

Thermo Scientific HM340E

Rotary Microtome

Product Code 905190

Operation Manual – English

ex Ser. No 44481

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Company Information

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This instrument conforms to the essential requirements of:
IVD Directive 98/79/EC

and its harmonized standards under Union harmonization legislation

Symbols

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



This symbol is used on the instrument, or in a document, to indicate that instructions must be followed for safe and correct operation. If this symbol appears on the instrument, always refer to the operator guide.



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



Cold surface, if necessary, use gloves



Cutting hazard, sharp edges, watch your fingers.



This symbol is 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.



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 of the device. It is stated on the product label sticker.



It is built up as follows: SYMMXXXX

S=Production site, Y=Year, M=Month, X= Counter

So the serial number states the production date of the device

A warning is given in the documentation if there is a danger of personal injury or damage to the equipment or samples.

Note

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

Table of Contents

| | |
|--|-----------|
| COMPANY INFORMATION | 3 |
| SYMBOLS | 4 |
| TABLE OF CONTENTS | 5 |
| CHAPTER 1 - SAFETY INFORMATION | 7 |
| GENERAL SAFETY | 7 |
| CHEMICAL SAFETY | 8 |
| ENVIRONMENT | 8 |
| WARRANTY STATEMENT | 8 |
| EMC STATEMENT | 9 |
| CHAPTER 2 - INTRODUCTION | 10 |
| INTENDED USE: | 10 |
| DESCRIPTION OF ROTARY MICROTOME HM 340E | 10 |
| SCOPE OF DELIVERY STANDARD EQUIPMENT | 11 |
| ADDITIONAL EQUIPMENT | 12 |
| TECHNICAL DATA SHEET | 14 |
| CHAPTER 3 – OPERATING INSTRUCTIONS | 16 |
| SETTING UP THE MICROTOME | 16 |
| FRONTAL VIEW | 17 |
| REAR VIEW | 17 |
| LATERAL VIEW LEFT SIDE | 18 |
| LATERAL VIEW RIGHT SIDE | 18 |
| INITIAL START-UP | 19 |
| OPERATING PANEL | 20 |
| DISPLAY AND KEY FUNCTION | 21 |
| <i>Hand Wheel Brake</i> | 21 |
| <i>Cutting Process Indication</i> | 22 |
| <i>Setting Section Thickness and Trimming Thickness</i> | 24 |
| <i>Cutting Movement and Retraction</i> | 26 |
| <i>Specimen Course Feed</i> | 27 |
| <i>Factory Defaults</i> | 31 |
| <i>Memory Function</i> | 31 |
| <i>Rocking Mode Function</i> | 32 |
| ADAPTERS FOR SPECIMEN CLAMPING | 33 |
| <i>Adapter, Non-Orienting</i> | 33 |
| <i>Adapter, Orienting, Specimen Orientation</i> | 33 |
| <i>Changing and/or Fastening Specimen Clamps</i> | 34 |
| <i>Re-Adjusting Specimen Clamps</i> | 35 |
| SPECIMEN CLAMPING | 36 |
| <i>Universal Cassette Clamp</i> | 36 |
| <i>Universal Cassette Clamp, Adjustable</i> | 36 |
| <i>Standard Specimen Clamp</i> | 37 |
| <i>Insert for Round Specimens, V-Insert and V-Distance Piece</i> | 38 |
| KNIFE AND BLADE CARRIERS | 41 |
| <i>Disposable Blade Carrier ER</i> | 41 |
| <i>Disposable Blade Carrier E</i> | 43 |
| <i>Knife Carrier C</i> | 45 |
| <i>Readjusting Knife or Blade Carriers</i> | 47 |
| SECTION WASTE TRAY WITH INTEGRATED ARM REST | 48 |
| LARGE FIELD MAGNIFIER | 48 |
| <i>Installing the Large Field Magnifier on the Microtome</i> | 49 |
| CHAPTER 4 – WORKING WITH THE MICROTOME | 50 |

Thermo Scientific Rotary Microtome HM 340E

| | |
|---|-----------|
| SECTIONING INSTRUCTIONS | 50 |
| <i>Conditions of Knife/BladeEdge</i> | 50 |
| <i>Setting the Cutting angle</i> | 50 |
| <i>How to Avoid Errors</i> | 52 |
| <i>Possible Sources of Errors – Cause and Removal</i> | 53 |
| CHAPTER 5 – MAINTENANCE AND CARE | 54 |
| CLEANING AND CARE | 54 |
| MAINTENANCE | 55 |
| <i>Annual Routine Maintenance</i> | 55 |
| <i>Service Contract</i> | 55 |
| REPLACEMENT WORK | 56 |
| <i>Replacing the Fuses</i> | 56 |
| <i>Rating of Fuses</i> | 56 |
| CHAPTER 6 – CONDITIONS FOR TRANSPORTATION | 57 |
| RETURNING THE INSTRUMENT FOR REPAIR OR ROUTINE MAINTENANCE..... | 57 |
| <i>Measure for taking out of Operation</i> | 58 |
| DISPOSAL OF THE INSTRUMENT AFTER FINAL SHUTDOWN..... | 59 |
| INDEX | 60 |

Chapter 1 - Safety Information

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

Any problems and queries should be referred to your Thermo Fisher Scientific service department, acting on behalf of Thermo Shandon Limited.



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 IEC 61010-1 and IEC 61010-2-101; 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. Thermo Fisher Scientific 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 Thermo Fisher Scientific 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 complies with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:



Thermo Fisher Scientific on behalf of Thermo Shandon Limited 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 Thermo Fisher Scientific service representative.

Warranty Statement

Thermo Shandon Limited as Part of Thermo Fisher Scientific 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 Thermo Fisher Scientific 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 Thermo Shandon Limited.
- Accessories and reagents which have not been approved by Thermo Fisher Scientific are used.
- The instrument is not operated or maintained in accordance with instructions.

EMC Statement

This IVD equipment complies with the emissions and immunity requirements of IEC 61326-2-6:2006.

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.

Chapter 2 - Introduction



Intended use:

The Thermo Scientific rotary microtome HM340E 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 HM340E.

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.

Description of Rotary Microtome HM 340E

The HM340E rotary microtome from Thermo Scientific is a powerful electronic universal microtome for demanding paraffin sectioning and hard sectioning applications, especially in day-to-day medical and biological work and research as well as in industry.

The HM340E 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 HM340E 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 HM340E 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 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.

For the users safety, the instrument is equipped with a mechanical hand wheel brake.

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.

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 HM340E is supplied with the following accessories:

| Quantity | Description |
|----------|--|
| 1 | Operating Panel |
| 1 | Section waste tray, big |
| 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

Additional available equipment (optional)

| Description | Cat. No. |
|--|----------|
| Section Transfer System STS with Blade Holder TE | 771200 |
| Standard Specimen Clamp for STS | 715550 |
| Transfer Surface for STS | 715550 |
| with Universal Cassette Clamp | 771110 |
| with Standard Specimen Clamp | 771120 |
| 100...115V/50...60Hz | 770210 |
| 220...240V/50...60Hz | 770220 |
| Disposable Blade Carrier ER | 705830 |
| Disposable Blade Carrier E | 705800 |
| Knife Carrier C | 705810 |
| Standard Knife Carrier N | 705820 |
| 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 Specimens, Ø 6 mm | 715070 |
| Insert for Round Specimens, Ø 15 mm | 715080 |
| Insert for Round Specimens, Ø 19 mm | 715280 |
| Insert for Round Specimens, Ø 25 mm | 715090 |
| V-Insert | 715100 |
| V-Distance Piece | 715320 |

Thermo Scientific Rotary Microtome HM 340E

| | |
|--|--------|
| Segment Arc | 715590 |
| Universal Specimen Holder | 715060 |
| Large Field Magnifier, 220 V | 760160 |
| Large Field Magnifier, 120 V | 760170 |
| Zoom-Stereomicroscope Zeiss Stemi 2000 | 755210 |
| Adapter for Stemi 2000 | 532090 |
| Ring Illumination, 100....240V/50...60Hz | 760340 |
| SEC 35 | 152200 |
| SEC 35e | 152215 |
| SEC 35p | 152570 |
| | |
| Steel Knives, Type C | |
| 12 cm | 152010 |
| 16 cm | 152020 |
| 18,5 cm | 152270 |
| 22 cm | 152030 |
| | |
| 12 cm | 152060 |
| 16 cm | 152070 |
| 22 cm | 152080 |
| | |
| 12 cm | 152220 |
| 16 cm | 152230 |
| 18,5 cm | 152280 |
| 22 cm | 152240 |
| Lubrication Oil, 250 ml | 350120 |

Technical Data Sheet

| Microtome | HM340E | |
|--|--------------------------------------|---|
| 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 |
| Specimen Size | when using a Macro- Specimen Clamp | max. 68 x 50 mm |
| Specimen Orientation | X- and Y-axes | universal 8° |
| Samples Rotation | | 360° |
| Storage Temperature Range | | - 20° C up to + 50° C |

Thermo Scientific Rotary Microtome HM 340E

| Microtome | HM340E | |
|----------------------------|---------------------|--|
| 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 ² |
| Power Requirements | | 100...240 V 1,6 A +/-10% |
| | | 50/60 Hz |
| Pollution Degree | | 2 |
| Overvoltage Category | | II |
| Protection class | | 1 |
| Sound Pressure | | 42 dB(A) |
| Dimensions | | 410 mm x 520 mm x 280 mm (wide/deep/high) |
| Weight | | 27 kg |

Chapter 3 – 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.

