



HM 450

Sliding Microtome

Operator Guide

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REF

910020
910020L
910020H

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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.



Due to moving parts, in connection also with the microtome knife, a danger area arises, which might lead to hand injuries in case of non-compliance with the safety features of the microtome and when disregarding the instruction manual



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



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



The EpreDia sliding microtome HM 450 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. Only qualified and trained laboratory personnel may operate the HM 450

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.

Care in Using Microtome Knife



To protect from the danger of being injured by the knife or blade, use the knife guard when adjusting specimen and knife. If possible, the specimen should be clamped in before the knife is inserted into the knife holder. The knife carrier is designed so that knives up to 16 cm long can be easily clamped in place and adjusted. Before changing the knife holder, always remove blade or knife. Unused knives should always be kept in a knife case. Never place the knife with the cutting edge upwards. Never try to catch a dropping knife. Never check the sharpness of the cutting edge with your fingers. The cutting edge is extremely sharp.



Fig 1: Epredia Sliding Microtome HM 450

1. Blade Holder
2. Display Screen
3. Specimen Head
4. Control Head
5. Specimen Advance Control
6. Removable Waste Tray

Introduction to the HM 450

Description of Sliding Microtome HM 450

The EpreDia sliding microtome HM 450 can be operated in either automatic or manual mode. The HM 450 incorporates stepper motor technology to enable precise, accurate specimen advancement towards the blade. The use of cross roller bearings results in a smooth, stable and non-tiring action for the operator.

The HM 450 will cut sections from 0 µm to 100 µm. The specimen clamping can be moved up and downwards via the two arrow-shaped coarse feed buttons on the left side of the instrument. This way, specimen and knife edge distance can be adjusted quickly. The knife carrier is designed so the knives can be easily clamped in place and adjusted, and the coaxial specimen orientation allows orientation with one hand.

The HM 450 has a user-friendly display panel that allows for program settings and sectioning parameters, including, section counter, step sum, remaining travel and specimen position memory function.

Theory of Operation

Cutting Movement

The EpreDia sliding microtome HM 450 has a linear roller bearing (cross roller bearing) for the bearing of the knife sledge and the block.

The cutting movement of the HM 450 is generated by horizontally moving the sledge in the cross-roller bearings. Here the knife, which is clamped into the knife carrier, is horizontally drawn over the specimen towards the user and away from them. This way, sections are produced.

After having moved the knife sledge backwards into the rear end position, a pre-selected section thickness is carried out either manually by pressing a button or automatically due to the alteration of the direction of the knife sledge. The specimen is

delivered towards the knife with the pre-selected section thickness in vertical direction and a new section is produced.

Specimen Coarse Feed and Trimming Function

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.

After the specimen and the knife are adjusted, further gradual feed for trimming can be carried out.

Specimen Clamping System and Specimen Orientation

According to the form and size of the specimens, different specimen clamping systems are available to carry the specimen. It is very easy to align the specimen to the knife, using the orienting adapter.

Knife Carrier

The knife carrier is easy to use and allows the microtome knives to be clamped and adjusted as needed. Depending on application, knives or disposable blades can be used.

Working with the Microtome

Preparation and Orientation



Before sectioning, the specimens must be prepared appropriately and embedded in suitable media. Cassettes as well as different forms for round and rectangular specimens can be used for embedding.

With the orienting adapter, the specimen can easily be oriented to the knife.

Coarse Feed and Trimming Function

To adjust approximately the space between specimen and cutting edge, use the coarse feed or the trimming function. Continue this to start trimming the specimen, thus achieving the level of interest. Any waste should be wiped away in a forward direction with a brush.

Sectioning Instructions



Due to moving parts in connection with the microtome knife, a danger area arises, which might lead to hand injuries in case of non-compliance with the safety features of the HM 450 and when disregarding the instruction manual

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

Condition of the Knife Edge



Only use a sharp knife. If the knife edge is blunt, move the knife horizontally either to the right or left side to continue working with the sharp area of the cutting edge, or have the knife sharpened.

Clean Knife Surfaces



For optimal sectioning, front and back of the knife must be clean. Especially, paraffin waste must be removed thoroughly.

Technical Data HM 450

Microtome	Section thickness range	0 - 100 μm
	Resolution	0,5 μm for 0...5 μm
		1 μm for 5...20 μm
		2 μm for 20...30 μm
		5 μm for 30...60 μm
		10 μm for 60...100 μm
	Retract function for compensating thermal extension	2 μm
	Trimming section thickness	5...500 μm
	Resolution	5 μm for 5...30 μm
		10 μm 30...100 μm
		20 μm for 100...200 μm
50 μm for 200...500 μm		
Specimen retraction during return travel	40 μm	
Vertical feed range	40 mm	
Horizontal knife stroke	190 mm	
Cutting drive	manual sliding movement	
Coarse feed	electronic via stepping motor	
Feed	automatic via sliding movement or	
	manual via feed button	
Specimen size	up to max. 80 x 60 mm	
Specimen orientation	x - and y - axes	universal 8°

