



# HM355S

## Rotary Microtome

### Operator Guide

388095-EP Issue 04 February 2022

**REF**

905200  
905200A  
905200ER  
905200STS

# Our mission is to improve lives by enhancing cancer diagnostics.

To every one of us at EpreDia, this mission is personal. Many of us have loved ones and family who have been affected by cancer.

You are on the front line of this fight, and our pledge is to arm you with the most innovative tools to enable early detection and diagnosis of this disease.

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# Company Information

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These instruments conform to the general safety and performance of:

- In Vitro Diagnostics Regulation (IVDR) EU 2017/746

## Symbols

The following symbols and conventions may be used throughout this document and on the instrument:

This symbol is used on the equipment, or in a document, to indicate that instructions must be followed for safe and correct operation.



This symbol is also used on the instrument, or in a document, to indicate that irritants or potentially harmful chemicals are present. Refer to the Material Safety Data Sheets for the products, and always use Good Laboratory Practice.

If this symbol appears on the instrument always refer to the operator guide.

This symbol is utilised on the instrument, or in a document, to indicate that there are potential biological risks associated with the instrument and / or with instrument use. Always use Good Laboratory Practice.



Cold surface, if necessary, use gloves



Cutting hazard, sharp edges, watch your fingers

Separate taking back of electrical and electronic instruments in the countries of the European Union:



This is to be applied in the countries of the European Union and other European countries with a separate collecting system within the waste management. This product, being an electro and/or electronic instrument, must be treated separately within the waste management process (WEEE).



Manufacturer

Serial number: It is stated on the product label sticker. It is built up as follows: SYMMXXXX-EP, where S=Production site, Y=year of production, M=Month of production, X= Counter, -EP=EpreDia. So, the serial number states the production date of the device.



This symbol is used on the instrument, or in the document, to indicate that instructions for use must be consulted

A warning is given in the documentation if there is a potential risk of injury, equipment failure or poor tissue sample processing outcome.

### Note

Notes give additional information about a job or instruction, but do not form part of the instruction.

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## EMC Statement

This IVD equipment complies with the emissions and immunity requirements of IEC 61326-2-6.

This equipment has been designed and tested to CISPR 11 Class A.

It is intended for use in a laboratory environment, by a trained and qualified professional. In a domestic environment it may cause radio interference, in which case it may be necessary to take measures to mitigate the interference.

## IVD Intended Purpose Statement



The EpreDia fully automated rotary microtome HM355S is an in vitro diagnostic device, designed to take precision sections of tissue specimens including the sectioning of paraffin embedded samples in medical, pharmaceutical laboratories as necessary preparation for their examination and subsequent diagnosis. Only qualified and trained laboratory personnel may operate the HM355S.

The instrument may only be operated within the scope of its intended use as described above and as per the instructions given in this manual.

Any other use of this instrument is considered as an improper action

# Safety Information

## Introduction

Epredia instruments are designed for convenient and reliable service; however, improper use or handling by a user may damage the instrument or cause a hazard to health. The instrument must not be used in a manner not specified by Epredia.

Correct maintenance procedures are essential for consistent performance. It is recommended that users secure a maintenance contract with our service department.

To remain compliant with regulatory requirements, and to ensure that mandatory safety upgrades are performed at the earliest opportunity, it is strongly recommended that all service activities are performed by Epredia-factory trained Engineers. Warranty may be voided if service is performed by non-factory trained Engineers.

Maintenance or repairs that are not performed by Epredia trained Engineers with proven training may affect the safety, performance and compliance of the equipment.

Please consult your local sales or support teams for more information about service contracts.



The following sections contain important information for the safe setup and use of the instrument, and should be read and understood by the user before using the instrument

## General Safety



This instrument, as supplied, conforms to IEC61010-1 and IEC61010-2-101; however, the addition of chemicals introduces potential hazards. Good Laboratory Practice must be employed and consideration must be given to the potential for hazard when dealing with these chemicals.



Do not use the instrument in close proximity to strong electromagnetic radiation, as these may interfere with the proper operation. The electromagnetic environment should be evaluated prior to operation of the device.



Good Laboratory Practice must be used when handling tissue samples to prevent cross contamination and infection. The user should complete a risk assessment to determine any potential hazards related to tissue handling.



- Do not introduce any source of ignition into, or near, the instrument once it has been loaded with reagents.
- Do not remove any panels or access covers, unless specifically instructed to do so. The instrument does not have any user serviceable parts. Potentially lethal voltages are present inside the instrument.
- The instrument must be properly connected to a good earth (ground) via the Mains input supply and positioned such that it is possible to interrupt the Mains supply at the source by removing the plug from the socket.
- Use only factory approved accessories or replacement parts within the instrument
- Only use reagents recommended in the operator guide

## Chemical Safety

The introduction of chemicals creates potential hazards. EpreDia has adopted the following position with regard to the subject of volatile chemicals used in laboratories:



Customers using non-specified chemicals in the instrument, do so at their own risk.

All chemicals recommended by EpreDia have auto-ignition temperatures considerably above any surface temperatures that can be reached during a single fault failure on the instrument.

The instrument contains no source of ignition in any areas of the instrument where chemicals are stored, or likely to leak into, in a single fault condition.

The operator is fully aware of the contents of the specification documents detailing the properties of the chemicals they are using.

The operator has carried out any legally required assessment of chemicals used and is using Good Laboratory Practice.

## Environment

This instrument is required to comply with the European Union's Waste electrical and Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol:



EpreDia has contracts with one or more recycling / disposal companies in each EU Member State and this product and packaging should be disposed of or recycled through them. For further information, contact your EpreDia service representative.

## Warranty Statement

EpreDia is proud of their quality, reliability and of our after-sales service. We continuously strive to improve our service to our customers.

Please ask your distributor or EpreDia representative about service contracts which can help maintain your instrument in an optimal operating condition.

Warranty provisions necessarily vary to comply with differences in national and regional legislation. Specific details can be found in the delivery documentation or from your dealer or representative.

Please note that your warranty may be invalidated if:

- This instrument is modified in any way, or not used as intended by EpreDia.
- Accessories and reagents which have not been approved by EpreDia are used.
- The instrument is not operated or maintained in accordance with instructions.
- The installation of the instrument was not conducted by a certified EpreDia representative.



Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user/or the patient is established.

# Introduction

## Description of Rotary Microtome HM355S

The EpreDia Rotary Microtome HM355S is a universal heavy-duty microtome for specially designed for sophisticated paraffin and hard sectioning techniques in biology, medicine, industry and research.

The HM355S sets new ergonomical standards concerning operation and comfort. The instrument is equipped with a section waste tray with integrated arm rest. The waste tray is built around and under the knife/ blade carrier for direct collection of section waste.

This model can be equipped with all compatible specimen clamps, knife and blade holders (see Additional Equipment) of the Rotary Microtome series. In addition, the stereomicroscope or the large field magnifier can be adapted.

The HM355S will cut sections in a range from 0,5 µm up to 100 µm. For the protection of knife and specimen, the instrument retracts the specimen at the end of the cut. If desired, the function <retraction> can be turned off. A trimming function with defined steps from 5 µm to 500 µm permits the fine adjustment up to the first cuts and results in larger section thicknesses when trimming.

The manual rotary movement of the hand wheel of the HM355S is converted into a vertical movement of the specimen clamping system. Sectioning is carried out by knives or blades, which must be adjusted and fixed on the knife/blade carrier.

The electronically controlled motor drive with precision tachometer generator guarantees an extremely fast adjustment to section force variations and constant cutting speed. It also ensures optimal section quality in each field of application.

The motorized coarse feed system allows the continuous specimen forward and backward travel with variable speed settings. This way, specimen and knife/blade edge distance can be adjusted quickly.

The operating panel is placed on the left side of the microtome. It can be removed and used separately,

also on the right side of the instrument. To do this, the operating knobs can be removed and installed on the other side of the operating panel. The touchpad keyboard is clearly arranged for easy and safe operation.

The selected section thickness, trimming thickness, section counter, sum of section thicknesses and remaining travel to the front-end position as well as speed of the cutting movement, the operating mode and the current date and time are indicated on the display of the operating panel.

The number of the sections made can be shown on the section counter on the display. After each downward movement of the specimen holder, the number on the section counter increases by 1. The sum of the sections carried out can also be seen on the display. Trimming values and sectioning values are added up. Section counter and sum of section thicknesses can be reset to zero at any time by using of the RESET-button.

The remaining travel to the front-end position can also be shown on the display. The remaining travel, which is still available for sectioning, is shown in microns. If the specimen holder is in the back-end position, the display shows 28 000 µm. This number decreases, the further the specimen holder is moved towards the front.

The knife/blade carriers are designed so that the knives/blades can be easily clamped in place and adjusted. The microtome is perfectly balanced for the use with the universal cassette clamp (715020). Using other clamps can result in slight object movements when the hand wheel brake is not activated.

For the user's safety, the instrument is equipped with an emergency stop device. An electronic and a mechanical hand wheel brake and a hand wheel handle, which can be pushed in, are installed for further safety.

The fast-freezing unit KS-34 allows frozen sectioning with the specimen temperature as low as - 45° C.