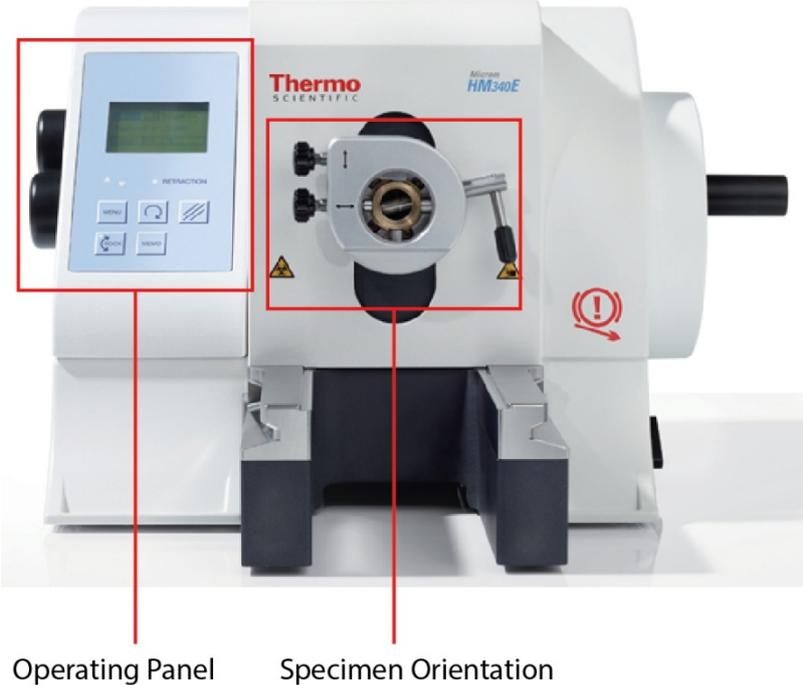
Note

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

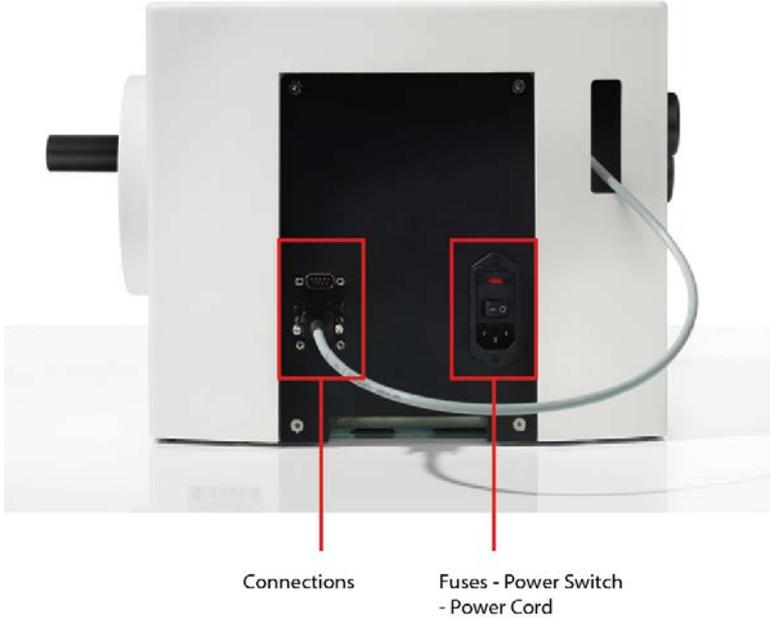
A safe function of the Microtome is only ensured, if the equipment possesses a temperature within the specified operating conditions (see technical data sheet, page 16). We highly recommend that the Microtome rests at least 2 hours after unpacking at ambient temperature before switching it on for the first time.

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 14 and 15, standard and optional accessories)

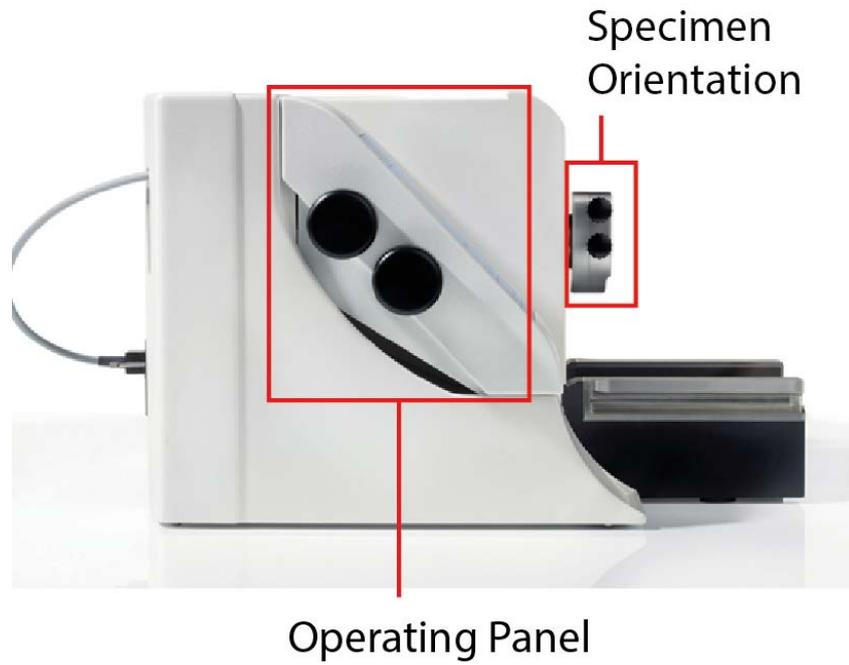
Frontal View



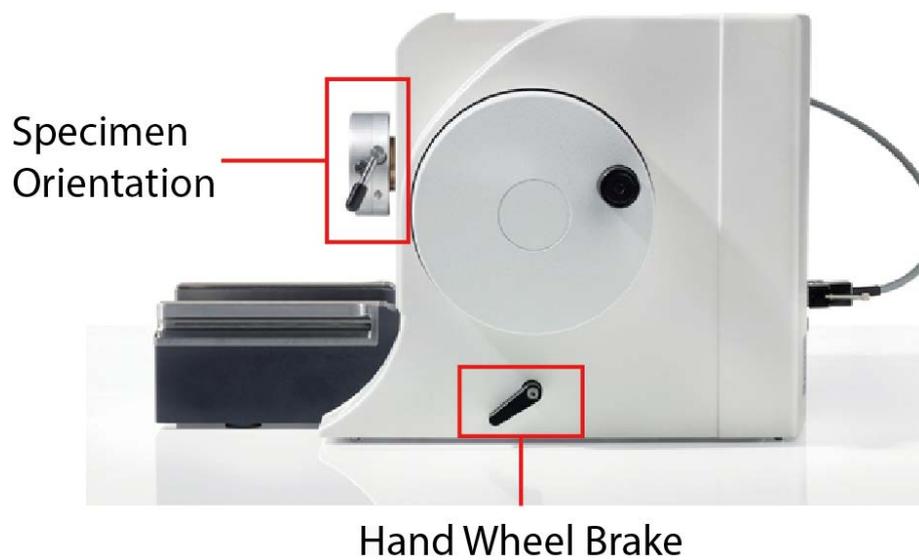
Rear View



Lateral View Left Side



Lateral View Right Side



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 | Not used |
| d | Cover for fuses |
| e | Power switch |
| f | Power socket |