Transportation- & storage conditions	
Storage temperature range	-20°C up to +50°C (at a max. rel. humidity of 60%)
Operating conditions	+5°C up to +35°C (at a max. rel. humidity of 60%)
	altitude up to 2000 m M.S.L.
	for indoor use only
	Floor loading requirements: 150 kg/m ²
Power requirements	100 V...240 V/0,5 A/50...60 Hz/+/-10%
Internal protections	
Secondary circuits	F1 on the power supply unit T 3,15 A
	F2 on the power supply unit T 3,15 A
	F1 on CPU board T2,5 AL
Primary circuits	2 x T 1 ,6 AH
Pollution degree	2
Protection Class	1
Overtoltage category	II
Sound pressure	39 dB(A)
	measured with 1 m distance to the instrument
Dimensions	wide: 370 mm, deep: 460 mm, high: 320 mm
Weight	23 kg

Operating Instructions

Setting Up the HM 450

Inspect the packaging. If it is damaged, or the contents do not match the supplied packing list, or both, inform your local Eprexia Representative. Unpack the HM 450 and remove the wrapping. Do not discard the packing, store it flat for future use.



Use safe lifting practices when moving the HM 450

To carry the instrument, lift it on the front and rear side from the lower side.

Do not carry the instrument on the handle of the knife sledge.

Always place the instrument on an even surface in a way that the knife guidance is moved towards the user and away from them.

The coarse feed arrow buttons and the display should show to the left side, and the knife carrier handle to the right side.

Choose the installation site so that the mains switch for separating the instrument from the power supply is accessible at any time.

Note

Sectioning can be influenced by nearby instruments which generate vibrations. For this reason, the HM 450 should be placed on a stable and vibration free table.

Note

The standard equipment provided with the HM 450 includes four rubber feet, which are smaller than the ones that were installed in our factory. Should the working height be too high when setting up the HM 450, unscrew the original feet and replace them with these lower ones.

Initial Turn-On

Note

The operator is responsible for the correct preparation of equipment and materials/samples for the optimum performance of this instrument.



Before turning on the instrument for the first time, please check that the power requirements indicated on the type plate label affixed HM 450 corresponds to the power supply voltage being used.

- Connect the power cord to the power socket Fig 3 (2) on the rear side of the instrument.
- Turn on the power switch Fig. 3 (1).

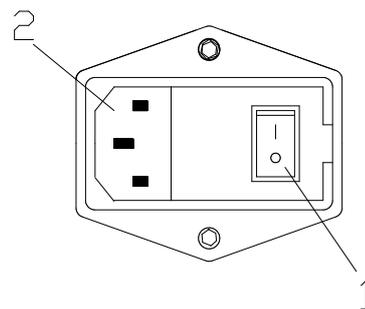


Fig 3

Whenever the instrument is turned on, the specimen clamping moves to the lower end position for initialization, here the

instrument type is shown. Afterwards, Feed and Trim are shown in the normal display mode.

The insert for the two fuses is placed beside the power switch. (Refer to the [Maintenance section, Exchange of fuses](#)).

If desired, the user can change the language himself.

Cutting Movement and Retraction

- To start the cutting movement of the microtome, move the sledge horizontally.
- The knife (or blade) which is clamped into the knife carrier is drawn horizontally over the specimen towards the user. This way, sections are produced.
- In the front reversal point of the sliding movement, i.e. when the sledge is moved again backwards, the specimen is retracted for the protection of knife and specimen.
- If the function <retraction> is active, this is shown by the message **R:ON** in the normal display mode.
- If desired, the function <retraction> can be turned off.

Locking the Sledge

For the protection against injury by unintended movements of the knife sledge, the microtome is equipped with a lock of the sledge in any position.

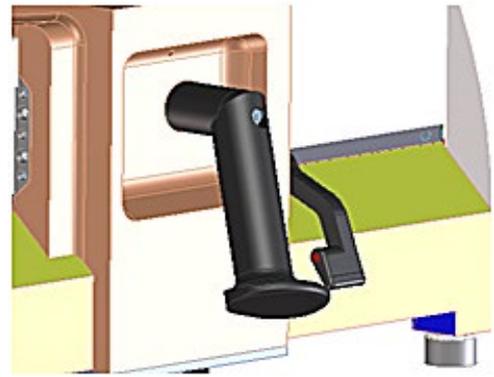


The sledge should be locked for the user's personal safety, e.g. when new specimens are clamped into position, knives are exchanged, the instrument is cleaned, or other adjustment processes are carried out.

- The lock is released via a lever on the rear side of the sledge and is easily accessible from the right side behind the handle.

Locking the sledge

- Swivel the locking lever from the upper position Fig 4 (1) into the lower position Fig 4 (2).
- For this, the red marked lever surface becomes visible to show the clamped state.



Loosening the sledge

- Swivel the lever from the lower position Fig 4 (2) into the upper position Fig 4 (1) until the red mark cannot be seen anymore.
- The knife sledge can be moved again.