## Scope of Delivery Standard Equipment

The Rotary Microtome HM355S is supplied with the following accessories:

Quantity	Description
1	Operating Panel
1	Section waste tray, large
1	Cover plate, brushed aluminium
1	Cover
1	Brush
1	Paraffin repellent PARA GARD, 100 ml
1	Operation Manual printed
1	CD-ROM with Operation Manual
1	Power Cord (230V)
1	Power Cord (115V)
1	Power Cord UK (optional, for deliveries to the UK)

### Additional Equipment (optional)

Description	Cat.-No.
<b>Section-Transfer-System STS</b>	
Section-Transfer-System STS with blade holder TE	771200
Standard Specimen Clamp for STS	715550
Transfer Surface for STS	575170
<b>Cool-Cut</b>	
with Universal cassette Clamp	771110
with Standard Specimen Clamp	771120

Description	Cat.-No.
Foot Pedal with Interlock Connector	640380
<b>Knife and Blade carrier</b>	
Disposable blade carrier ER	705830
Disposable blade carrier E	705800
Solid blade holder N	705820
Solid blade holder C	705810
<b>Specimen Clamps</b>	
Standard specimen clamp	715010
Universal cassette clamp	715020
Adjustable universal cassette clamp	716130
Adjustable universal cassette clamp, for Macro cassettes	716120
Adjustable universal cassette clamp, for Macroflow-cassettes	716150
Foil clamp	715030
Sandwich supporting material	176010
Insert for round specimen, Ø 6 mm	715070
Insert for round specimen, Ø 19 mm	715280
Insert for round specimen, Ø 25 mm	715090
V-insert	715100
V-distance piece	715320
<b>Microtome steel knife, type C</b>	
16 cm	152020
Paraffin repellent, 6 x 4oz	2300
Lubrication oil, 100 ml	350110

# Technical Data Sheet

Feed Section Thickness Range		0.5 – 100 µm
Resolution	0.5 µm from 0.5 – 5 µm	
	1 µm from 5 – 20 µm	
	2 µm from 20 – 30 µm	
	5 µm from 30 – 60 µm	
	10 µm from 60 – 100 µm	
Trimming Thickness Range		5 – 500 µm
Resolution	5 µm from 5 – 30 µm	
	10 µm from 30 – 100 µm	
	20 µm from 100 – 200 µm	
	50 µm from 200 – 500 µm	
Specimen Retraction during Return Travel		40 µm, disengageable
Horizontal Feed Range		28,000 µm
Vertical Specimen Stroke		72 mm
Section Counter		5-digit, with reset
Section Thickness Sum		5-digit, with reset
Remaining Travel to Front End Position		5-digit
Specimen Size	when using a Standard Specimen Clamp	max. 55 x 50 mm
	when using a Macro-Specimen Clamp	max. 68 x 50 mm
Specimen Orientation	X- and Y-axes	universal 8°
Samples Rotation		360°
Cutting Drive		motorized, electronically controlled
Modes of Operation		interval, single, multi and continuous mode
Cutting Speed		0 – 450 mm/s
Coarse Feed		motorized, variable speed
Storage Temperature Range		- 20° C up to + 50° C
Operating Conditions	for indoor use only	+ 10° C up to + 40° C (at a max. rel. humidity of 60 %) altitude up to 2000 M.S.L.

Floor Loading Requirements	110 kg/m <sup>2</sup>
Power Requirements	100...240 V 1,6 A ±10% 50/60 Hz
Pollution Degree	2
Protection Class	1
Overvoltage Category	II
Sound Pressure	42 dB(A)
Dimensions	410 mm x 520 mm x 280 mm (wide/deep/high)
Weight	31 kg

# Operating Instructions

## Setting up the Microtome

Cut through the bands around the carton.

- Open the carton.
- Remove the accessories.
- On the lower front and rear side of the instrument, there are two recessed grip to lift and carry the microtome.

### Note

*Do not use the hand wheel handles to lift or carry the instrument.*

- Lift the microtome out of the carton.
- Position the instrument such that it is possible to interrupt the Mains supply at the source by removing the plug from the socket.
- Place the microtome on a stable and vibration free table, as sectioning can be influenced by nearby instruments which generate vibrations.
- Hand wheel must be free and accessible in a comfortable way.
- Remove the separately packed section waste tray and install it at the base plate from the front side.
- Remove the separately packed cover plate and place it on the top of the microtome.
- In the rear part at the bottom of the instrument, there are sliding feed for an easy moving of the microtome.
- Slightly lift the base at the front end only and slide the microtome into place.

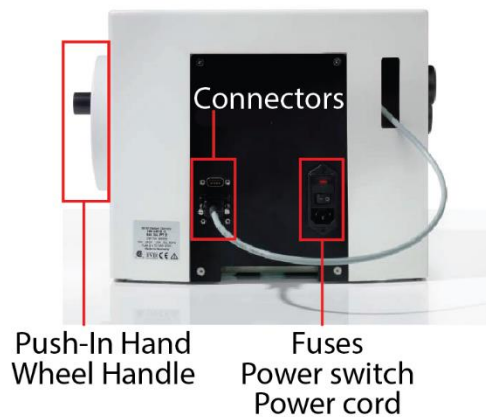
### Note

*Remove the section waste tray to move or carry the instrument. The section waste tray can be pulled out of its proper position.*

## Front View

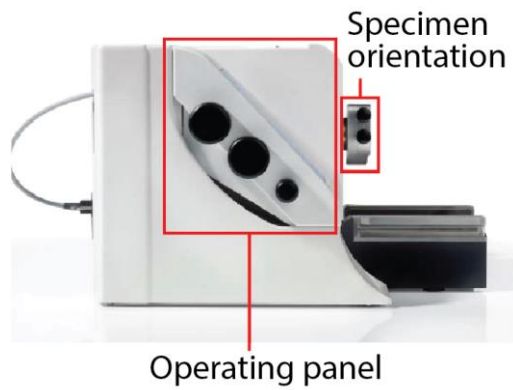


## Rear View

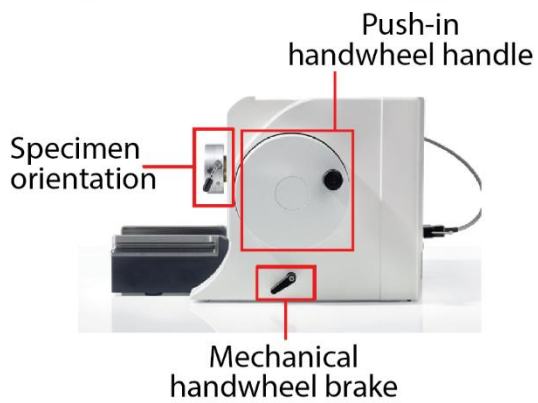




## Lateral View Left Side



## Lateral View Right Side



### Note

A safe function of the Microtome is only ensured, if the equipment possesses a temperature within the specified operating conditions (see Technical Data Sheet, page 10). We highly recommend that the Microtome rests at least 2 hours after unpacking at ambient temperature before switching it on for the first time.

### Note

Before starting section, instrument, knife carrier and section waste tray should be treated with the included or any other commercially available paraffin repellent. This medium considerably reduces the adhesive property of paraffin sections to the individual parts (see page 9, standard and optional accessories).

## Initial Start-up

### Note

The type of examination materials used and all special conditions for their processing, pre-treatment and, if necessary, storage as well as instrument controls for correct and safe operation are the responsibility of the operator. The operator is also responsible for special equipment and materials and/or reagents used for the operation of the instrument.

The operating panel, which is packed separately, can be attached to the instrument or used freestanding. First connect the operating panel with the instrument:



- a) For Service Purposes only
- b) Operating Panel
- c) Foot Pedal
- d) Cover for Fuses
- e) Power Switch
- f) Power Socket

- Connect the cable of the operating panel to the connector (b) on the rear side of the microtome and fasten it with the two screws.
- Should the operating panel be attached to the instrument, push the connector through the corresponding hole on the rear side of the microtome.
- The operating panel can be used freestanding. It can be placed on the left as well as on the right side of the microtome.

- The knobs are separately packed and must be attached to the operating panel.
- The knobs can easily be removed and placed on the either side of the operating panel.
- Connect the plug of the foot pedal cable into the connector (c) and fasten the cable on the microtome with the two screws. (optional)
- Connector (a) is for service purposes only.

### Note

(optional, for users of foot pedal only).

If the foot pedal or interlock connector are not connected, the operating mode "emergency stop" is used. In this mode, the electronic hand wheel brake is activated and the cutting drive motor cannot be started.

Always connect the foot pedal or interlock connector.

## Using the Foot Pedal (optional)

Before using the Foot Pedal on HM355S first time (it applies to every HM355S using the foot pedal first time), you have to consider the following procedure:

- Turn on the Microtome.
- Connect the Dongle (Interlock connector) with connector X16 (c) on the rear side of the microtome (see figure on page 15).
- Press the button on the Dongle in order to activate the “Emergency Stop” function.
- Now disconnect the Dongle. The “STOP” symbol should appear on the display.
- Connect the Foot Pedal with connector X16 (c).
- Vigorously step on the foot pedal as far as it will go.
- On display should appear the “STOP” Symbol as long as the foot pedal is being stepped on. It shows that the “Emergency Stop” function is working properly.

### Note

*From now on always use either the Foot Pedal or the Dongle (without Foot Pedal); the instrument won't work without them.*



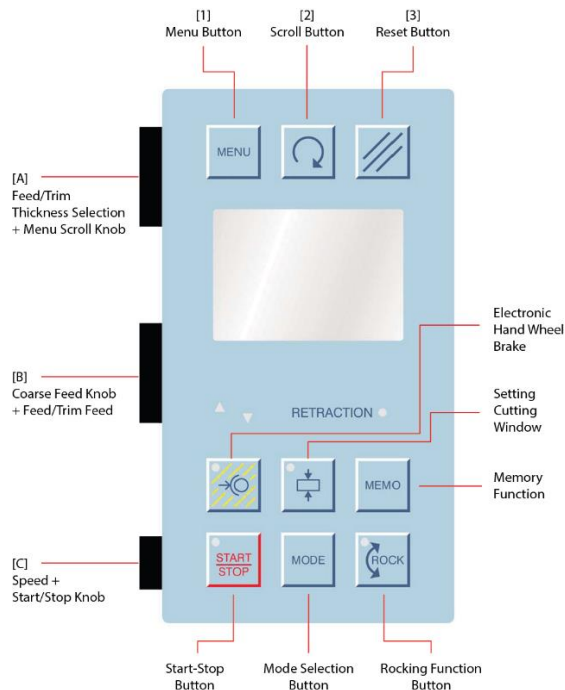
The functionality of the built-in emergency Stop function of the foot pedal has to be tested every time the foot pedal was newly connected with the microtome. The test has to be carried out before the microtome is used! After the foot pedal was connected with the microtome, press down the foot pedal completely. “STOP” appears in the display, proven that the functionality is granted. The principle use of the Foot Pedal is written in the user manual of the microtome.