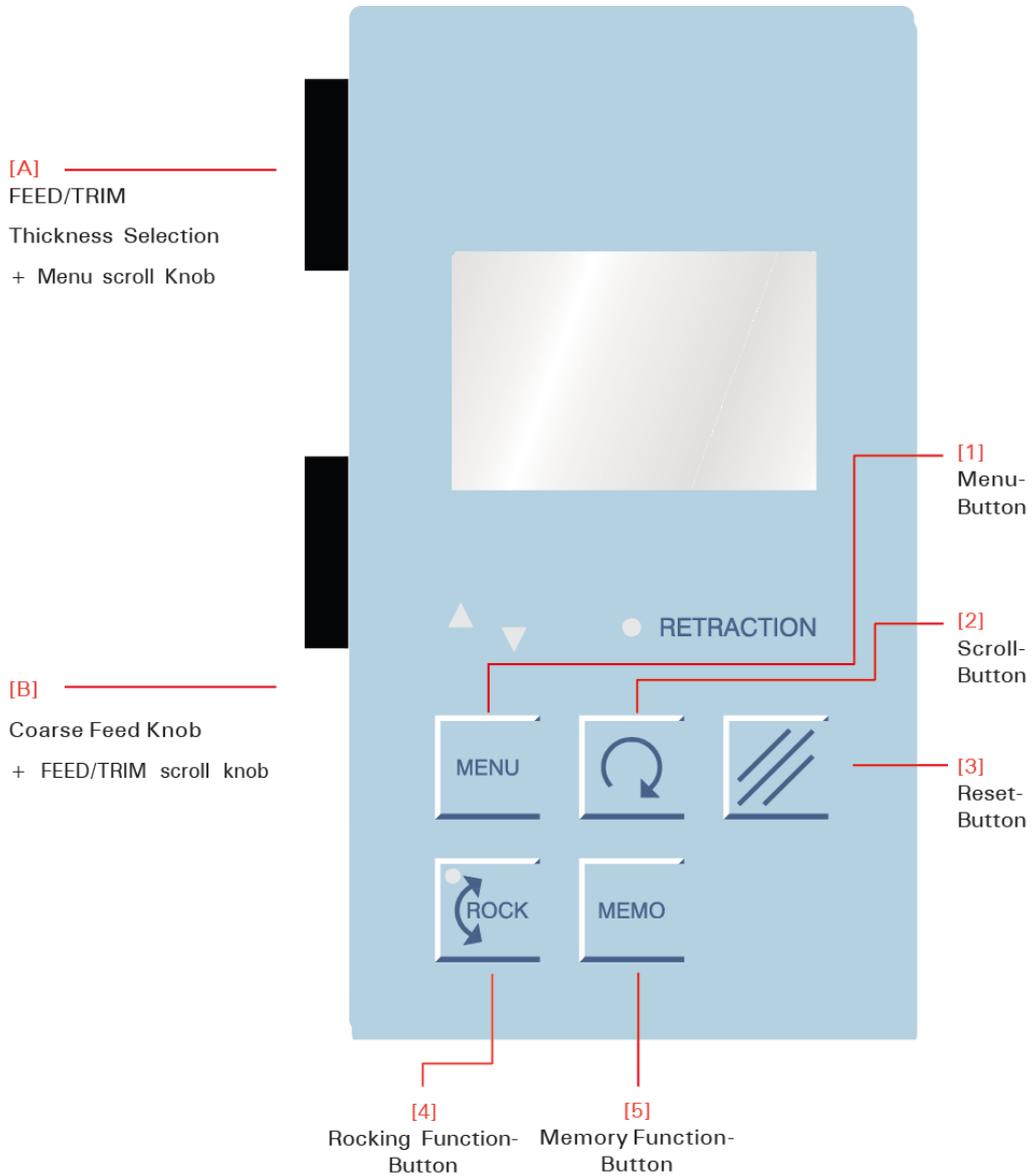
- Connect the cable of the operating panel to the connector (b) on the rear side of the microtome and fasten it with the two screws.
- Should the operating panel be attached to the instrument, push the connector through the corresponding hole on the rear side of the microtome.
- The operating panel can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

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 Function

Thermo Scientific Microtomes are designed to support your workflow. To achieve best results, take your time to get know the HM340E thoroughly before starting work.

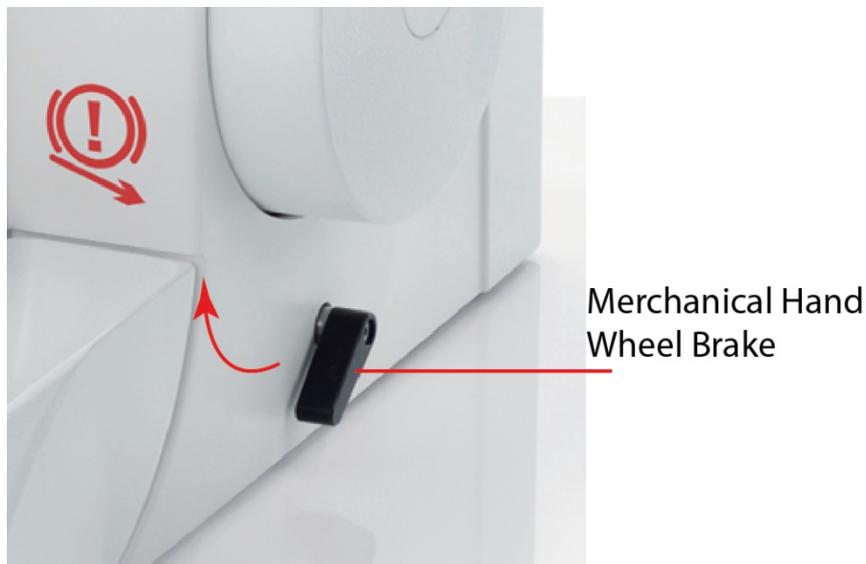
Hand Wheel Brake



For your personal safety, the hand wheel brake must always be activated when working on the specimen holder or knife/blade carrier.

Note

The microtome is equipped with a mechanical hand wheel brake. This prevents unintended movements of the specimen holder and knife/blade carrier. This reduces the danger of being injured when adjusting the specimen clamp and knife/blade carrier.



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



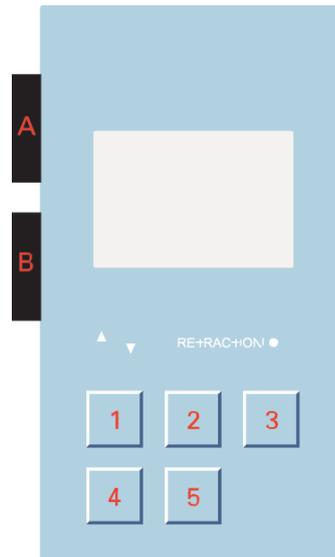
Turn the lever downwards to unlock the hand wheel brake. Pull the lever upwards in the direction of the arrow to lock the hand wheel. The hand wheel cannot be turned with a locked hand wheel brake.

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 Thickness

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.

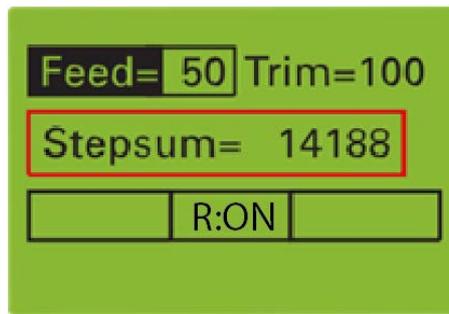


The section counter adds up the number of sections produced. After each downward movement of the specimen holder, the number on the section counter increases by 1.

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

Section Thickness Sum

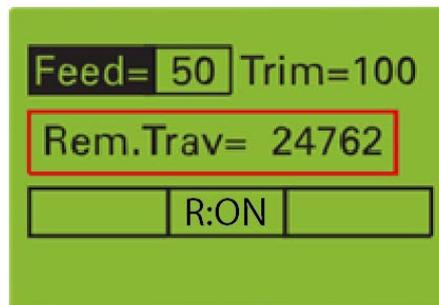
The middle line of the display shows information about the sectioning status.



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

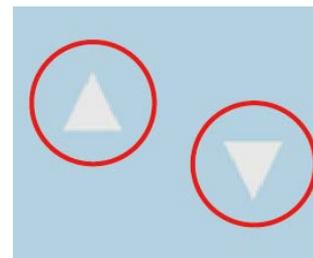


This value shows the distance in microns, which is left for sectioning in microns.

Note

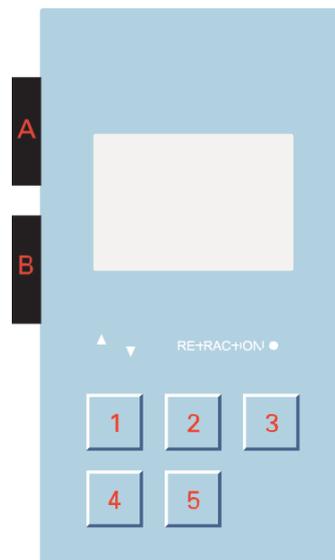
If the specimen holder is in the back end position, the display shows 28 000 μm . This number decreases the closer the specimen is moved to the front.