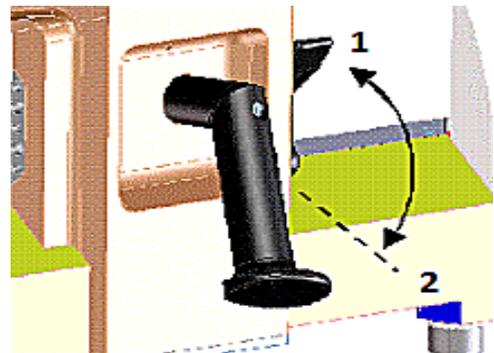


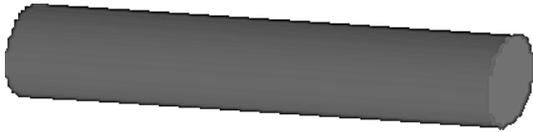
Fig 4

Additional Ballast for Sledge

As required by users to vary the weight of the sledge, we have included additional ballast Fig 4-3-1 into the standard equipment.

To assemble the additional ballast, please proceed as described below:

Additional Ballast



- Remove the two cover caps, located sideways at the sledge Fig 4-3-2.
- Insert the ballast Fig 4-3-1 into the opening and close it again by using the two cover caps Fig 4-3-2.

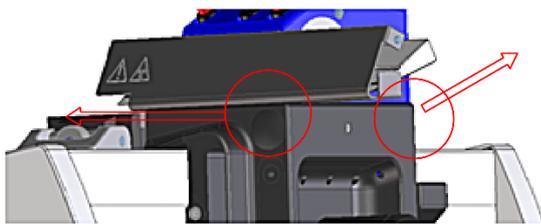


Fig 4-3-2

- Fix the ballast with the laterally set-screw Fig 4-3-3.
- To remove the ballast, please execute this procedure in reverse order.

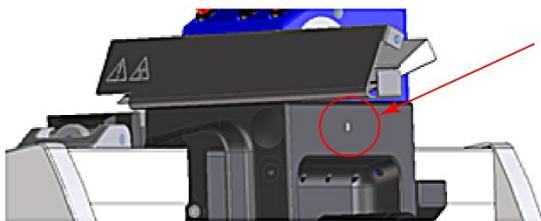


Fig 4-3-3

Setting Section Thickness and Trimming Thickness

The required section thickness and trimming thickness is set via the operating knob on the left side of the instrument.

To choose between section thickness and trimming thickness, press the operating knob Fig 5 (1) or the button on the handle. The respective chosen value is now shown with a frame on the display.

When the instrument is turned on again, the values which were chosen when the instrument was turned off, are shown again.

When turning the operating knob, slight resistances can be felt.

Feed = selected section thickness

Trim = selected trimming thickness

The graduation of the section thicknesses is divided into 5 ranges:

Range	Graduation
from 0 μm to 5 μm	0,5 μm
from 5 μm to 20 μm	1 μm
from 20 μm to 30 μm	2 μm
from 30 μm to 60 μm	5 μm
from 60 μm to 100 μm	10 μm

The graduation of the trimming thicknesses is divided into 3 ranges:

Range	Graduation
from 5 μm to 30 μm	5 μm
from 30 μm to 100 μm	10 μm
from 100 μm to 200 μm	20 μm
from 200 μm to 500 μm	50 μm

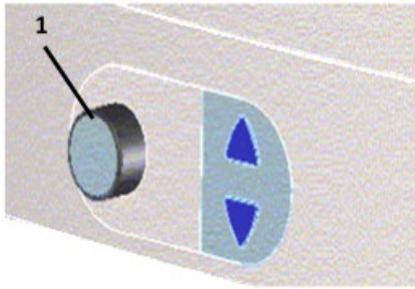


Fig 5

Specimen Feed

Coarse Feed and Speed for Coarse Feed

For the fast up and downward travel between specimen and knife edge, the HM 450 has a coarse feed with vertical direction.

- The specimen clamping can be moved 40 mm vertically up or downwards via the two coarse feed buttons Fig 6 (1).
- The specimen is moved upwards as long as the arrow-up-button is being pressed.
- To move the specimen downwards, press the arrow-down-button.
- If this button is pressed shorter than one second, the specimen is moved downwards as long as this button is being pressed.
- If this button is pressed for more than one second, the specimen is moved downwards even after releasing the button until lower end position is reached.
- This mode is shown on the operating panel by illuminating the red arrow-down.
- The movement is either automatically stopped when reaching the lower end position or by pressing again one of the two arrow buttons.



It is not recommended to carry out an exact coarse feed on knife level while the retraction indication lights up. There is a risk of damage to the specimen during the first cuts.