## Operating Panel

The operating elements of the panel are clearly arranged and allow for a safe operation of the instrument.

### Note

The operating panel can be removed from the instrument and be used free standing.



## Display and Key Functions

Epredia Microtomes are designed to support your workflow. To achieve best results, take your time to get know the HM355S thoroughly before starting work.

### Setting Cutting Window

- Turn the hand wheel so that the lower edge of the specimen is positioned slightly above the knife edge.
- Briefly press button [5] to set the upper limit of the cutting window.
- Continue turning the hand wheel clockwise to place the upper edge of the specimen just below the knife edge.

- Briefly press button [5] again to set the lower limit of the cutting window.
- A green LED in button [5] shows the length of the cutting window during each further passing through of the cutting window zone.

To set a new cutting window

- Stop rotation of the hand wheel and double press the cutting window button.
- The cutting window is now cancelled.
- Move the hand wheel so that the specimen is in the desired start position of the cutting window.
- Briefly press button [5] to set the upper limit of the cutting window.
- Continue turning the hand wheel clockwise to the desired end position.
- Briefly press button [5] to set the lower limit of the cutting window.
- The new cutting window is now set.

### Note

A cutting window should only be set while the specimen is moved downwards. If, by mistake, a cutting window limit is set during return travel of the specimen, the set limits are applied to the cutting movement accordingly.

### Starting and Stopping of Cutting Drive

The cutting drive can be turned on by pressing two times either button [7] or knob [C] or the foot pedal (optional). It can be turned off by pressing one time either button [7] or knob [C] or the foot pedal (optional).

### Note

A double click is necessary in order to start the cutting drive.

For this, the function “emergency stop” must not be activated and the mechanical brake must not be locked twice.

**Note**

The course function of the cutting drive results from the selected cutting window, the selected operating mode and the set cutting speed.



For your personal safety, push in the hand wheel handle before starting the motorized cutting drive.

**Hand Wheel Brakes**



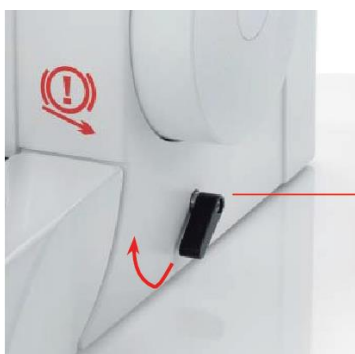
For your personal safety, both brakes must always be activated when working on the specimen holder or knife carrier.

**Note**

The microtome is equipped with an electronic brake and a mechanical hand wheel brake to prevent unintended movements of the specimen holder. Activating the brakes reduces the risk of being injured when adjusting the specimen clamp and/or knife/blade carrier.



When the instrument is turned off, the electronic hand wheel brake cannot be activated! Whenever the instrument is turned off, activate the mechanical brake.



Mechanical Hand Wheel Brake

- To lock the **mechanical hand wheel brake** pull the lever upwards (in direction of the arrow). The STOP symbol appears in the display.

To activate the electronic brake, press button [4]. The red LED in the brake button [4] lights up. Now, the motorized cutting drive cannot be started by mistake.

To release the electronic brake, press the brake button [4] again.



For safety reasons, the electronic brake is automatically activated after each stop of the motorized cutting drive.

**Note**

Starting the cutting motor drive is not possible when the instrument is turned off or when the mechanical hand wheel brake is activated. This is indicated by a STOP symbol appears in the display. A red LED in the brake button lights up when the electronic brake is activated.

**Emergency Stop**

To stop the sectioning motor immediately, the microtome has an emergency stop device (a second one is available with the optional foot pedal).



Only use the emergency stop button in a case of emergency, do not use it as a brake.

**Note**

The hand emergency stop button is placed on the right side of the microtome above the hand wheel.

- Push the red button to stop the motorized cutting drive immediately.

The operating panel display will show "STOP" when the emergency stop is activated.



- To continue sectioning, pull out the red button.

### Note

The second emergency stop device is integrated into the foot pedal (optional).

- Vigorously step on the foot pedal to immediately stop the motorized cutting drive.

This emergency stop device is activated as long as the foot pedal is being stepped on. "STOP" is shown on the display of the operating panel, if the "emergency stop" is activated.

- To continue sectioning, release the foot pedal. The cutting drive can be started again.

### Cutting Process Indication

In the middle line of the display information about the sectioning status can be seen.

- Press the "scroll button" [2], to show a list of the functions on the display.

The following information on the current sectioning position of the instrument can alternatively be seen in the middle line of the display:

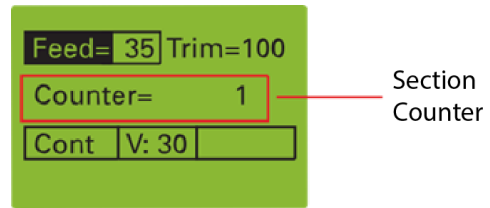
number of sections
sum of section thicknesses
remaining travel to the front-end position

- To do so, press button [2] until the required information is shown on the display.

If no information is required in this line, press button [2] until this line of the display is blank.

### Section Counter

The middle line of the display shows information on the sectioning status.

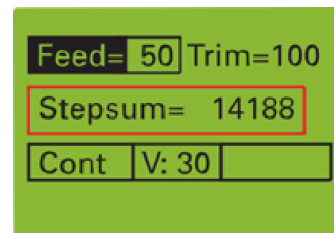


The section counter adds up the number of sections produced. After each downward movement of the specimen holder, the number on the section counter increases by 1.

The counter can be reset to zero by pushing the "reset button" [3].

### Section Thickness Sum

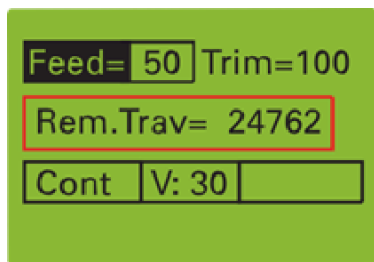
The middle line of the display shows information about the sectioning status.



This value shows the sum of the sections already cut in microns. Trimming values and sectioning values are added up.

To reset to zero press "section counter" reset button [3].

## Remaining Travel to Front End Position

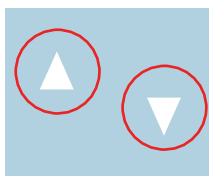


This value shows the distance in microns, which is left for sectioning in microns.

### Note

If the specimen holder is in the back-end position, the display shows 28000  $\mu\text{m}$ . This number decreases the closer the specimen is moved to the front.

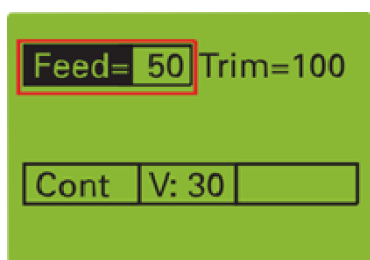
The end position is shown by a flashing LED.



## Setting Section and Trimming Thickness

The required section and trimming thicknesses are set with the knob [A].

- To choose between section thickness and trimming thickness, press the knob [A].



In the NORMAL display mode the thickness range is indicated in the display.

### Note

When switching over from trim sectioning to fine sectioning by using knob [A], the motorized cutting speed can be reduced.

FEED pre-selected section thickness

TRIM pre-selected trimming thickness

The graduation of the section thicknesses is divided into five ranges:

Range	Graduation
up to 5 $\mu\text{m}$	0.5 $\mu\text{m}$
from 5 $\mu\text{m}$ to 20 $\mu\text{m}$	1 $\mu\text{m}$
from 20 $\mu\text{m}$ to 30 $\mu\text{m}$	2 $\mu\text{m}$
from 30 $\mu\text{m}$ to 60 $\mu\text{m}$	5 $\mu\text{m}$
from 60 $\mu\text{m}$ to 100 $\mu\text{m}$	10 $\mu\text{m}$

The graduation of the trimming thicknesses is divided into four ranges:

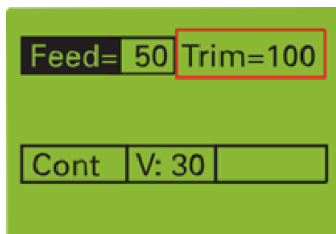
Range	Graduation
up to 30 $\mu\text{m}$	5 $\mu\text{m}$
from 30 $\mu\text{m}$ to 100 $\mu\text{m}$	10 $\mu\text{m}$
from 100 $\mu\text{m}$ to 200 $\mu\text{m}$	20 $\mu\text{m}$
from 200 $\mu\text{m}$ to 500 $\mu\text{m}$	50 $\mu\text{m}$

## Trimming and First Cuts

After the specimen and the knife/blade are adjusted, further gradual feeding for trimming can be carried out using the function “trimming mode”. For different sectioning series, deeper layers of the specimen can be reached with the function “trimming”.

- Press the knob [A] for the section thickness setting to select TRIM.

When the instrument is operating in the NORMAL display mode, the TRIM value is shown with an outline.



In this mode, turn the knob [A] to alter the value.

During each hand wheel rotation, the specimen holder is moved forwards by the pre-selected trimming value in the upper reversal point.

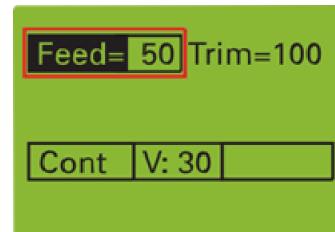
- In addition, press the coarse feed knob [B] for further TRIM feed.

Whenever this knob [B] is pressed, the specimen holder is moved forward by the amount of the pre-selected trimming value using knob [A].

## Fine Feed

After having adjusted knife and specimen and having trimmed the specimen, sectioning can be started.

- Press the knob [A] to select the FEED section thickness setting.



In the NORMAL display mode, an outline around the value is shown on the display.

When this mode is activated, turn the knob [A] to change the value.

- Turn the hand wheel in a clockwise direction to feed the specimen at the selected section thickness.

The same process is carried out when the motor drive for the cutting movement is turned on. The hand wheel on the right side of the instrument rotates.