The end position is shown by a flashing LED.

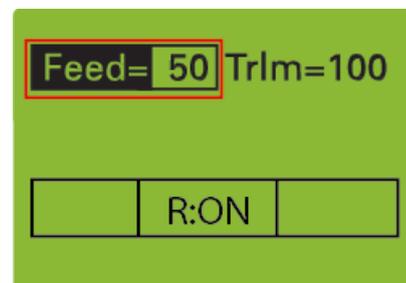


Setting Section Thickness and Trimming Thickness

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.

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 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 four ranges:

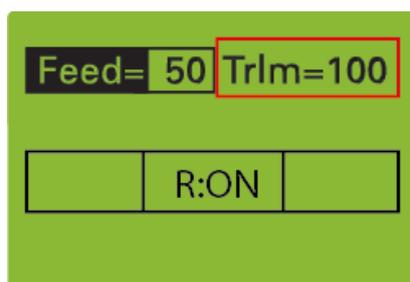
| Range | Graduation |
|---|------------------|
| up to 30 μm | 5 μm |
| from 30 μm to 100 μm | 10 μm |
| from 100 μm to 200 μm | 20 μm |
| from 200 μm to 500 μm | 50 μm |

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 forward by the pre-selected trimming value in the upper reversal point.

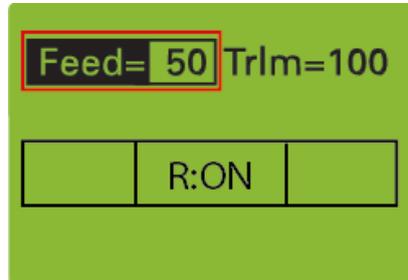
- Press the coarse feed knob [B] for further TRIM feed.

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 to change the value.

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

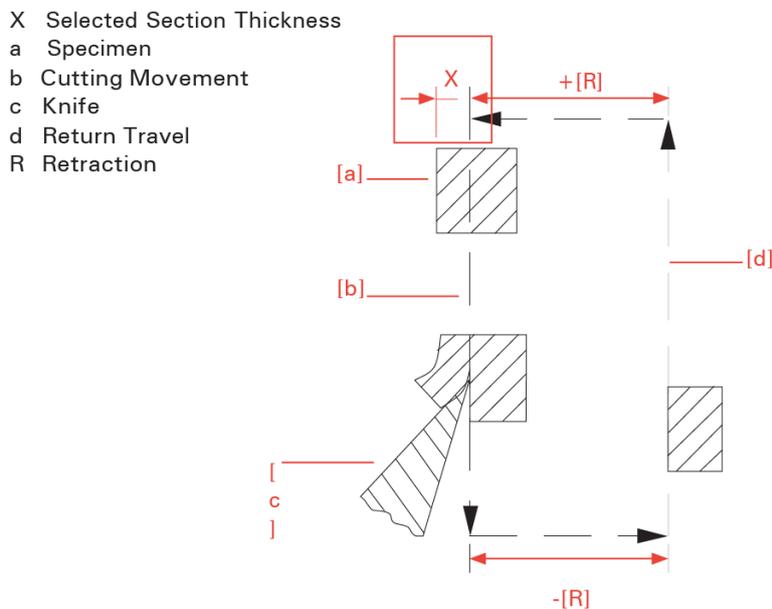
Cutting Movement and Retraction

The cutting movements of the microtome are generated by turning the hand wheel.

- To start the cutting movement of the microtome, turn the hand wheel clockwise.
- 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.



Specimen Course 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.

- The specimen holder is moved to the front as long as knob [B] for activating the coarse feed forward.

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] back-wards, 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.

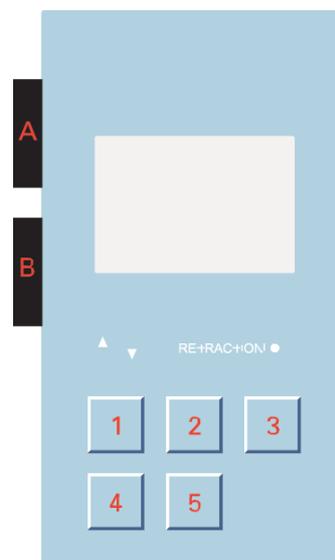
Automatic return movement can be stopped by briefly turning knob [B] in the opposite direction.

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

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

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

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



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 and the date can be shown constantly in the normal display mode by pressing the scroll button [2].

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



Display Mode

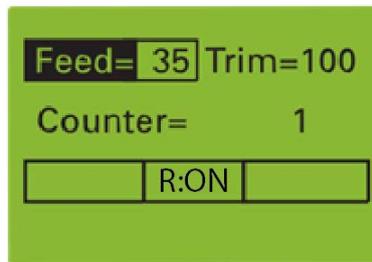
- Press the MENU button [1].

Thermo Scientific Rotary Microtome HM 340E



- 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.



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.

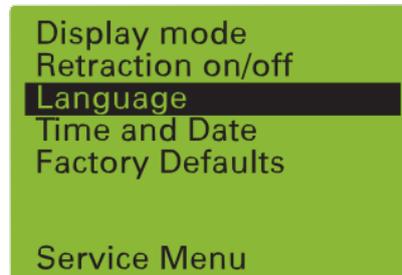
Note

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

Language Selection for the Display

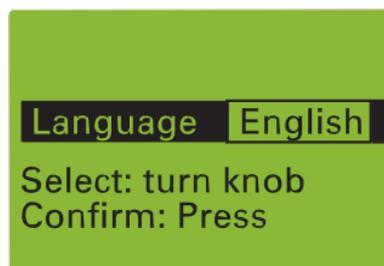
The information on the display can be shown in different languages.

- 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.



Factory Defaults

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

| HM340E | Factory Defaults |
|------------|------------------|
| Retraction | Off |
| Language | German |
| Fine | 0,5 µm |
| Trim | 5 µm |

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 [5] for approx. 1 sec.
“Pos. stored“ is then briefly shown on the display.
- Then proceed with work (trimming, first-cuts, fine sectioning). 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 [4] to start Rocking function.



- Press the ROCK button [4] again to turn it off.

Adapters for Specimen Clamping



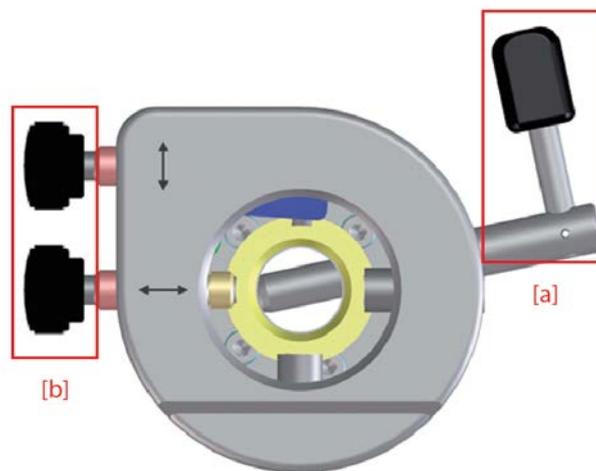
When adjusting the specimen the mechanical hand wheel brake must be locked in and the knife guard has to be used to cover the knife/blade edge.

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.

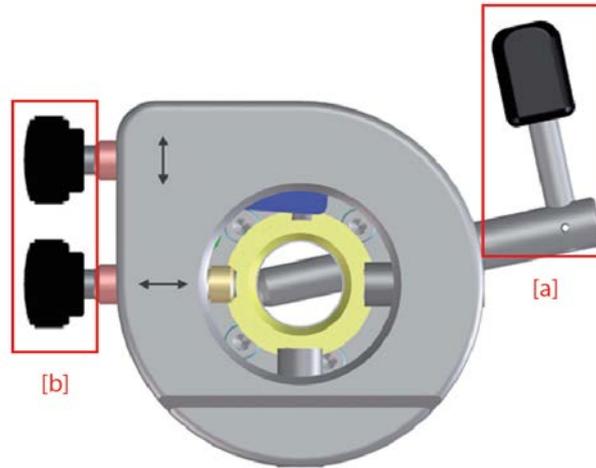
After having oriented the specimen, turn the lever [a] upwards to fix the specimen clamp in its position before starting sectioning.