Three different speeds for the coarse feed are available: 400, 700 and approx.1100 $\mu\text{m/s}$. The three settings are shown on the display by the following symbols:

* = 400 $\mu\text{m/s}$,

** = 700 $\mu\text{m/s}$

*** = approx.1000 $\mu\text{m/s}$.

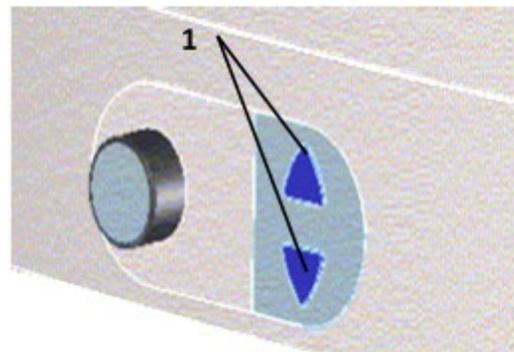


Fig 6

Trimming and First Cuts

After the specimen and the knife are adjusted, further gradual feed for trimming may be carried out using the function "trimming". For different sectioning series, deeper layers of the specimen can be reached with the function "trimming".



It is not recommended to carry out an exact coarse feed on knife level while the retraction indication lights up. There is the risk of damage to the specimen during the first cuts.

The function "trimming" can be activated by pressing the operating knob or by pressing the button on the handle.

If the HM 450 is in the manual feed mode, the normal display mode shows "Man".

The trimming thickness, which is actually on the display, is delivered in each rear reversal point of the sliding movement as long as the arrow-up-button is briefly pressed.

If the instrument is in the automatic feed mode, "Auto" is shown in the lower line of the display.

The actual thickness, which was selected on the operating knob, is delivered in each rear reversal point of the sliding movement.

Fine Feed, Manual

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

The fine feed can be carried out either manually or automatically. The desired feed mode can be selected via the submenu "Automatic/Manual".

When the manual feed mode is activated, "Man" is shown in the lower line of the display.

The manual fine feed is carried out by briefly pressing the arrow-up-button.

To generate sections, move the sledge towards the front.

Fine Feed, Automatic

When the automatic feed mode is activated, "Auto" is shown in the lower line of the display.

The feed of the pre-selected section thickness is always automatically carried out in the rear reversal point of the sliding movement, regardless of the position at which the sledge is moved forwards again.

Note

For optimal sections, always move the sledge together with the knife to the rear side over the entire specimen and then move it forwards.

Retract Function for Compensating the Thermal Extension

Normally the ambient air slowly warms up the paraffin specimen which was cooled down before. Due to the rising temperature, the paraffin expands and the achieved sections will be slightly thicker than the pre-selected value.

Especially after longer breaks between the sections, a thermal expansion becomes obvious resulting in a thicker first cut at the same section thickness setting. This thermal expansion of the specimen can be compensated by using the retract function.

- Before starting cutting again, briefly press the arrow-down-button of the coarse feed once.
- The specimen will be moved by 2 µm downwards away from the knife.
- Now normal sectioning processes can be started.

Operating Panel

The ergonomically shaped operating panel has a large, illuminated graphical display, Fig 7 (1) showing clearly the respective operating states and settings.

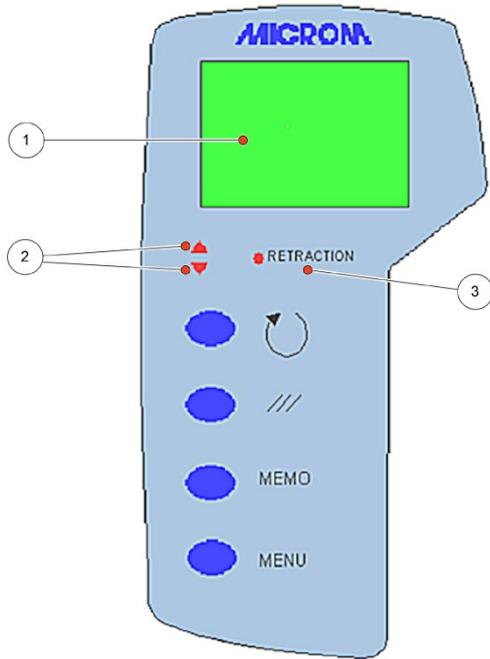


Fig 7

The two arrow-shaped LEDs, Fig 7 (2) blink, when the specimen is just in its upper or lower end position.

Another LED, Fig 7 (3) shows that the specimen clamping is just in its retraction (if retraction is turned on) while the knife sledge is drawn backwards.



It is not recommended to carry out an exact coarse feed on knife level while the retraction indication lights up. There is the risk of damage to the specimen during the first cuts.

Keyboard

Below-mentioned the four buttons of the operating panel and their meaning signification on the operating panel are described.

Scroll Button

Via this button, Fig 8 different information, Fig 9 can be called in the second line on the display:

- current time and date
- number of sections since the last reset.
- section thickness sum in μm since the last reset.
- available remaining travel in μm .
- blank line.



Fig 8

Time: 16:48
 Date: 28.10.02
 Counter = 235
 Stepsum = 23510
 Rem.Trav = 14490

Fig 9



Fig 10

Reset Button

Via this button, Fig 10 the section counter or the section sum can be reset to zero.