When using the motorized cutting drive, insert the hand wheel handle in safety precaution!



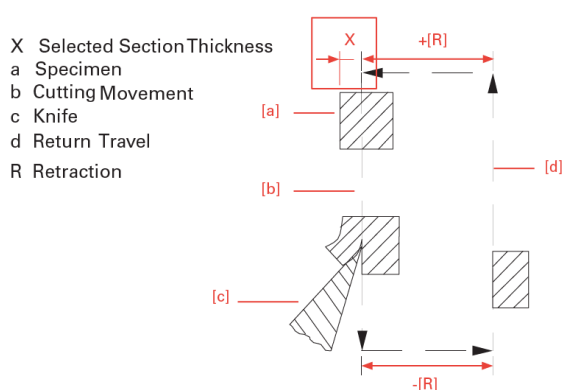
## Cutting Movement and Retraction

The cutting movements of the microtome are generated by turning the hand wheel or use the motorized cutting drive.

- To start the cutting movement of the microtome, turn the hand wheel.
- As the specimen moves down, sectioning is carried out (cutting movement b)

Continue turning the hand wheel to move the specimen back up (d).

To protect the knife and specimen during return travel, the specimen is retracted (R).



The yellow LED Retraction lights up. If desired, the function <retraction> can be turned off.



The instrument is able to adjust the cutting range to the size of the specimen. This is called the cutting window.

## Motorised Cutting Drive

Sectioning can be carried out either manually by turning the hand wheel or by means of a motorized cutting drive.

The cutting movement can be started by pressing twice the button START/STOP [7] twice the foot pedal (optional) or knob [C].

The cutting speed can be set continuously from 0 – 450 mm/s with knob [C].

### Note

*The cutting speed refers to the cutting window. For the upward return travel, a proportionally higher retraction speed is used.*

### Note

*To adjust the cutting window in relation to a specimen, it can be set continuously within the maximum values.*

### Note

*The motorized cutting drive can only be started, when the mechanical hand wheel brake [4] and the emergency stop are not activated.*

### Note

*For safety reasons, the electronic brake function is activated automatically after each stop of the motorized cutting drive.*

## Specimen Coarse Feed

After changing the specimen or moving the knife or knife carrier, it is necessary to adjust the specimen to the knife edge again. This can easily be done by means of the specimen coarse feed and the defined trimming values.

For fast forward and backward moves between specimen and knife edge, the microtome has a motorized coarse feed system.

- To move the specimen holder forward (to the front), turn the knob [B] forward i.e. in the direction of user.

The feed speed is controlled by the turn angle. When knob [B] is only slightly turned forwards, the speed is slow. The speed will increase by turning knob [B] further towards the front.

- To move the specimen holder backwards, turn the knob [B] backwards, i.e. in the opposite direction of the user.

Turn angle increase will cause higher return speed.

If knob [B] is kept at a high speed for more than two seconds, the specimen will automatically move to the rear position.

Automatic return movement can be stopped by briefly turning knob [B] in the opposite direction.

The coarse feed motor turns off after having reached the back-end position.

Cutting movements can either be started by pressing the button START/STOP [7] twice, by stepping on the foot pedal (optional), or by pressing knob [C].

When the specimen orientation is in the front-end position, the red LED arrow (pointing downward) on the operating panel starts blinking.

When the specimen orientation is in the back-end position, the red LED arrow (showing upward) on the operating panel starts blinking.

Press the knob [B] to release trim feed with the selected value, even if the fine mode is active.

## Operating Modes

For the motorized cutting movement of the microtome, the following operating modes are available:

interval stroke
single stroke
multi stroke
continuous stroke

### Selection of Operating Modes

The operating mode can be selected in two ways:

- directly with the MODE-button [8]
- over Menu by using knob [A]

#### Mode Selection via MODE-Button

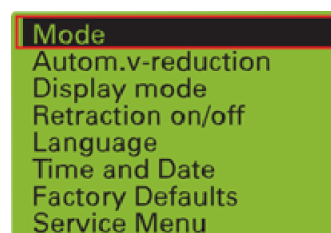
Press the MODE-button [8] gradually to change among the 4 different operating modes

#### **Note**

*When selecting multi stroke via the MODE-button [8], the default value of sections is 2.*

#### Mode Selection via Knob [A]

- Press the menu button [1]
- Select "Mode" in the menu by pressing the knob [A]

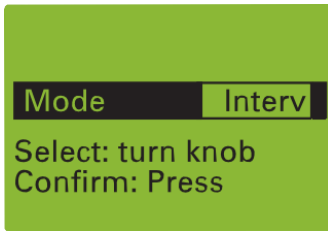


- In the submenu "Mode" select between the four operating modes with the knob [A].

The selected operating mode is shown in the display on the operating panel.

### Interval Stroke

- Press the MENU button [1]

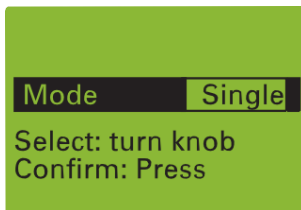


- In the submenu “Mode” select the function “Interval”

Now a gradual approach between the specimen and the cutting edge is possible. The cutting drive remains activated as long as either button START/STOP [7] or knob [C] or the foot pedal (optional) is constantly pressed.

### Single Stroke

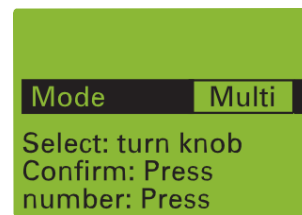
- Press the MENU button [1]
- In the submenu “Mode” select the function “Single”



- Unlock the lever for the mechanical brake.
- Press twice the START/STOP button [7] or knob [C] or step on the foot pedal (optional), to release a single cutting cycle.

### Multi Stroke

- Press the MENU button [1].

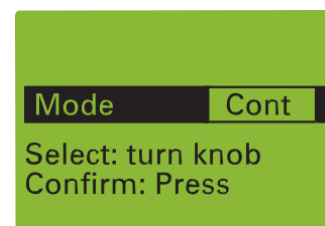


- Select the function “Multi” in the submenu “Mode” by turning the knob [C] and confirm by pressing it.
- Then press the knob [C] again.
- Then turn it to select the desired number of sections. The number of the cutting strokes depends on the chosen pre-selection (2 up to 99).
- Unlock the lever for mechanical stroke.
- Press twice the START/STOP button [7] or twice the knob [C] or twice the foot pedal (optional), to release a multiple cutting cycle.

After the set number of sections has been carried out, the movement stops in the upper reversal point.

### Continuous Stroke

- Press the MENU button [1].
- In the submenu “Mode” select the function “Cont” via the knob [A] or button [8].



- Unlock the lever for the mechanical brake.
- To start a continuous cutting cycle, press twice the START/STOP button or twice knob [C] or step twice on the foot pedal (optional).

To stop the continuous stroke, press knob [C] or the brake button [4] or the foot pedal (optional) once more.

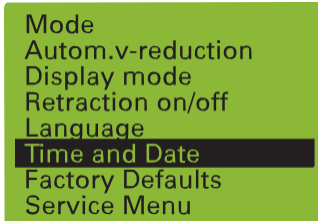
### Note

*If a cutting cycle has been started, it will run through to the end and stop in the next upper reversal point.*

## Time and Date

With this part of the menu, the time and date can be set on the instrument.

Press the MENU button [1].



Select "Time and date" by turning the knob [A] and confirm it by pressing.

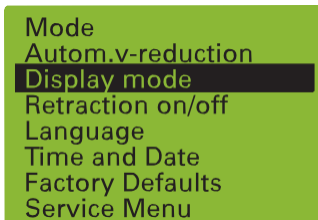
### Note

The time can be shown constantly in the normal display mode by turning the scroll button [2].

## Display Mode

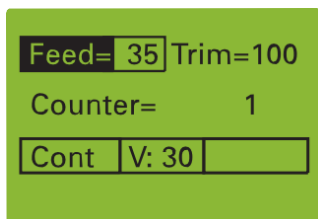
The display mode can be selected in this position. It is possible to choose between a NORMAL and a LARGE display mode.

- Press the MENU button [1].



- Select the display mode by turning the knob [A] and confirm it by pressing it.

The normal display mode shows the selected fine and trim section thickness with additional status indications at the same time.



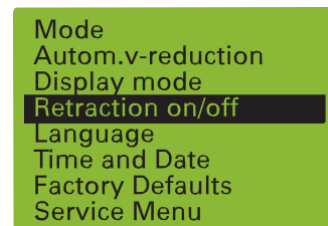
## Large Display Mode



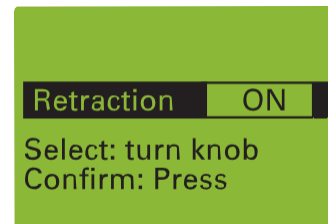
## Turning off the "Retraction" Function

If desired, the function "Retraction" can be turned off.

- Press the MENU button [1].



- Select submenu "Retraction" by turning the knob [A].
- Press the knob to confirm the selection.



- Turn the knob [A] to select the desired function: ON or OFF
- Press the knob [A] to confirm the setting.

The yellow LED RETRACTION might stay on and will go off only after the specimen has been passed through the cutting movement by turning hand wheel.



- To turn the "Retraction" mode on again, please proceed as described above.

### Note

The selected function is shown on the display as ON or OFF.

## Language Selection for the Display

The information on the display can be shown in different languages.

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German

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English

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French

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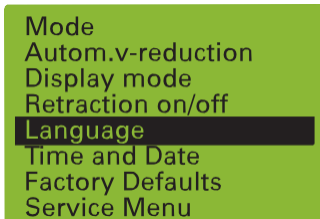
Spanish

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Italian

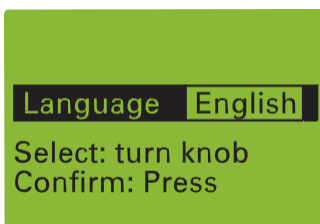
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- Press the MENU button [1]



- In the sub-menu select “Languages” by turning the knob [A]
- Turn the knob [A] to select the desired language.
- Press the knob [A] to confirm the selected language.
- Press the menu button [1] to return to the NORMAL display mode.