Note

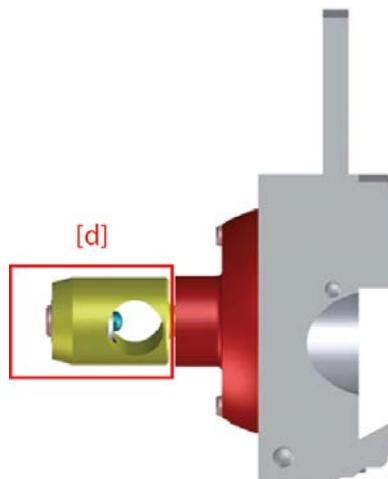
When turning the orienting screws [b] a slight resistance can be felt when the clamp is aligned parallel with the cutting surface.

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.



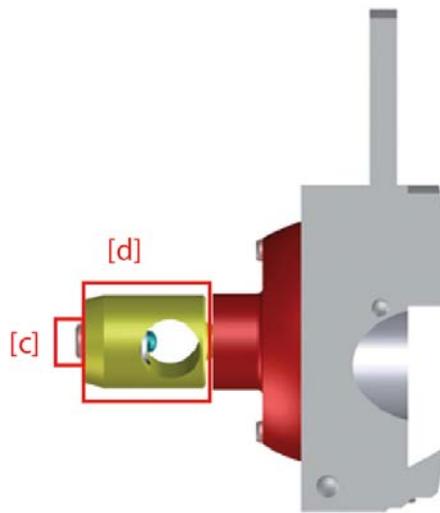
Re-Adjusting Specimen Clamps

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.



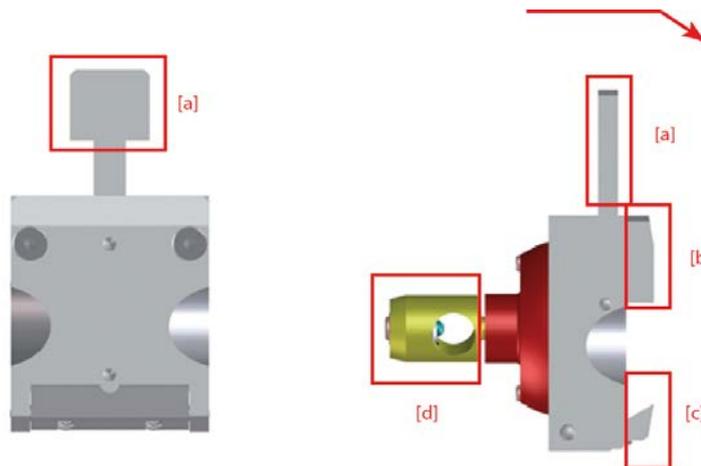
Specimen Clamping

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.



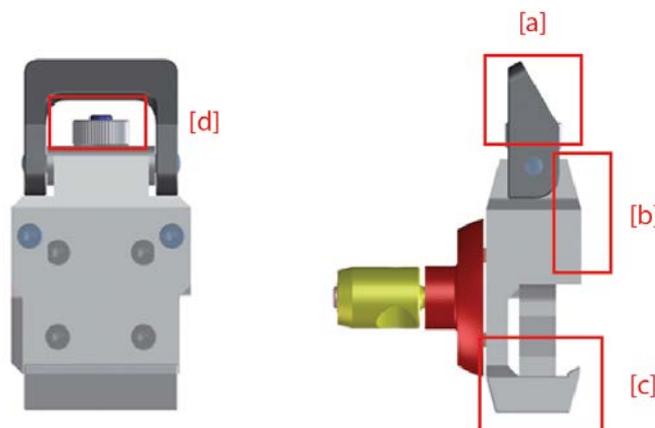
- To insert or remove the cassette from between the fixed [b] and movable [c] jaws, pull the lever [a] to the front (in the direction of the arrow).

Note

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

Universal Cassette Clamp, Adjustable

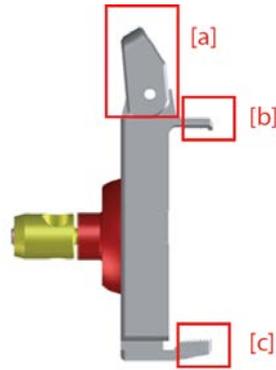
To insert or remove cassettes between the fixed [b] jaw and the moveable jaw [c], move the lever [a] upwards.



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.

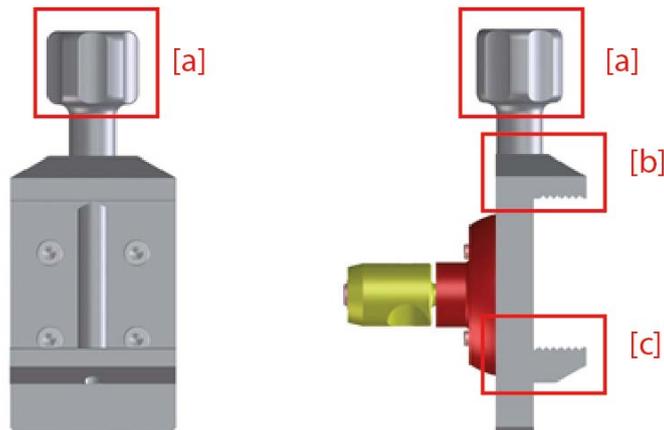


Note

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

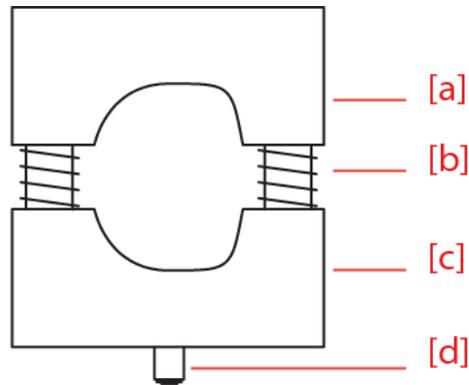
For the stability of the specimen, do not let it project too much over the clamping jaws.

Note

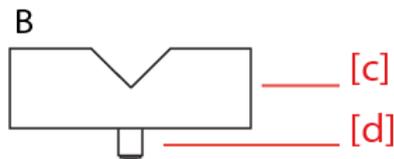
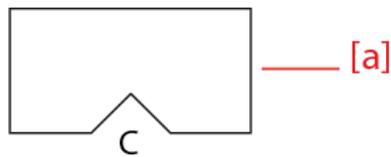
The standard specimen clamp is equipped with two different movable jaws [c], which are of different weight. The lightweight jaw is used with inserts for round specimens.

Insert for Round Specimens, V-Insert and V-Distance Piece

To cut round specimens, the insert for round specimens with defined diameters of 6, 15, 19 and 25 mm (special sizes on request) or the V- insert can be clamped into the standard specimen clamp.



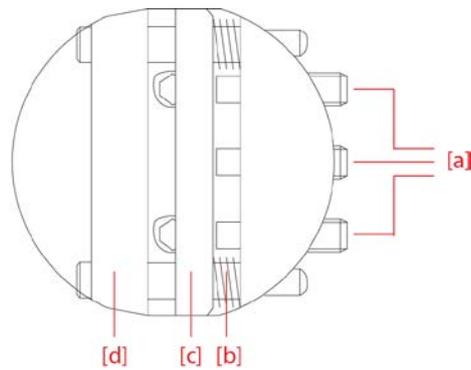
- The pin [d], which fits into the lower clamping jaws [c], positions the insert precisely. The two springs [b] help to remove the specimens from the inserts.



- 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.