- Select the desired number via the scroll button so that it is shown on the display.
- Then press the reset button.
- The number on the display is reset.

Memory Button

The memory function, Fig 11 is used to rapidly find again a stored first cut position. Pre-condition for this is that blocks are cut which have been embedded in the same mold and always have approximately the same height.



Fig 11

- To set the first cut position, press the MEMO button longer until "Memo position saved!" is shown on the display.
- Finish sectioning, remove the specimen and clamp in a new one.
- Briefly press the MEMO button to reach the first cut position again rapidly.
- An arrow symbol on the display shows the direction of the movement.
- After having reached the stored first cut position, the coarse feed turns off. And display "Memo position reached".
- Fast trimming without time-consuming, gradual feed on the knife is now possible!



It is not recommended to carry out an exact coarse feed on knife level while the retraction indication lights up. There is the risk of damage to the specimen during the first cuts.



When changing the knife angle, a new first cut position must be selected as otherwise the danger of a collision with injuries might arise.



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

Menu Button

Via the menu button, Fig 12 you have access to further settings which are described below.

- Normally these settings are made when starting to work and do not have to be altered while sectioning.
- In the respective submenus, options can be changed by turning the selection knob to the left side or to the right side and can be confirmed by pressing this knob (ENTER).



Fig 12

Automatic/Manual

Here the automatic feed is turned on or off. The options are shown as in the list below, Fig 13.

Automatic/Manual	
Automatic turned on	Auto
Automatic turned off	Man

Fig 13

Note

If the automatic feed is turned on (Auto), a feed of the selected section thickness is delivered when the knife sledge is moved from the return travel into cutting direction.

- Press the menu button. The submenu is shown on the display.
- Select "Mode", Fig 14 via the selection knob and confirm it by pressing the knob.
- If the automatic feed is turned off (Man), briefly press the arrow-up-button to release a manual feed of the selected section thickness.
- The selected mode is permanently shown by Auto or Man in the normal display mode.



Fig 14

Retraction On/Off

The instrument is equipped with an electronic retraction which can be turned off.

During the return travel of the knife, the specimen is drawn back (away from the knife). This way, the knife does not touch the specimen surface during its return travel.

When the knife movement is reversed for the return travel, the retraction is released without having to pass a certain point. To activate the retraction, just alter the direction.

The retraction process can be heard during each direction alteration by a short click of the stepping motor. It can also be seen via the retraction LED.

- Press the menu button. The submenu (fig. 15) is shown on the display.
- Select "Retraction on/off" via the selection knob and confirm it by pressing this knob.



Fig 15

RETRACTION	
Retraction turned on	R:ON
Retraction turned off	R:OFF

Fig 16

Speed for Coarse Feed

In this menu, the speed for the coarse feed can be selected in three different settings.

- Turn the selection knob to alter the number of the indicated stars, Fig 17. They correspond to the different speeds according to the opposite list, Fig 18.
- Press the selection knob to confirm the indicated setting.



Fig 17

SPEED FOR COARSE FEED	
Coarse feed speed 400 µm/s	*
Coarse feed speed 700 µm/s	**
Coarse feed speed approx.1100 µm/s	***

Fig 18

Language Selection

Here the respective language of the display messages can be selected, Fig 19.



Fig 19

The following languages are available:

- German
- English
- French
- Spanish
- Italian
- Chinese
- Japanese
- Norwegian
- Swedish
- Finnish

- Turn the selection knob and select the desired language.
- Press the selection knob to confirm the desired setting.

Selecting the Display Mode

Here the display mode Normal and Large can be selected, Fig 20.



Fig 20

- The normal display mode, Fig 21 shows the selected feed and trim thicknesses with additional status indications.

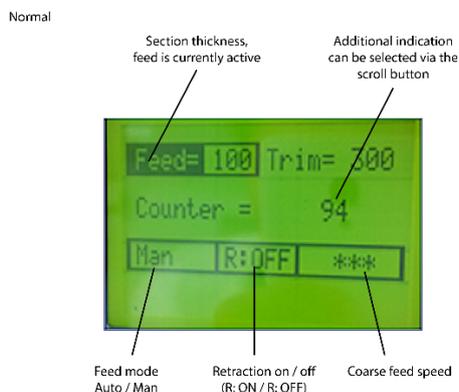


Fig 21

- The large display mode, Fig 22 only shows the active section thickness with a large number together with a symbol for the feed or trim thickness range.

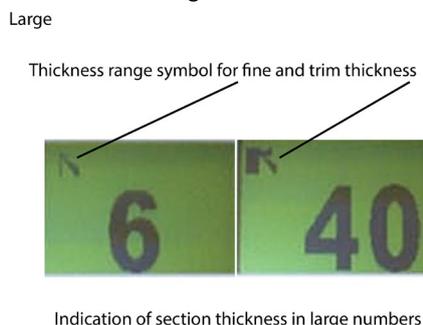
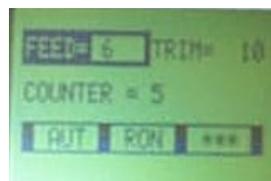


Fig 22

- Press the menu button. The submenu is shown on the display.