The display now shows the information in the desired language.



## Cutting the Setting Speed

- The desired cutting speed is set continuously with the knob [C] and is shown on display with values from 0–100.

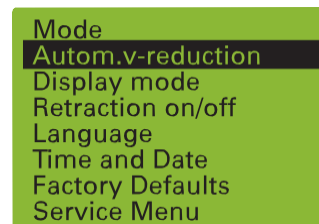
### Note

*To save time, the return travel speed is faster than the selected cutting speed.*

In addition, the maximum cutting speed can be turned slower for fine sectioning than for trim sectioning.

Switching over from trim sectioning to fine sectioning with knob [A] results in a reduction of the motorized cutting speed according to the corresponding pre-selection.

- To pre-select the speed reduction, press the menu button [1].
- In the sub-menu select “Autom. v-reduction” with the knob [A].



- Turn the knob [A] to select the maximum speed from 0 up to 100.
- Press the knob [A] again to store the selected speed.
- Press the menu button [1] again to return to the normal display mode.



Switching over from fine sectioning to trim sectioning results in a corresponding speed increase.

## Factory Defaults

With this option, you return all settings to factory defaults.

HM355S	Factory Defaults
Mode	Cont
Auto-V-Reduction	100
Retraction	Off
Language	German
Fine	0.5 µm
Trim	5 µm
Speed	0

### Note

By selecting this function, language is reset to German.

## Memory Function

### Note

The memory function is used to return to the same position as for first cuts. This function can only be used for the setting with which blocks are cut, which have been embedded in the same molds. The blocks must be of similar height.

- To set the so-called “first-cut-position”, move the specimen clamping forward with the coarse feed knob [B] until the specimen is positioned close to the knife edge.
- To store this position, press the button MEMO [6] for approx. 1 sec. “Pos. stored” is then briefly shown on the display.
- Then proceed with work (trimming, first-cuts, finesectioning). When the work on the block has been finished, briefly press the MEMO button. The specimen clamping then moves backwards to unclamp the specimen and insert a new specimen.

The specimen surface is now in the “first-cut-position”.



The stored cutting position can only be used effectively when blocks with the same height are cut. Neither adjustments on the knife carrier nor the knife carrier must be moved on the consoles.



When moving the knife carrier, a new first-cut-position must be selected. Otherwise the danger of a collision with injuries might arise.

When turning on the instrument again later, the first-cut position must be selected and stored again for safety reasons.

## Rocking Mode Function

Newly installed allows you to perform manual sectioning in rocking mode. To cut the sample, you just move the hand wheel up and down.

### Setting the Rocking Function

- Press the ROCK button [9] to start the Rocking function.



- Press the ROCK button [9] again to turn it off.

## Push-In Hand Wheel Handle

For safer working with the motorized cutting drive, the hand wheel handle can be pushed in.

- To lock the hand wheel handle, first take the handle on its outer bush and push it inside until it locks.



- To unlock the handle, turn off the motorized cutting drive and press the interior locking knob of the hand wheel handle.



## Adapters for Specimen Clamping



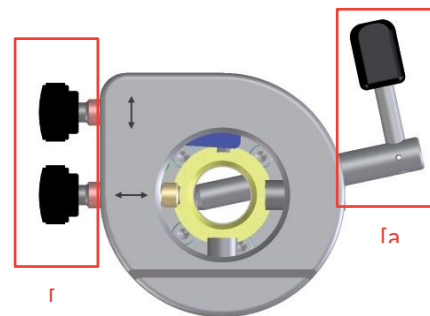
When adjusting the specimen, the mechanical hand wheel brake must be locked in and the knife guard has to be used to cover the knife/blade edge.

### Adapter, non-orienting

This adapter serves for a non-orienting fastening of the specimen clamps directly onto the cylinder of the instrument.

### Adapter, orienting, Specimen Orientation

This adapter serves for an orienting fastening of the specimen clamps. This allows the specimen to be aligned with the knife/blade.



To bring the specimen into the desired position, move the clamping lever [a] towards the front.

This will loosen the specimen clamp and a rotation of 360° on the cylinder axis (Z-axis) is possible.

With the two orienting screws [b], the specimen clamp can be moved 8° in each direction on the X-axis and Y-axis.

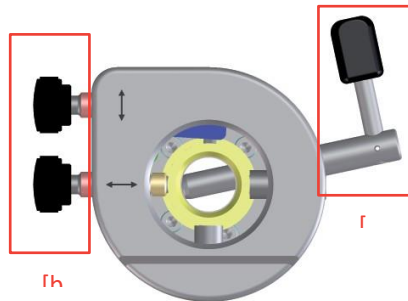
After having oriented the specimen, turn the lever [a] upwards to fix the specimen clamp in its position before starting sectioning.

### Note

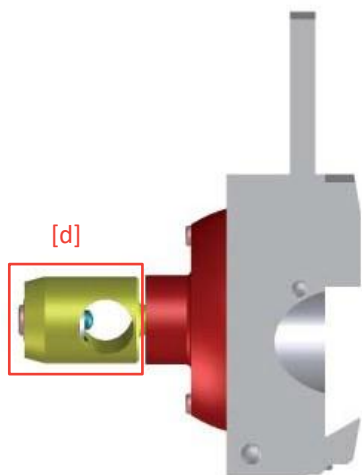
*When turning the orienting screws [b] a slight resistance can be felt when the clamp is aligned parallel with the cutting surface.*

## Changing and/or Fastening Specimen Clamps

The available specimen clamps are all fastened or removed in the same way.



- To change the specimen clamping system, press the clamping lever [a] downwards and pull it to the side.
- Now the specimen clamp can be pulled to the front and another specimen clamp can be placed into the clamping system.
- Insert the new specimen clamp into the cylinder head so that the clamping lever [a] can be put through the hole of the orienting adapter [d] and pulled through from the right side.
- Then align the specimen clamp with the orienting screws [b] in the X- and Y-axis and orientate it on the Z-axis.
- Press the clamping lever upwards.



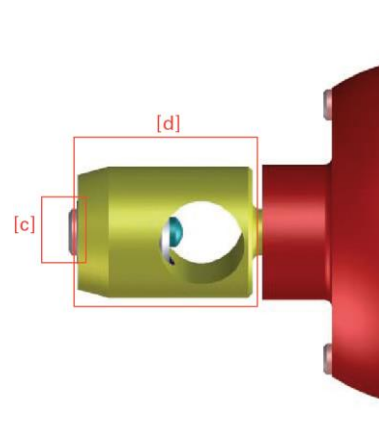
## Re-adjusting Specimen Clamps

### Note

Frequent use of the clamping lever can result in loss of optimal clamping strength. If the necessary readjustment is not carried out, it might be possible that the specimen clamp does not clamp anymore.

The clamping lever [a] should be in an almost upright position.

- To determine the clamping position of the clamping lever [a], adjust the inner screw [c] on the backside of the orienting adapter [d] using an allen key (size 3 mm).
- Turn the allen key in a clockwise direction if no clamping is possible or if the position of the clamping lever [a] is too high.
- If the clamping position of the clamping lever [a] is too low, turn the allen key in a counter-clockwise direction.
- Insert the specimen clamp again and check the clamping position. If further adjustment is necessary, please perform above described procedure again.





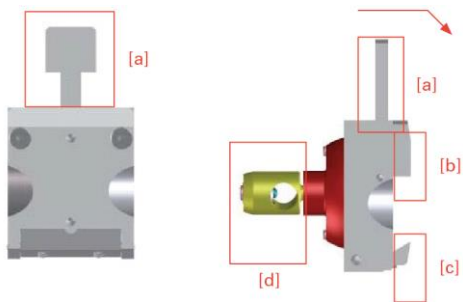
## Specimen Clamping

### Note

To clamp specimens, different systems are available. With the orienting adapter it is simple to align the specimen properly to the knife.

### Universal Cassette Clamp

The universal cassette clamp allows a quick-change system.



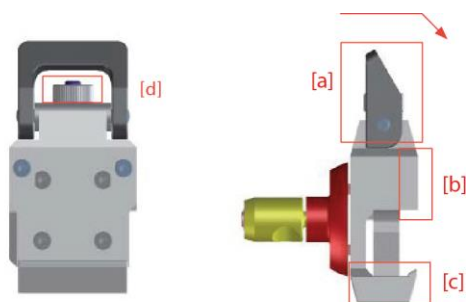
- To insert or remove the cassette from between the fixed [b] and movable [c] jaws, pull the lever [a] to the front (in the direction of the arrow).

### Note

To achieve optimal clamping keep the locating surface of the cassette free of paraffin.

### Universal Cassette Clamp, adjustable

- To insert or remove cassettes between the fixed [b] jaw and the moveable jaw [c], move the lever [a] upwards.

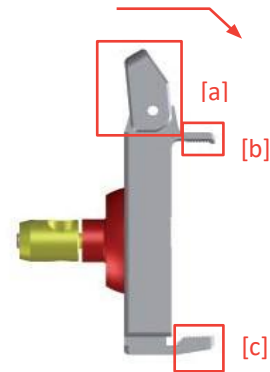


- To adjust the size of a cassette size which is not to the norm, use the adjustment nut [d].

To cut big specimen, two different Macro-Universal-Cassette clamps (Macro-UCC, adjustable) are

available for use with MacroFlow- Cassettes or other commercially available Macro-Cassettes.

The unrestricted use of the Macro-UCC is only possible with ER blade carrier.

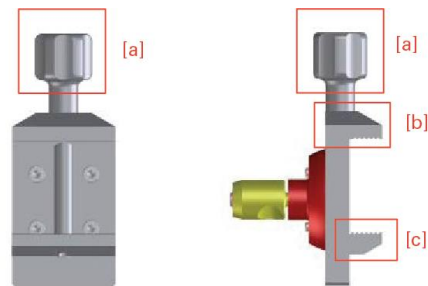


### Note

Maximum 68mm x 50mm specimen size can be cut. The Paraffin blocks in MacroFlow-Cassettes are 70-72mm long and should be trimmed to 68mm length manually.