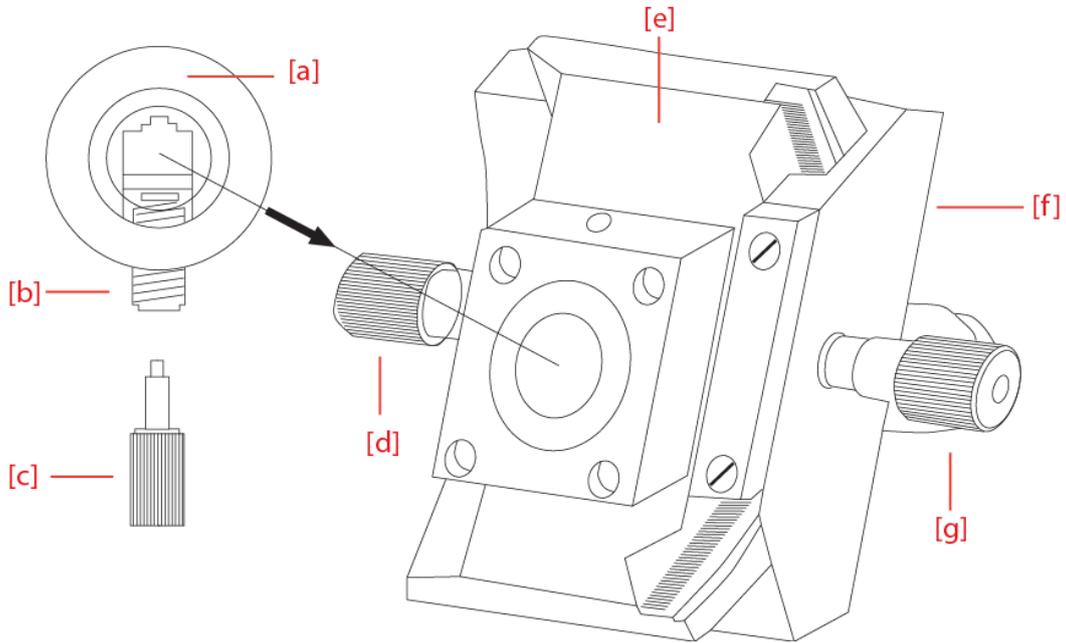
- To insert the specimen, loosen the three clamping screws [a] slightly and push the movable jaw [c] sideways against the two springs [b].
- The specimen is kept in place by the springs [b]; however, its position can be changed. Turn the three clamping screws [a] to clamp the specimen tightly against 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 Thermo Fisher Scientific's sandwich supporting material (Cat. No. 176010).

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



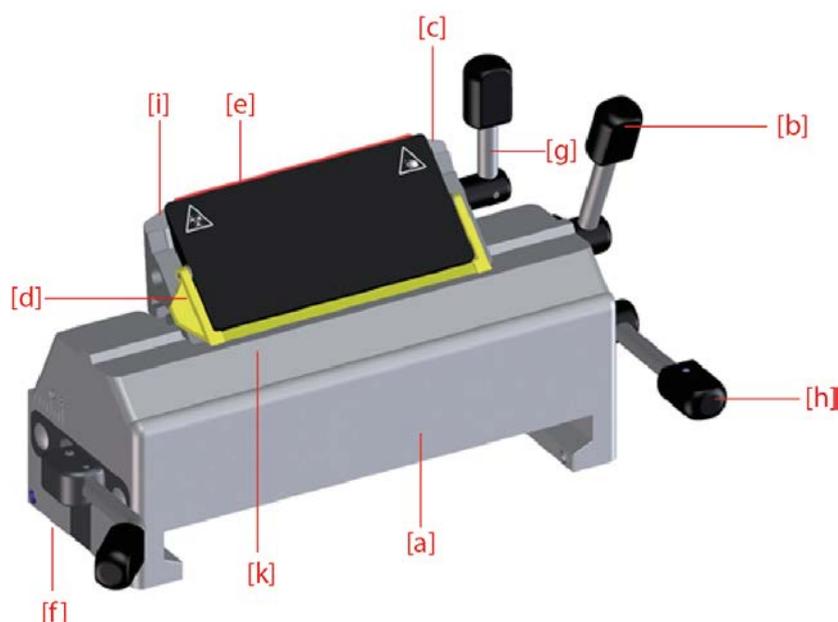
Due to moving parts on the knife/blade holder and the extreme sharpness of the microtome knife or blade, a danger area arises, which might lead to hand injuries if the safety features and the instruction manual are not followed carefully. The knife or blade carriers are equipped with a knife guard for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

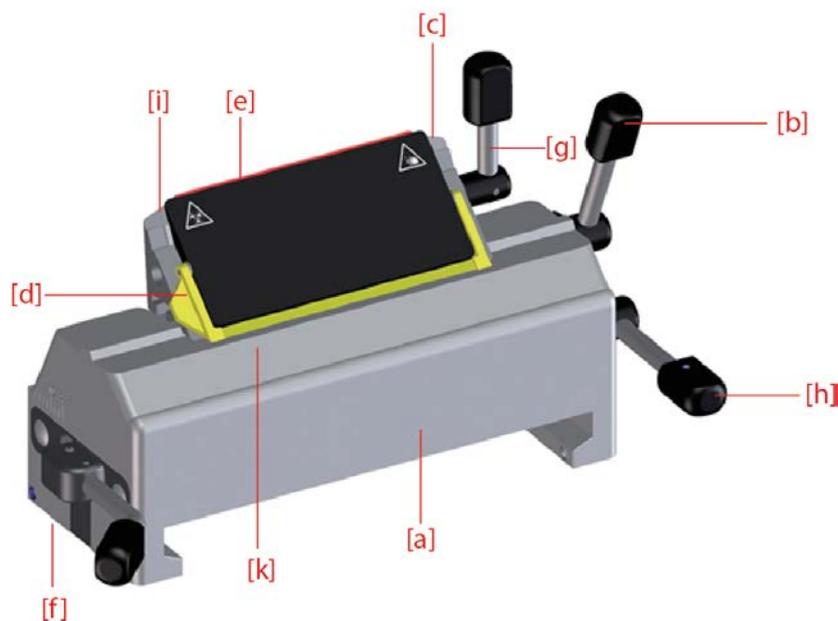
Using High Profile Blades

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

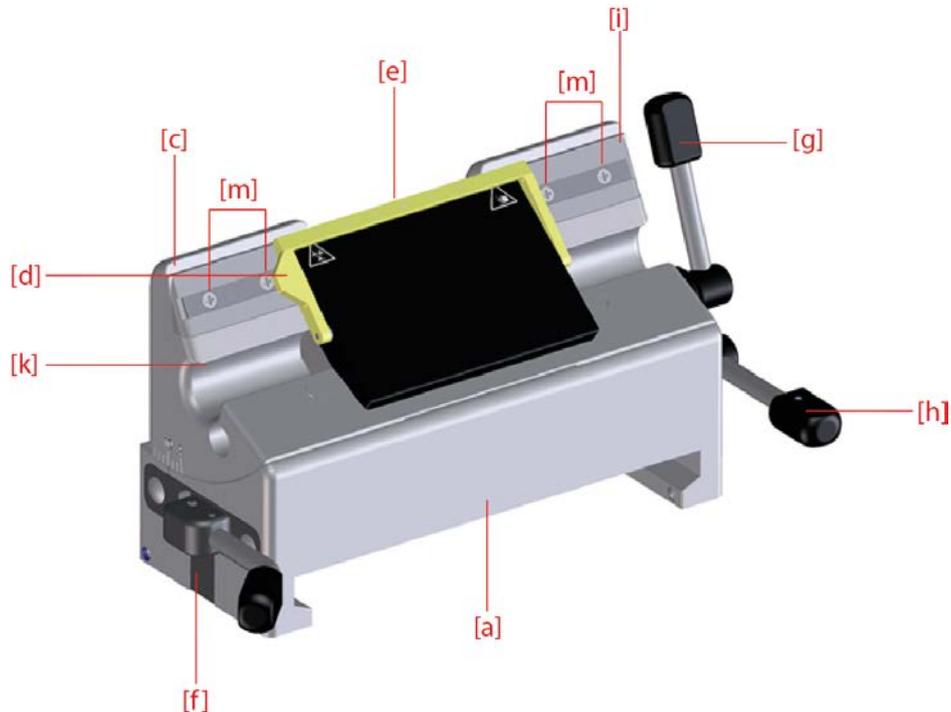
Loosen the clamping lever [f] on the left side of the blade carrier, to move the carrier forwards and backwards on the guide bars, this allows a rough adjustment of blade to specimen.

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.

Moving the Blade Carrier on the Console

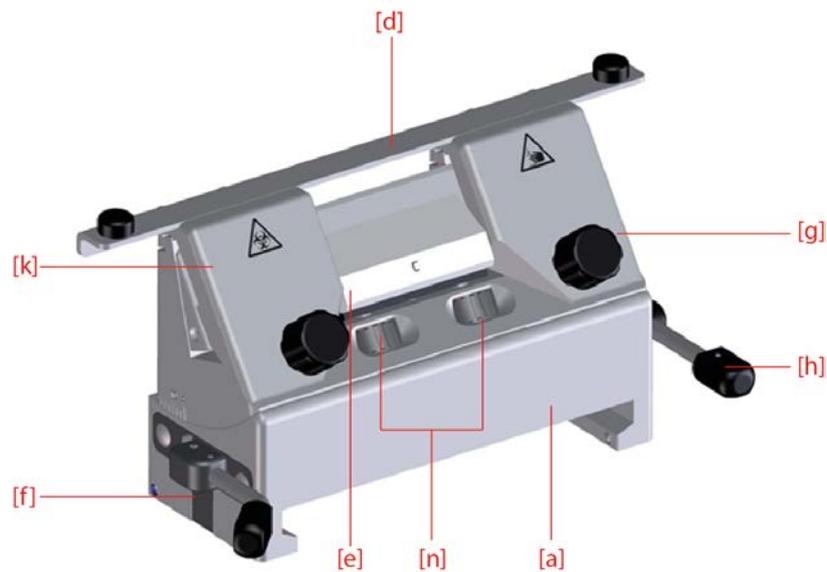
If the clamping lever [h] is loosened, the upper part [k] of the blade carrier can additionally be moved 1 cm to the left or right side. This way, the cutting edge can optimally be used. The clamping lever for the angle adjustment can be pulled off after a correct angle setting to avoid that the angle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

- 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 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.