- Select "Display mode" via the selection knob and confirm it by pressing this knob.
- Return with another press on the menu button.



Time and Date

With this menu the current time as well as the current date, Fig 23 can be set.



Fig 23

- Press the menu button. The submenu is shown on the display.
- Select "Time and Date" via the selection knob and confirm the setting by pressing this knob.

Note

In the normal display mode, the current time can be shown constantly via the scroll button.

Service Menu



The Service Menu must only be used by an EpreDia technical personnel.

Specimen Clamping

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

Standard Specimen Clamp (Cat. no. 715480)

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

- Insert the specimen on the front fixed jaw, Fig 24 (2) and tighten it via the clamping screw, Fig 24 (3) with the movable jaw, Fig 24 (1).

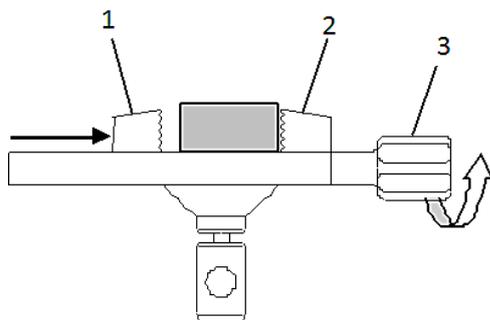


Fig 24



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

Standard Specimen Clamp Crosswise (Cat. no 715140)

- **This specimen** clamp is used in the same way as the above-described standard specimen clamp (Refer to the [Standard Specimen Clamp, cat. no. 715480](#)).
- The clamping screw and thus the clamping direction of this clamp is arranged transversely in relation to the sectioning direction.
- Specimens with a size up to 45 x 60 mm can be inserted.



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

Universal Cassette CLAMP (Cat. no. 715500)

The universal cassette clamp represents a quick change system for standardized embedding cassettes.

- To insert or remove cassettes, press the lever, Fig 25 (1) upwards.

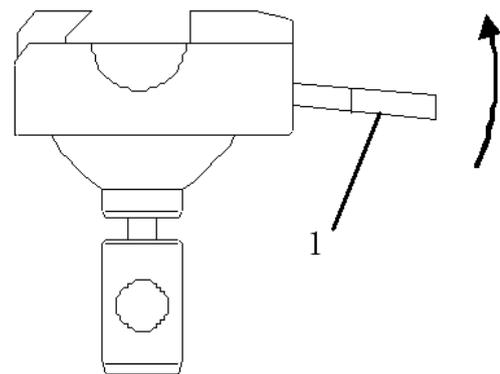


Fig 25



When inserting the universal cassette clamp, please note that the lever, Fig 25 (1) is always in parallel alignment with the movement direction of the knife sledge. If the clamp is inserted diagonally in relation to the cutting direction, the feed drive might block

Changing Specimen Clamps

Due to the quick change system of the specimen clampings, specimen clamps can be easily and rapidly changed without needing any tools.

- Loosen the clamping of the specimen clamp, Fig 26 (1).
- Set the specimen clamp horizontally by means of the set screws of the orientation device.
- To replace the specimen clamp turn the eccentric lever downwards, Fig 26 (1) to the stop and pull it off, Fig 26 (2).

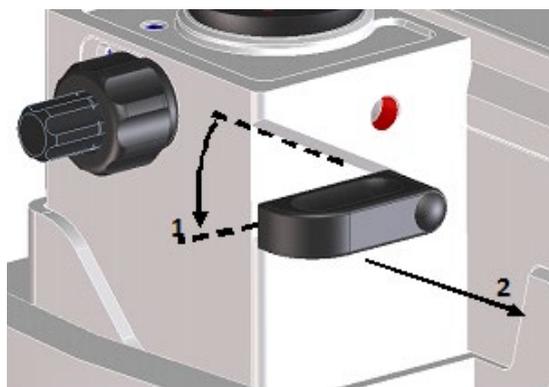


Fig 26

- Now the specimen clamp can be removed and replaced with another one.

Note

Before inserting another clamp, please note the position of the hole in the adapter. It must be aligned in longitudinal direction of the instrument so that the eccentric lever can be pushed in again.

- Again push the eccentric lever into the specimen block.
- Then press the eccentric lever upwards to fix the specimen clamp in position.

Knife Carrier



Due to moving parts in connection with the microtome knife, a danger area arises, which might lead to hand injuries in case of non-compliance with the safety features of the HM 450 and when disregarding the instruction manual.

The knife carrier of the HM 450 is easy to use and equipped with a knife guard for user safety while adjusting knife and specimen.



While working on the knife carrier, it should be locked with the sledge locking (Refer to the [Locking the Sledge](#) section).

Inserting the knife

- To insert the knife, slightly unscrew the two clamping screws, Fig 27 (1) until the knife can be pushed in from the side.
- Then tighten the two clamping screws to fix the knife in its position.