### Standard Specimen Clamp

The standard specimen clamp is used for rectangular and square paraffin and plastic blocks.



- Insert the specimen against the fixed jaw [b] first.
- Then tighten with the clamping screw [a] to tighten the specimen via the movable jaw [c].

### Note

For the stability of the specimen, do not let it project too much over the clamping jaws.

**Note**

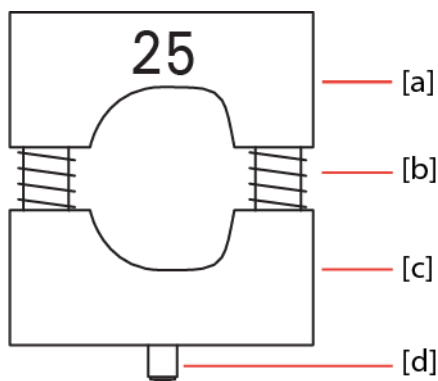
The standard specimen clamp is equipped with two different movable jaws [c], which are of different weight. The lightweight jaw is used with inserts for round specimens.

**Note**

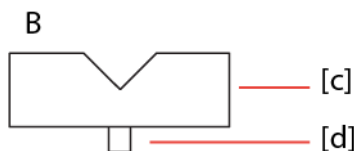
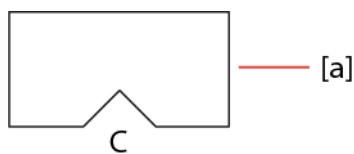
To exchange the movable clamping jaw [c], unscrew the clamping screw [a] to remove the jaw and replace it.

Insert for Round Specimens, Insert and V-Distance Piece

To cut round specimens, the insert for round specimens with defined diameters of 6, 19 and 25 mm (special sizes on request) or the V- insert can be clamped into the standard specimen clamp.



- The pin [d], which fits into the lower clamping jaws [c], positions the insert precisely. The two springs [b] help to remove the specimen from the inserts.

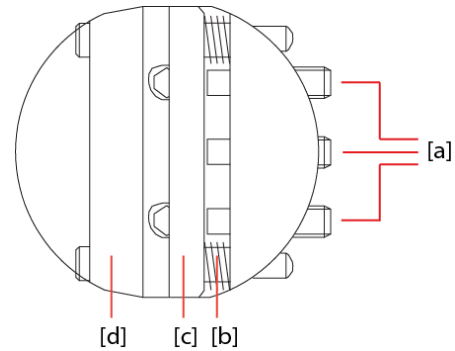


- To fasten the V-distance piece on the fixed jaw of the standard specimen clamp, the clamping screw must be unscrewed from the spindle.

- Pull the spindle off the clamp.
- After having inserted the V-distance piece, insert the spindle and the clamping screw again.

Foil Clamp

The foil clamp is used for foils or thin specimens.



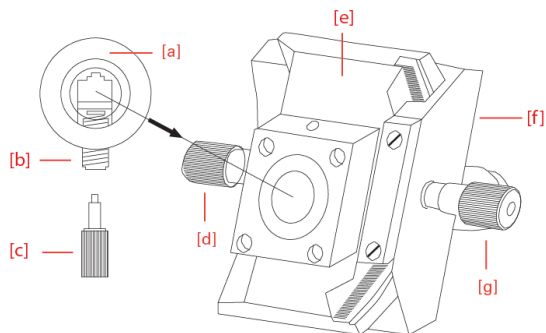
- To insert the specimen, loosen the three clamping screws [a] slightly and push the movable jaw [c] sideways against the two springs [b].
- The specimen is kept in place by the springs [b]; however, its position can be changed. Turn the three clamping screws [a] to clamp the specimen tightly against the fixed jaw [d].
- When using an orienting adapter with the instrument, first insert the enclosed graduated ring into the orienting adapter with the pin. With the graduated ring the orientation in X-/Y-direction is cancelled.
- However, it is possible to turn the Z-axis 60° in either direction.
- Then insert the foil clamp.

**Note**

According to the various specimens, it might be helpful to use in addition Eprexia sandwich supporting material (Cat. No. 176010) on the right and left side between specimen and clamping jaw.

## Segment Arc and Universal Specimen Holder

The segment arc and universal specimen holder are highly suitable for the clamping of small specimens embedded in plastic.



- The specimen is inserted in the holder [a] and clamped with the screw [b] with the hex head wrench [c].
- Then the holder together with the specimen is put into the segment carrier [e], where the holder can be turned 360°.
- Thus, the specimen can be aligned as required.
- Then, the holder is clamped into the selected position with the screw [d].
- The carrier [e] can be moved on the base [f]. This way, the surface of the specimen can be placed parallel to the knife/blade.
- The screw [g] is used to swing the carrier onto the base.

## Knife and Blade Carriers

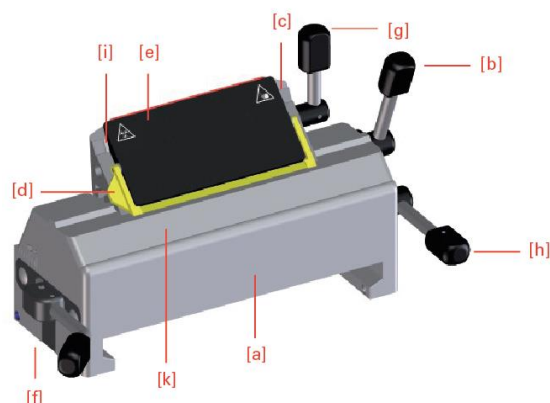
Due to moving parts on the knife/blade holder and the extreme sharpness of the microtome knife or blade, a danger area arises, which might lead to hand injuries if the safety features and the instruction manual are not followed carefully. The knife or blade carriers are equipped with a knife guard for user safety while adjusting knife or blade and specimen.



Always cover the knife/blade edge with the knife guard when adjusting specimen and/or the blade/knife.

### Disposable Blade Carrier “ER”

The disposable blade carrier ER is designed to take all commercially available high- and low-profile blades.



### Using Low Profile Blades

- Insert the blade into the slot behind the clamping plate [e] by turning the clamping lever [g] towards the front. Swing the knife guard [d] to the front.
- Loosen the clamping lever [g] and, if necessary, slightly push the lower part of the clamping plate [e] as well.
- Insert the blade on the rail [c] and push it from the side to the middle.

- Afterwards, return the clamping lever [g] upright, thus locking the blade in position.
- After loosening the clamping lever [b] and after having moved the knife guard [d] upwards, move the blade together with the entire upper part without having to loosen the blade clamping.
- This way, the entire cutting length of the blade can be used.
- Then tighten the clamping lever [b].

The lever [b] can be removed by pulling it off towards the side.

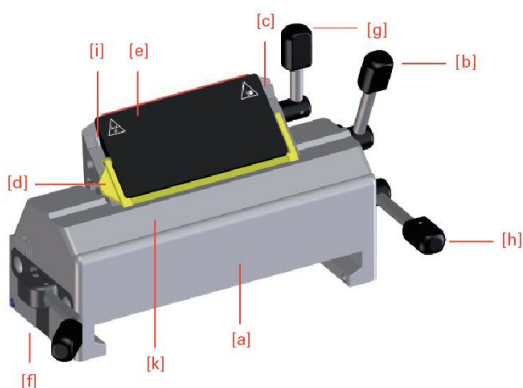
### Using High Profile Blades

When using high profile blades, first remove the spacer strip [i].

- For this, turn the clamping lever [g] to the front until it stops.
- Pull off the clamping lever [g] and remove the clamping plate [e].
- Remove the spacer strip [i].
- Insert the clamping plate and clamping lever again.

### Clearance Angle Adjustment

The clearance angle between cutting edge and specimen can be shifted and adjusted to the needed requirements of the tissue to be sectioned.



- Loosen the clamping lever [h] on the right side of the blade carrier and move the upper part [k] of the blade carrier on the base [a].

The adjusted clearance angle can be read on the scale on the upper part [k].

- Then turn the clamping lever [h] upwards to lock in the new clearance angle.

The clamping lever for the angle adjustment can be pulled off after a correct angle setting is reached to avoid that the angle is shifted accidentally.

### Note

*From experience, usable cuts are only achieved at a clearance angle of 10° or more.*

### Moving the Blade Carrier on the Console

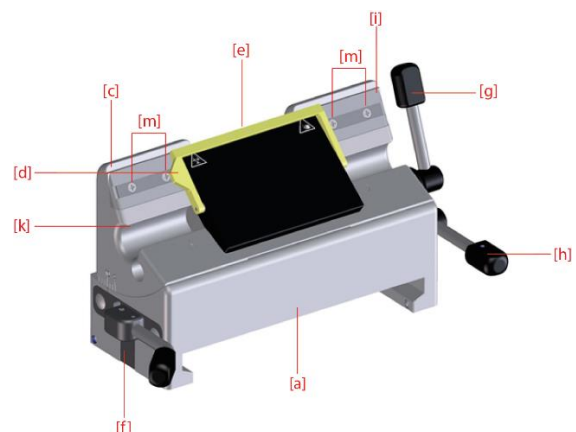
Loosen the clamping lever [f] on the left side of the blade carrier, to move the carrier forwards and backwards on the guide bars, this allows a rough adjustment of blade to specimen.

### Protection Against Injury

A knife guard [d] on the clamping plate can be moved upwards over the blade for protection against injury.

### Disposable Blade Carrier “E”

The disposable blade carrier E is designed to take all commercially available high- and low-profile blades.



### Inserting the Blade

Insert the blade into the slot behind the clamping plate [e]

- When using high profile blades, first loosen the four screws [m] and remove the spacer strip [i].

- Turn the clamping lever [g] to the front.
- Swing the knife guard with scale [d] to the front.
- A small gap between rail [c] and clamping plate [e] can be seen.
- Insert the blade on the rail [c] and push it from the side to the middle.
- Afterwards, return the clamping lever [g] upright, thus locking the blade in position.

The knife guard [d] is provided with a scale.