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

Clearance angle adjustment

- 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.

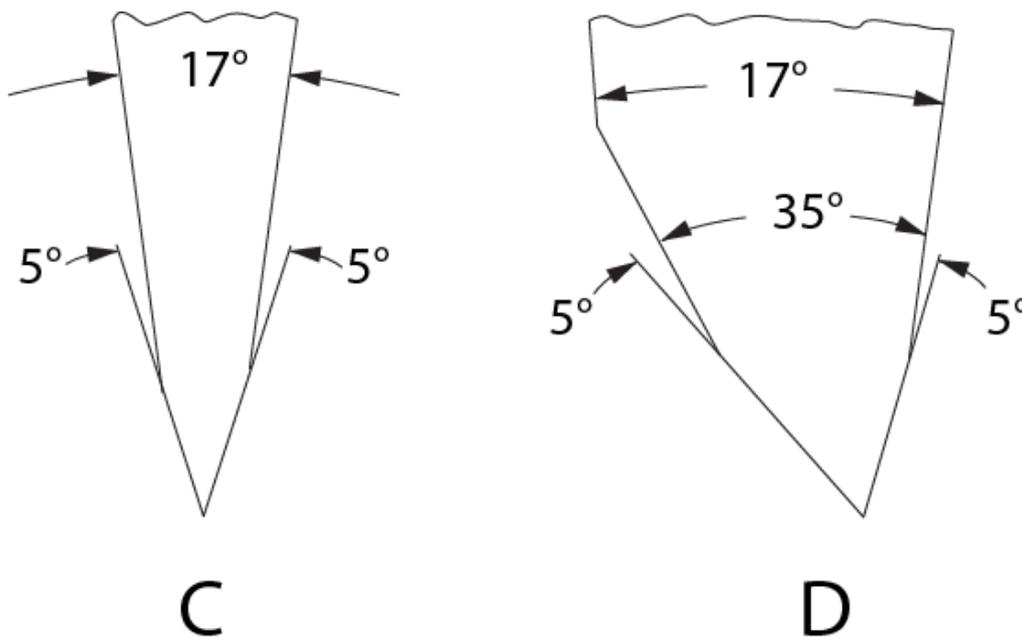
Central Clamping Plate

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:

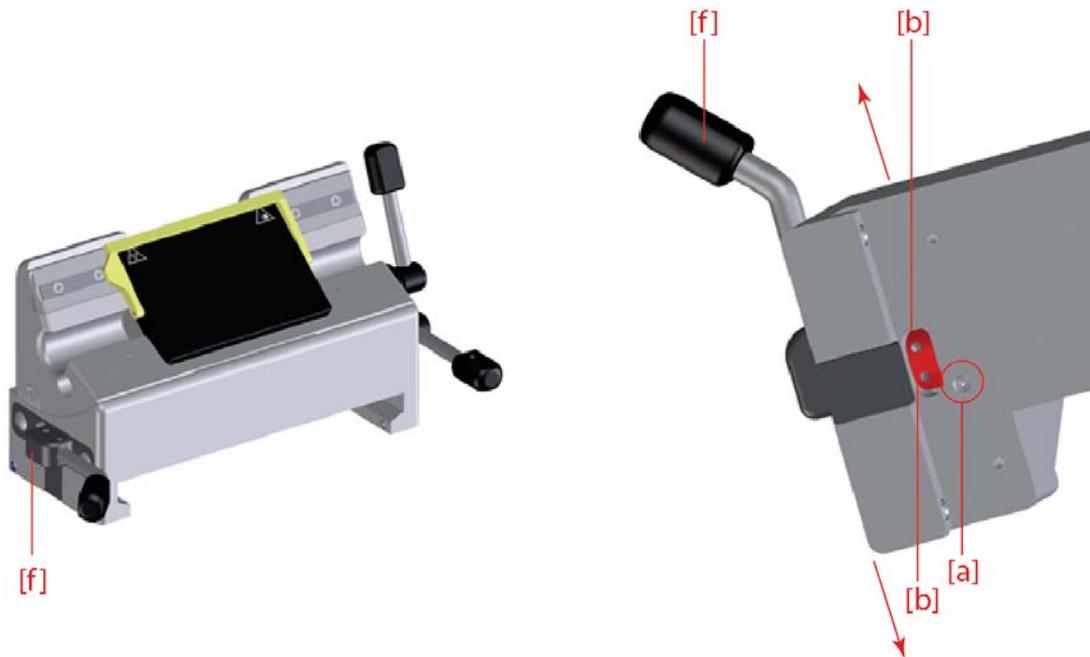
- Clamping plate c for c-knives
- Clamping plate d for d-knives

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 cannot be clamped anymore.



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

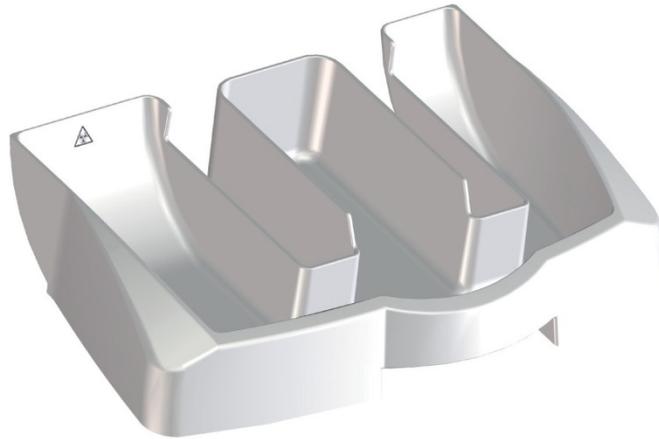
- Loosen the locking screw [a] on the lower side of the knife/blade carrier.
- Insert a pin into one of the holes of the adjusting screw [b] and turn the screw in the above shown directions.
- When the clamping is to be strengthened, turn the adjusting screw [b] to the right side.
- When the clamping 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.

For optimum strength of the knife/blade holder, clamping should begin when the lever grip [f] is approximately parallel to the front end of the knife/blade holder.

If necessary, repeat the above-mentioned process.

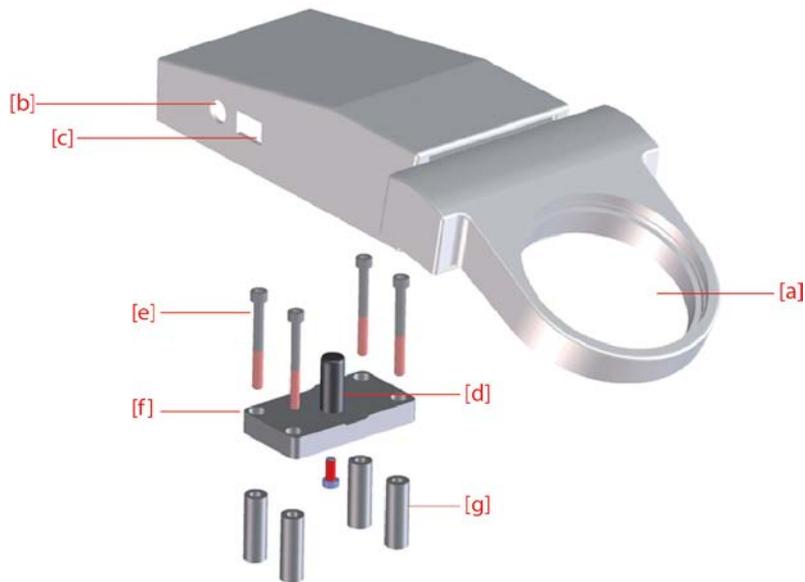
Section Waste Tray with Integrated Arm Rest

The section waste tray fully surrounds the knife/blade holder and has an integrated arm rest, permitting fatigue-free use of the microtome. It is easy to clean and can be removed at any time by being pulled towards the user.