Clearance angle adjustment

The clearance angle between cutting edge and specimen can be adjusted very easily to the respective requirements of the tissue to be sectioned without loosening the clamping of the knife.

- For this, use the two coaxial screws, Fig 27 (2) and (3) on the upper side of the knife carrier.
- Loosen the clamping screw, Fig 27 (3) in a counter-clockwise direction and adjust the clearance angle by means of the set screw, Fig 27 (2).
- The adjusted clearance angle can be read on the scale which is on the right side of the knife carrier.
- Then tighten the screw, Fig 27 (3) in clockwise direction to fix the clearance angle.

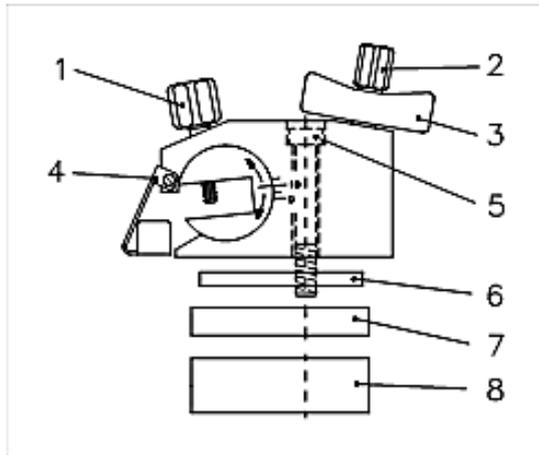


Fig 27

Protection Against Injury

- The knife carrier is equipped with a knife guard, Fig 27 (4) which should be used while knife or specimen are adjusted.



Please note that it is not recommended that knives with a length of more than 16 cm (e.g. 22 cm) are used. Due to the knife projecting over the knife guard, increasing the hazard of use.

Moving the Knife Sideways

- If the cutting edge of the knife is blunt, loosen the clamping screws, Fig 27 (1) and move the knife to the left or right side.
- This process can also be used to protect the knife, as for trimming and fine sectioning different parts of the knife can be used.

Diagonal Position of the Knife

- After having loosened the central fastening screw of the knife carrier (5) via the attached hex head wrench (size 6), the knife can be adjusted diagonally according to the tissue to be sectioned. This is called "angle cut".
- However, please note that due to the diagonal positioning the usable width of the specimen decreases.

Height Adjustment Plates (Optional)

In case the height adjustment of the specimen block is not sufficient for cutting high specimens, a height adjustment plate can be mounted between knife carrier and sledge.

Height adjustment plates are available with 5 mm, 10 mm and 20 mm.

Knife Profile

Knives with profile c and d are available. The opposite figure, Fig 28 shows schematically the angles on the cutting edge profiles of c- and d-knives.

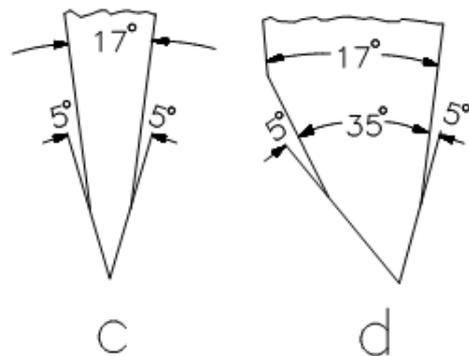


Fig 28

Blade Holder for Disposable Blades

Two different types of disposable blades are available: low profile blades (height: 8 mm) and high profile blades (height: 14 mm). When using disposable blades, a blade holder together with a disposable blade is clamped into the knife carrier.

Inserting the Blade

- Insert the blade holder into the knife carrier from the left side and tighten the two clamping screws on the knife carrier.
- The clamping lever on the blade holder can be positioned in two ways: 0 = loosened, 1 = clamped.
- To insert the blade, turn the clamping lever to 0.
- Please note that locating and clamping surfaces are clean.
- To clamp the blade, turn the clamping lever to 1.

Clearance Angle Adjustment

- The clearance angle between blade and specimen must be adjusted in the same way as the clearance angle between knife and specimen is adjusted.

Protection Against Injury

- The knife carrier of the instrument is equipped with a knife guard which can be moved sideways.
- This knife guard should be used while knife and specimen are adjusted.

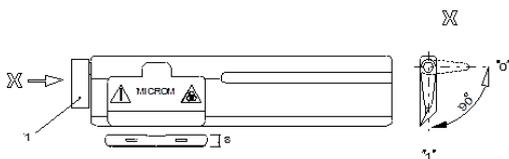


Fig 29

Standard Equipment

Epredia Sliding Microtome HM 450 (Cat. No 910020)

The sliding microtome HM 450 is supplied with the following accessories:

- 1 hex head wrench 5 mm
- 1 hex head wrench 6 mm
- 1 cover
- 4 rubber feet with lower height
- 1 instruction manual

Additional Equipment (Optional)

Disposable Blade Holder

	Cat. No.
Blade holder with eccentric fast clamping	
- for low profile blades	705200
- for high profile blades	705340
Case for disposable blade holder	
Cat. no. 705200 and 705340	152160