- After loosening the clamping lever [g] and after having moved the knife guard [d] upwards, move the blade together with clamping plate [e] according to the scale to the left or right side.
- This way, the entire cutting length of the blade can be used. Then press the clamping lever [g] upwards.
- The levers [g] and [h] can be removed by pulling them off towards the side.
- The lever [g] can also be used on the left side. This way, the blade can be clamped with the left hand.

### Clearance Angle Adjustment

The clearance angle between cutting edge and specimen can be shifted and adjusted to the requirements of the tissue to be sectioned.

- Loosen the clamping lever [h] on the right side of the blade carrier and move the upper part [k] of the blade carrier on the base [a].
- The adjusted clearance angle can be read on the scale of the upper part [k].
- Then turn the clamping lever [h] upwards to lock in the new clearance angle.

### Note

*By experience, usable cuts are only achieved at a clearance angle of 10° or more.*

If the clamping lever [h] is loosened, the upper part [k] of the blade carrier can additionally be moved 1 cm to the left or right side. This way, the cutting edge can optimally be used. The clamping lever for the angle adjustment can be pulled off after a

correct angle setting to avoid that the angle is shifted accidentally.

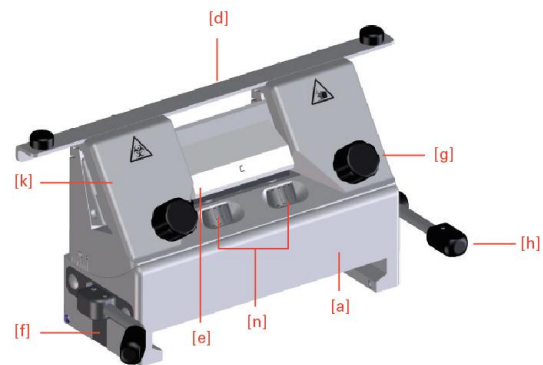
### Moving the Blade Carrier on the Console

- Loosen the clamping lever [f] on the left side of the blade carrier, to move the carrier forwards or backwards on the guide bars. This allows a rough adjustment of the blade to the specimen.

### Protection Against Injury

A knife guard [d] on the clamping plate [e] can be moved upwards over the blade for the protection against injury.

### Knife Carrier “C”



### Inserting the Knife

- To insert the knife, the clamping screws [g] must be unscrewed slightly so the knife can be pushed in from the side.
- The height of the knife is adjusted with the two knurled nuts [n].

If the cutting zone of the knife cannot be used anymore, it can be moved over its entire length to the left and right side by loosening the clamping screws [g]. This allows an optimal use of the entire knife edge.



When clamping the knife, please tighten the two clamping screws [g] simultaneously.

## Clearance Angle Adjustment

The clearance angle between cutting edge and specimen can be shifted and adjusted to the requirements of the tissue to be sectioned.

- Loosen the clamping lever [h] on the right side of the knife carrier and move the upper part [k] of the knife carrier on the base [a]. The adjusted clearance angle can be read on the side scale of the upper part [k].
- Then turn the clamping lever [h] upwards to lock in the new clearance angle.

The clamping lever [h] for the angle adjustment can be pulled off after a correct angle setting to avoid that the angle is shifted accidentally.

### Note

*By experience, usable cuts are only achieved at a clearance angle of 10° or more.*

If the clamping lever [h] is loosened, the upper part [k] of the knife carrier can be moved 1 cm to the left or right side. This way, the cutting edge can be optimally be used.

### Moving the Knife Carrier on the Console

Loosen the clamping lever [f] on the left of the knife carrier to move the carrier forwards and backwards on the guide bars. This allows a rough adjustment of knife and specimen.

### Protection Against Injury

The knife carrier is equipped with two knife guards [d] which can be moved sideways. These knife guards should be pushed together in the middle while adjusting knife or specimen. This reduces the danger of injury considerably.

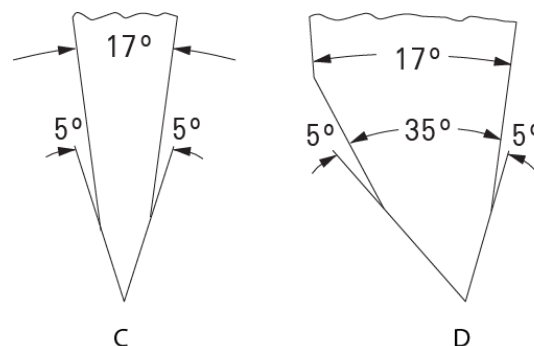
### Central Clamping Plate

The knife is clamped and stabilized in the cutting zone by the central clamping plate [e] – exactly where the highest cutting forces are applied.

Two types of clamping plates [e] are available for the knives:

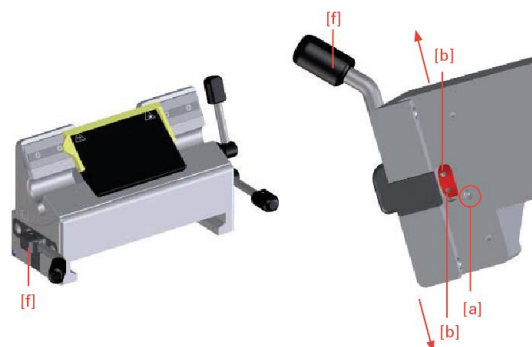
- Clamping plate C for C-knives
- Clamping plate D for D-knives

The graphic below shows the angles on the cutting-edge profiles of C- and D-knives.



### Readjusting Knife or Blade Carriers

Frequent use of the clamping levers can cause the knife or blade carriers not to optimally clamp any longer. If the necessary readjustments are not made, it might even be possible that the knife or blade carriers can- not be clamped anymore.



If the clamping lever [f] does not allow a sufficient clamping, the clamping can be adjusted as follows:

- Loosen the locking screw [a] on the lower side of the knife/blade carrier.
- Insert a pin into one of the holes of the adjusting screw [b] and turn the screw in the above shown directions.
- When the clamping is to be strengthened, turn the adjusting screw [b] to the right side.
- When the clamping is to be loosened, turn the adjusting screw [b] to the left side.
- Before inserting the knife or blade carrier again, tighten the set screw [a].
- Afterwards, push the knife or blade carrier onto the consoles and check the clamping function.

If necessary, repeat the above-mentioned process.



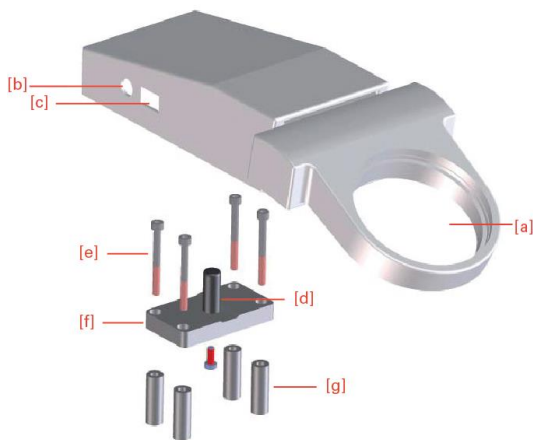
## Section Waste Tray with integrated Arm Rest

The section waste tray possesses an integrated arm rest and surrounds the knife carrier area and allows monitoring working with the microtome. It can be easily removed from the front at any time and is easy to clean.



## Large Field Magnifier

The large field magnifier has a 2,5 x magnification.



Connect the integrated light to the power outlet with the power cord [b] and turn it on and off with the switch [c].



Before using the large field magnifier for the first time, please check if the voltage conditions at the installation site comply with the power requirements and frequency noted on the supply unit of the magnifier.

## Installing the Large Field Magnifier on the Microtome

Please use the enclosed fastening elements to attach the magnifier to the microtome.

- Remove the cover plate on the upper side of the microtome hood.
- Remove the front plastic caps from the upper side of the housing.

Carefully introduce the four sleeves [g] into the drilled holes with guidance of the screws [e].



Please be sure that the sleeves do not fall into the interior of the microtome!

### Note

Make sure the plate [f] is mounted in such a way that the peg [d] is closer to the front of the microtome!

- Put the plate [f] on the sleeves and fasten it to the microtome with four screws [e].
- Put the movable plastic socket, which is located at the lower side of the magnifier, on the peg [d].
- The magnifier can be adjusted forwards and backwards for the most comfortable viewing position.

### Note

If the large field magnifier is not used, slightly raise it and turn it sideways on the peg.

# Working with the Microtome



Due to moving parts on the knife/blade holder and the extreme sharpness of the microtome knife or blade, working with the microtome might lead to hand injuries if the safety instructions given in this manual are not carefully attended to.

## Sectioning Instructions

### Note

To cut usable sections, the following points are of utmost importance:

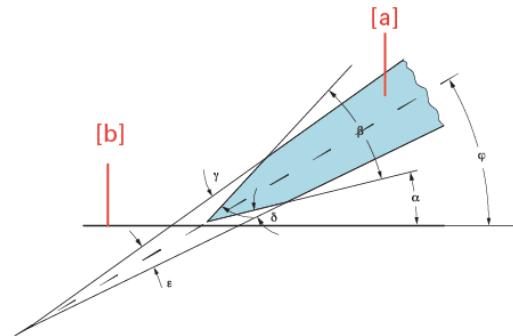
### Conditions of Knife/Blade Edge

ONLY USE A SHARP KNIFE OR BLADE!

- If the cutting edge is blunt, move the knife/blade horizontally either to the right or left side to continue working with the sharp area of the cutting edge, or have the knife re-sharpened or replace the used blade by a new one.
- For optimal sectioning, front and back of the knife must be clean.
- Especially paraffin waste must be removed thoroughly.

