automatic mode c7, continuous stroke, single stroke and the step mode may be selected with optional front or rear stops (c4, c5).

The program mode c6 is suitable to trim specimens of very hard consistency that require low cutting speeds and small section thicknesses.

The following is an example for programming:

Select 50 strokes in program I on the thumbwheel switch a2. Select a section thickness of 20 micrometres on the thumbwheel switch a3 - i.e. 02 must be selected as the section thickness is adjusted 10x in micrometres.

Select 10 strokes in program II using a2 at a section thickness of 3 micrometres using a4. Select the program mode c6 and adjust a low cutting speed of 3 mm/s on the potentiometer c11. The cutting action may then be started with the footswitch.

It may take a while to trim the surface of the specimen. However, in the program mode, the Polycut E operates automatically. Cutting will stop automatically when the preselected number of sections has been reached. This gives the user some extra time to do other things.

Trouble shooting

If the user is unfamiliar with the microtome, these practical tips should resolve the problem quickly.

Mode c6 or c7 selected - specimen carrier stationary and switches b4, b5, b7, b8, c9 or c10 are illuminated

- Select c8 manual mode and depress the appropriate green counter button, until the lamp goes out.
- Check the emergency stop d1 has not been activated. By turning the knob clockwise, the stop condition is deactivated.
- Check the footswitch is connected.
- Check the cutting and return speed is not set to zero (c11, c12).
- Check the microtome is switched on (d5).

Mode c8 selected - specimen carrier stationary on depressing the switches

- Check the microtome is switched on (d5).
- Check the emergency stop d1 has not been activated.
- Check the red switch of the power supply is switched on.
- Check the cables are connected.

Thick-thin sections

 Check all retaining screws are firmly secured. Increase the clearance angle.

Tearing sections

- Selected knife angle too big.
- Selected clearance angle too big.

Mode c7 selected - specimen carrier travels to the front and rear before stopping

 Either c4 or c5 is activated. Read the appropriate section in this manual.

Mode c7 selected - specimen carrier does not reach the knife and no section is obtained

 The value adjusted on the potentiometer c14 is too low, or the value on c15 too high.

Optional accessories

Stereo-zoom microscope

For microscopical analysis, we recommend to use a stereo-zoom microscope, e.g. model 570 or model 580, with optional photo attachment and a microscope carrier.

The microscope is screwed to the clamping blocks. The microscope carrier is slewable and supported by a screw in the back.

Equipment for frozen sections

A choice of two freezing accessories is available. The Frigomobil -0 is a repositionable freezing unit for freezing the specimen. It consists of a freezing stage which can be clamped in the vice and will freeze specimens down to -40° C.

The Frigomobil -OM is designed for both specimen and knife cooling. An additional feed tube for the coolant with an adapter and clamp for standard knives is provided. This optional accessory can only be used in conjunction with knife holder -B.

CAUTION: The coolant feed tube is inflexible and should therefore be appropriately supported. The cutting window should be selected in order to reduce the movements of the feed tube to a minimum.

Nitrogen freezing attachment

For materials that require freezing to low temperatures for cutting, such as rubber, we offer a nitrogen freezing attachment. The specimen is placed on the specimen stage and frozen. The temperature may be selected continuously down to -170– C.

If you need more information please do not hesitate to contact us.

Section conveyor

A section conveyor is provided to transport the sections. It is operated via a separate control unit and a footswitch. It is suitable for paraffin sections in conjunction with the knife holder -B and -C.

Variable declination blocks

For cutting celloidin, wood or material of tubular structure, variable declination blocks will be available soon. If you need further information please do not hesitate to contact us.

Notes

Knife ordering information

Knives for knife holder A

Catalog No.

0213 11141

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12 cm, tungsten carbide, facet angle 40°	0216 12477
12 cm, tungsten carbide, facet angle 50°	0216 12478
12 cm, tungsten carbide, facet angle 60°	0216 11736
12 cm, tungsten carbide, facet angle 40°	0216 11727
12 cm, tungsten carbide, facet angle 50°	0216 11728
16 cm, tungsten carbide, facet angle 40°	0216 11739
16 cm, tungsten carbide, facet angle 50°	0216 11740
16 cm, tungsten carbide, facet angle 60°	0216 11741
16 cm, tool steel, facet angle 40°	0216 11730
16 cm, tool steel, facet angle 50°	0216 11731
22 cm, tool steel, facet angle 40°	0216 11733
22 cm, tool steel, facet angle 50°	0216 11734

Knives for knife holder B

22 cm, profile b		0216 07114
22 cm, profile c		0216 07116
22 cm, profile d		0216 07136
30 cm, profile b		0216 07126
30 cm, profile c	+	0216 07128
30 cm, profile d		0216 07139

Knives for knife holder C

12 cm, tungsten carbide, profile Cc	0216 60114
12 cm, tungsten carbide, profile Cd	0216 60127
12 cm, tool steel, profile Cc	0216 60128
12 cm, tool steel, profile Cd	0216 60127
16 cm, tungsten carbide, profile Cc	0216 60113
16 cm, tungsten carbide, profile Cd	0216 60115
16 cm, tool steel, profile Cc	0216 60076
16 cm, tool steel, profile Cd	0216 60078
22 cm, tungsten carbide, profile Cc	0216 60116
22 cm, tool steel, profile Cc	0216 60077
22 cm, tool steel, profile Cd	0216 60079
Plastic knife case for 12 and 16 cm knives	0213 11140

Plastic knife case for 22 and 30 cm knives

Parts list

		Catalog No.
1	Basic instrument with control panel and power supply	0383 20211
2	Base plate with eccentric ring	0383 09422
2a	Holder for round specimens Ø 6,15,25 mm	0383 08992
2b	Specimen clamp 44 x 58 mm	0383 09415
3	Base plate with vise 80 x 100 mm	0383 09267
4	1 pair of mounting blocks for vice	0383 20176
5	Object plate, metal, 8 x 6,5 cm	0383 11721
	Object plate, metal, 12 x 8 cm	0383 11722
	Object plate, metal, 16 x 12 cm	0383 11723
	Object plate, metal, 25 x 20 cm	0383 11724
5	Object plate, plastic, 8 x 6 cm	0404 09909
	Object plate, plastic, 12 x 8 cm	0404 09910
	Object plate, plastic, 20 x 12 cm	0404 09911
	Object plate, plastic, 25,5 x 19 cm	0404 09912
6	Embedding frames, variable in size	
	up to 25 x 19 cm	0405 09373
7	Spacer blocks, 1 pair	0383 20024
8	Knife holder - A with clamping blocks	0383 11719
9	Clamping blocks for knife holder -A and -B, 45°	0383 11901
10	Knife holder -B with mounting blocks	
	and clamping blocks	0383 11720
11	Knife holder -C with clamping blocks	0383 60063

Optional accessories

Microscope with holder (not illustrated)	0383 20087
Section conveyor (not illustrated)	
for knife holder -B and -C	0383 20101
Cooling attachment Frigomobil "O" (not illustrated)	
with specimen cooling	0354 09727
Cooling attachment Frigomobil "OM" (not illustrated)	
with specimen and knife cooling	
for knife holder B	0354 09721
Nitrogen freezing device (not illustrated)	0378 18152
Preparation set, complete (not illustrated)	0371 12702

Polycut E - drawing











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