Specimen Clamps

Universal cassette clamp	715500
Standard specimen clamp, 45 x 80 mm	715480

Height Adjustment Plates

5 mm	448070
10 mm	440400
20 mm	440410

Microtome Knives

Steel knives, type c	
12 cm	152010
16 cm	152020
18.5 cm	152270
22 cm	152030
25 cm	152040
30 cm	152050
Steel knives, type d	
12 cm	152060
16 cm	152070
22 cm	152080
25 cm	152090
30 cm	152100
Tungsten carbide knife 16 cm, d	152120
Tungsten carbide knife 16 cm, c	152330
Solid tungsten carbide knife 16 cm, d	152460

Knife case	
12 cm	152220
16 cm	152230
18.5 cm	152280
22 cm	152240
25 cm	152250
30 cm	152260
Disposable blades for paraffin	
<u>Low Profile Blades</u>	
MX-35 Ultra	3053835
MX-35 Premier+	3052835
MX-35 Premier	3051835
MB-35 Premier	3050835
MB-22 Premier	3050822
<u>High Profile Blades</u>	
HP-35 Ultra	3153735
HP-35n Ultra	3151735

Troubleshooting

Note

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

Preparation of the Specimen

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

Temperature of the Specimen

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 carrier, specimen holder and specimen orientation.

Selection of the Knife

Carefully select the required knife material and profile.

Adjustment of the Knife

Take care to adjust the proper clearance angle of the knife.

Select a clearance angle adjustment of 10° or more according to the facet angle.

Cutting Speed

Take care to select proper cutting speed.

General Rule: The harder the material, the slower the cutting speed

Trimming

Take care in bringing the knife and specimen together.

Appendices

Appendix A – Maintenance

Exchange of Fuses

The two mains fuses are installed on the back of the instrument beside the power switch, Fig 30 (1).

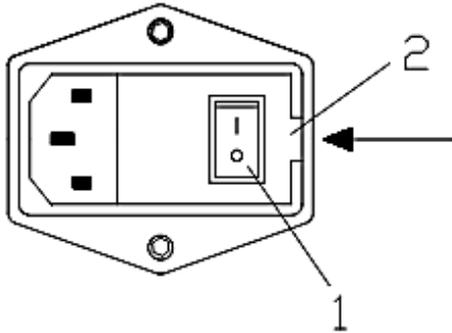


Fig 30

- To exchange the two fuses, turn off the power switch of the instrument and unplug the instrument.
- Open the small cover, Fig 30 (2) of the fuse holders from the right side (see arrow) by means of a flat screw driver.
- Pull out the fuse holders, each of which is marked with an arrow and exchange the fuses against new ones.

Rating of fuses:

For power requirements 100 - 240 V:

2 x T 1.6 AH

Appendix B - Cleaning and Care

Note

Before using any cleaning or decontamination method, except for those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment,

Cleaning Intervals

Cleaning, care and decontamination of the HM 450 depends on how frequently the instrument is used. For optimal sectioning, the instrument must be free of section waste, especially the guides and clamping mechanism.

Cleaning Agents

Mild household cleaners can be used to clean the HM 450. Do not use aggressive cleaners or solvents, as the paint and plastic parts can be affected.

Note

Before starting cutting, instrument, knife carrier and section waste trays should be treated with a commercially available paraffin repellent, e.g. Para Gard.

Care

- Remove the knife from the knife carrier.
- Clean it with a dry cloth to avoid the formation of rust and keep it in a knife case.



Never put the knife with the cutting edge upwards on the table.

- Clean the operating controls and the surfaces of the knife carrier, especially the space where the knife is installed.
- The cross roller bearings are covered and protected against dust and section waste and need not to be lubricated or cleaned by the customer.
- Clean the specimen clamping system, specimen orientation, housing and vertical carrier.

Appendix C - Transportation of the Instrument

Taking Back the Instrument for Repair or Routine Maintenance

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

- To guarantee trouble-free function of the instrument after transportation, please note the below-mentioned measures for the transportation preparation.
- In addition, the conditions for storage and transportation as mentioned in the [Technical Data](#) must be observed during the entire transportation.



Always be aware of the potential biological risks associated with the instrument after use. Always use Good Laboratory Practice.

Measures for Closing Down:

- Turn off the instrument.
- Unplug the unit.
- Remove knife or blade and store it in a safe way.
- Secure the sledge via the lock of the sledge as described in [Locking the Sledge section](#).



Any shipping of the instrument requires original packaging materials. Damages caused by shipping with non-conform packaging are not covered by the manufacturer warranty. Any damage repairs

resulting in non-conforming package are fully charged to the sending party.



The user must care for a clean and safe condition of the instrument when returning it to an appropriate service provider.

Note

If the original packaging is no longer available, please contact your local EpreDia representative.

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Revision Control For This Document

Date	Revision Number	Changes Made
February 2022	2	IVDR compliance requirements added, including this revision record table.



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