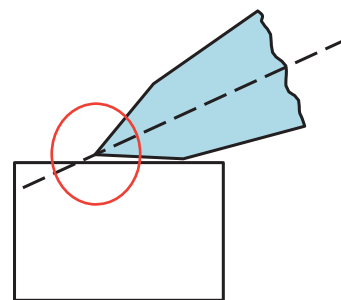
### Setting the Cutting Angle

Angle of the knife [a] in relation to the block surface [b]:



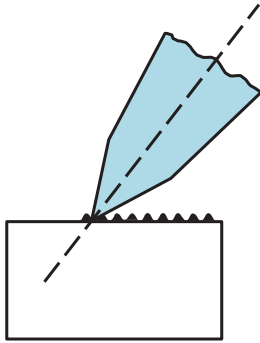
1	Clearance angle $\alpha$
2	Wedge angle $\beta$
3	Upper sharpening angle $\gamma$
4	Lower sharpening angle $\delta$
5	Blade angle $\epsilon$
6	Angle of inclination $\varphi$

The knife/blade must never be placed on an angle that is too flat since the knife/blade does not cut into the block at all this way. Only the rear side slides over the sectioning surface.





An angle, which is too steep, is also unfavourable as the knife/blade might vibrate too much while sectioning. The so-called “chatters” appear on the block surface as well as on the sections as parallel stripes having negative effects on the microscopical evaluation.



Different microtome producers use different scaling for their clearance angle adjustment, resulting from different calculation bases. The clearance angle might refer to the facet surface or to the angle between knife main surface and block surface. As the facet has a divergence from the knife main surface of approx. 5°, the resulting difference is approx. 5°. Therefore, set the correct angle on EpreDia INSTRUMENTS AT 10°.



## How to Avoid Errors

### Specimen preparation:

When preparing specimens, be sure that a suitable embedding medium, fixation, dehydration and infiltration time are chosen.

### Specimen temperature:

Sectioning is carried out at ambient temperature (excluding frozen sections). If the temperature is too high, the paraffin softens. Therefore, avoid heating paraffin specimens by direct exposure to sunlight or other near sources of heat.

### Tightening the clamping screws:

Tighten all clamping screws and clamping levers on the knife/blade carrier, specimen holder and specimen orientation.

### Selection of the knife/blade:

Carefully select the required knife/blade material and profile.

### Adjustment of the knife/blade:

Carefully adjust the proper clearance angle of the knife: 5 – 7° for glass knives. For settings for diamond knives ask the knife manufacturer.

Select a clearance angle adjustment of 5 – 15° according to the facet angle. Typically, adjust an angle of 10 – 12°. Take care to adjust knife height.

### Cutting speed:

Always cut at proper speed.

### Note

*General rule: The harder the material, the slower the cutting speed.*

### Trimming:

Carefully bringing the knife/blade and specimen together.

## Possible Sources of Errors – Cause and Removal

Problem	Cause	Solution
Thick-thin-sections	Blunt knife/blade	Move knife/blade or insert a new one
	Knife/blade angle unfavourable clearance angle	Adjust knife/blade angle, until an optimal angle can be found
	Insufficient clamping on specimen clamping and/or knife/blade carrier	Check all screw and clamping connections on specimen clamping and knife/blade carrier. Tighten them, if necessary
Compressions	Blunt knife/blade	Move knife/blade or insert a new one
	Specimen too warm	Cool specimen
	Unfavourable clearance angle	Try clearance angle adjustments until an optimal angle can be found
	Cutting speed too high	Turn hand wheel slower or reduce the speed of the cutting drive motor
“Chatter” on sections	Cutting speed too high	Turn hand wheel slower or reduce the speed of the cutting drive motor
	Unfavourable clearance angle	Try clearance angle adjustments until an optimal angle can be found
	Insufficient clamping on specimen clamping and/or knife/blade carrier	Check all screw and clamping connections on specimen clamping and knife/blade carrier. Tighten them, if necessary
Feed is not working, no sections are produced	Front end position has been reached	Move specimen backwards with the coarse feed motor
	Coarse feed motor is blocked	Contact a service technician
Tight Hand Wheel, partly	Debris and section waste between microtome and base plate	Remove section waste and clean microtome

Problem	Cause	Solution
Tight hand wheel during the entire movement	Dirty link block	Contact a service technician
Instrument cannot be turned on	Power cord not correctly connected	Check power cord
	Defective main fuse	Check/replace the fuses in the fuse box
Cutting drive motor cannot be started	Emergency stop button is activated	Deactivate the emergency stop button
	Foot pedal (optional) or interlock connector not connected	Connect foot pedal (optional) or interlock plug
	Mechanical hand wheel brake activated	Deactivate the hand wheel brake by moving the lever down
"?" displayed for 10 seconds	Failure at linear potentiometer	Call service

**Note**

*In case of equipment failure and/or service work, please turn off the instrument and contact your local dealer.*

# Maintenance and Care

## Cleaning and Care

Cleaning and care of the microtome should be carried out daily. Please proceed as follows:

- Turn off the power switch of the instrument.
- Activate the mechanical hand wheel brake.
- Remove the knife/blade from the knife/blade carrier. Clean it and store the knife in a case and the blade in its dispenser!
- Remove section waste by using a dry brush.
- Pull the section waste tray towards the front and dispose of the section waste according to your specific lab regulations.



Never put the knife with the cutting edge upward on the table!!

- Loosen the clamping lever on the left side of the knife or blade carrier and pull the knife/blade carrier towards the front.
- Clean the operating controls and the surfaces of the knife or blade carrier, especially the space where the knife or blade is installed.
- Clean the consoles, hand wheel, specimen clamping system, specimen orientation as well as the base plate and housing.

### Note

*Mild domestic cleaners can be used to clean the microtome. Do not use aggressive cleaners or solvents, as the paint and plastic parts can be affected.*

### Note

*In order to avoid electrostatic loadings, clean housing only by using cotton or paper cloths. We highly recommend to not use any microfiber or polyester cloths!*



When getting in contact with cleaning agents or paraffin repellents, e.g. PARA GARD, the surface of the black cover ribbon behind the specimen clamping might be damaged. Please take care that the cover ribbon does not get in contact with these agents when cleaning the housing, knife or blade carrier or the base plate.

## Maintenance

- Before starting sectioning, instrument, knife or blade carrier and section waste tray should be treated with commercially available paraffin repellent.

### Note

*This considerably reduces the adhesive force of paraffin waste on the individual parts of the microtome.*

### Annual Routine Maintenance

To secure section quality and to ensure proper functioning of the microtome, it is recommended that a routine maintenance be performed by a trained service technician once a year.

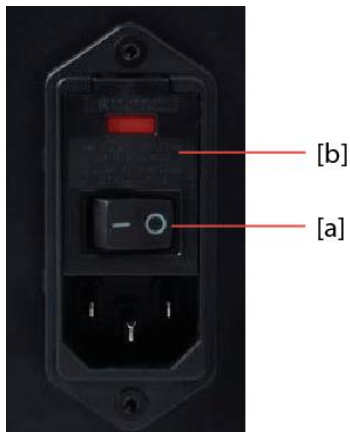
### Service Contract

Epredia offers a service contract which guarantees that your instrument is always in perfect condition. For more information, please contact the nearest Epredia sales office.

### Note

*We strongly recommend to not carrying out repair by yourself. All warranties and guarantees would then be null and void! Repair work must only be carried out by an authorized service technician.*

## Replacement Work



### Replacing the Fuses:

The two power fuses are located above the power switch [a] on the rear side of the microtome.

- To replace the two fuses, turn off the power switch [a] of the instrument and unplug it.
- Then open the cover [b] using a flat screwdriver.
- Pull out the fuse holders and replace the fuses with new ones.
- Put back the fuse holder completely and close the cover [b].

### Rating of Fuses

For power requirements 100 – 240 V, 2 fuses T2,5AH slow-blow.

# Conditions for Transportation

## Returning the Instrument for Repair or Routine Maintenance

Repair or maintenance works is normally carried out at the site of installation. If this is not possible for some specific reasons, the instrument can be returned to EpreDia. The contact address can be found in the front of this instruction manual.

To guarantee a trouble-free function of the instrument after transportation, please follow the instructions for transportation preparations.

In addition, the conditions for storage and transportation as mentioned in the Technical Data Sheet, must be observed during the entire transportation.



Please also note the precautionary measures described in our safety precautions concerning biological hazards!

## Measures for Taking out of Operation

- Turn off the power switch of the instrument.
- Activate the mechanical hand wheel brake.
- Remove knife or blade and store it in a safe place.
- Remove the section waste tray.

Transporting Outside Closed Buildings, please Observe the Following Measures

- Turn off the power switch of the instrument.
- Activate the mechanical hand wheel brake.
- Remove knife or blade and store it in a safe place.
- Remove the section waste tray, the operating panel, the knife/blade carrier and the specimen clamp. These parts have to be packed separately.

- To lift the instrument, use the recessed grip on the lower front and rear side of the instrument



During transport, do not move the instrument by holding the hand wheel handle. Danger of injury!

Use the original packing material since it protects the instrument optimally during transport.



Shipping of the instrument requires original packaging materials! Damages caused by shipping in non-original packaging is not covered by the manufacturer warranty! Any damage repairs resulting from shipping in other material is charged to the shipping party. We reserve the right NOT to repair the instrument if it is too badly damaged.

To order original packaging materials if needed, please contact EpreDia International or your local, authorised EpreDia dealer.



The user must insure clean and safe conditions of the instrument when returning it to an appropriate service provider.

### Note

*In case the instrument or parts of the instruments is/are sent to EpreDia or to one of its representatives in a condition which has potential danger of infection, the instrument and/or the part(s) will be returned to the customer in an unrepaired status. Costs for this are to be charged to the customer.*

## Disposal of the Instrument after Final Shutdown

After the final shutdown of the instrument, we recommend contacting a local recycling company for the disposal according to the nationally applicable regulations.

Under no circumstances is it allowed to dispose of the instrument together with ordinary domestic waste.

Please dispose of your instrument separately from other waste to not harm our environment and/or human health by uncontrolled waste disposal.

Recycle your instrument whenever possible to support the sustainable recycling of material resources.

Industrial users should contact their suppliers and observe the conditions of the contract. This product must not be disposed of together with other commercial waste.

Please contact your supplier!

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# Revision Control For This Document

Date	Revision Number	Changes Made
February 2022	4	IVDR compliance requirements added, including this revision record table.



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