The large field magnifier has a 2,5 x magnification

Large Field Magnifier



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.



The large field magnifier cannot be used in conjunction with the Cool-Cut

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 micro- tome!

Please be sure that the sleeves do not fall into the interior of the micro- tome!

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.

Chapter 4 – Working with the Microtome



Due to moving parts on the knife/blade holder and the extrem sharp- ness 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/BladeEdge

ONLY USE A SHARP KNIFE

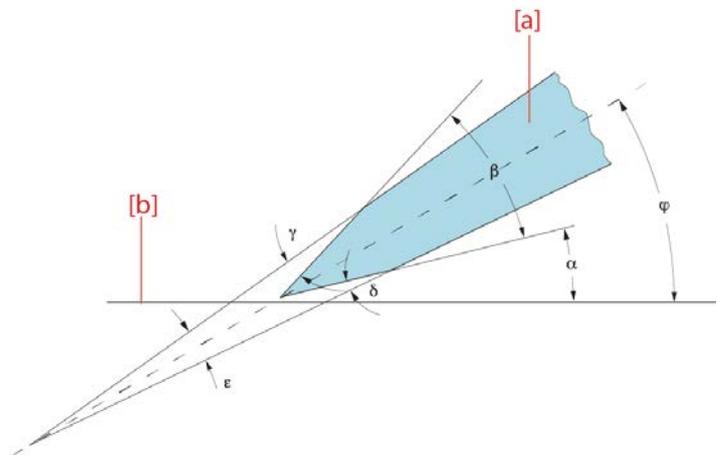
If the cutting edge is blunt, move the knife/blade horizontally either to the right or left side to continue working with the sharp area of the cutting edge, or have the knife re-sharpened or replace the used blade by a new one.

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

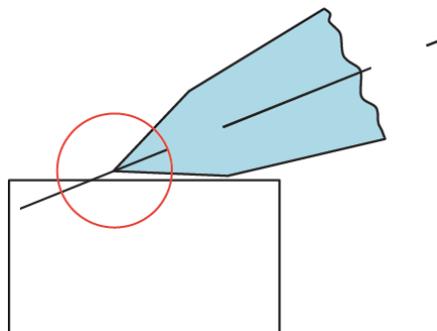
Angle of the knife [a] in relation to the block surface [b]:

Setting the Cutting angle

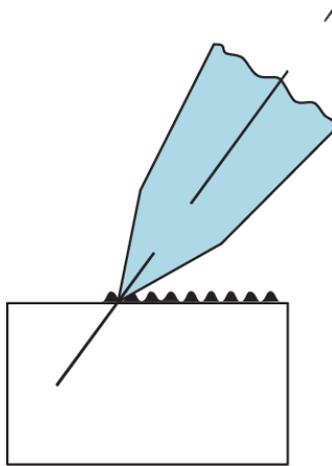
1. Clearance angle α
2. Wedge angle β
3. Upper sharpening angle γ
4. Lower sharpening angle δ
5. Blade angle ε
6. Angle of inclination φ



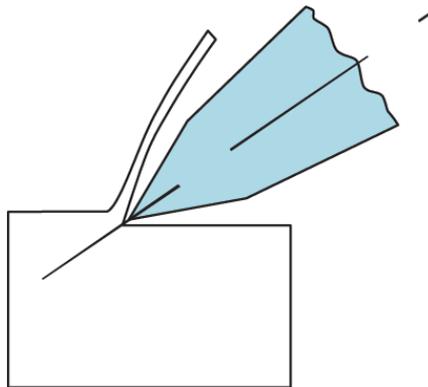
The knife/blade must never be placed on an angle that is too flat since the knife/blade does not cut into the block at all this way. Only the rear side slides over the sectioning surface.



An angle, which is too steep, is also unfavorable 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.



Between these two limit cases, the correct knife angle must be determined. A clearance angle between facet angle and block surface of approx. 5° is normal.



Different microtome producer 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 Thermo Scientific 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 bring 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 unfavorable 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 |
| | unfavorable clearance angle | try clearance angle adjustments until an optimal angle can be found |
| | cutting speed too high | turn hand wheel slower |
| “chatter“ on sections | cutting speed too high | turn hand wheel slower |
| | unfavorable 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 course 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 |
| tight hand wheel during the entire handwheel | dirty link block | contact a service technician |
| hand wheel will not turn | the mechanical hand wheel brake is on | Release the hand wheel brake by lowering the lever |
| instrument cannot be turned on | power cord not correctly connected | check power cord |
| | defective main fuse | check/replace the fuses in the fuse box |
| “?” 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.

Chapter 5 – 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!
- 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 insure proper functioning of the microtome, it is recommended that a routine maintenance be performed by a trained service technician once a year.

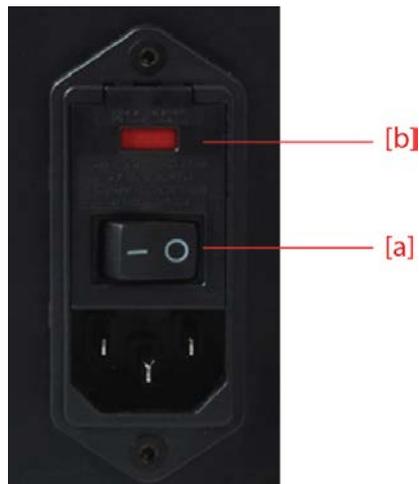
Service Contract

Thermo Fisher Scientific offers a service contract which guarantees that your instrument is always in perfect condition. For more information, please contact the nearest Thermo Fisher Scientific 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 T1,6AH, slow-blow.

Chapter 6 – 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 Thermo Fisher Scientific. 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 (see page 16), must be observed during the entire transportation.



Please also note the precautionary measures described in our safety pre- cautions concerning biological hazards!

Measure 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.

For Transporting Outside Closed Buildings, please Observe the Following Measures

- Turn off the mains 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 Thermo Fisher Scientific International or your local, authorised Thermo Fisher Scientific 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 are sent to Thermo Fisher Scientific 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 to contact 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!

Index

A

| | |
|--|----|
| Accessories | 59 |
| Adapter, Non-Orienting | 33 |
| Adapter, Orienting, Specimen Orientation | 33 |
| Adapters for Specimen Clamping | 33 |
| Additional Equipment | 12 |
| Annual Routine Maintenance | 55 |

C

| | |
|---|----|
| Changing and/or Fastening Specimen Clamps | 34 |
| Chemical Safety | 8 |
| Cleaning and Care | 54 |
| Company Information | 3 |
| Conditions for Transportation | 57 |
| Conditions of Knife/BladeEdge | 50 |
| Cutting Movement and Retraction | 26 |
| Cutting Process Indication | 22 |

D

| | |
|---|----|
| Description of Rotary Microtome HM 340E | 10 |
| Display and Key Function | 21 |
| Disposable Blade Carrier E | 43 |
| Disposable Blade Carrier ER | 41 |
| Disposal of the Instrument after Final Shutdown | 59 |

E

| | |
|---------------------|---|
| EMC Statement | 9 |
| Environment | 8 |

F

| | |
|------------------------|----|
| Factory Defaults | 31 |
| Frontal View | 17 |

G

| | |
|----------------------|---|
| General Safety | 7 |
|----------------------|---|

H

| | |
|---------------------------|----|
| Hand Wheel Brake | 21 |
| How to Avoid Errors | 52 |

I

| | |
|---|----|
| Initial Start-up | 19 |
| Insert for Round Specimens, V-Insert and V-Distance Peice38 | |

| | |
|---|----|
| Installing the Large Field Magnifier on the Microtone | 49 |
| Intended use | 10 |
| Introduction | 10 |

K

| | |
|--------------------------------|----|
| Knife and Balde Carriers | 41 |
| Knife Carrier C | 45 |

L

| | |
|-------------------------------|----|
| Large Field Magnifier | 48 |
| Lateral View Left Side | 18 |
| Lateral View Right Side | 18 |

M

| | |
|---|----|
| Maintenance | 55 |
| Maintenance and Care | 54 |
| Measure for taking out of Operation | 58 |
| Memory Function | 31 |

O

| | |
|------------------------------|----|
| Operating Instructions | 16 |
| Operating Panel | 20 |

P

| | |
|--|----|
| Possible Sources of Errors – Cause and Removal | 53 |
|--|----|

R

| | |
|--|----|
| Rating of Fuses | 56 |
| Readjusting Knife or Blade Carriers | 47 |
| Re-Adjusting Specimen Clamps | 35 |
| Rear View | 17 |
| Replacement Work | 56 |
| Replacing the Fuses | 56 |
| Returning the Instrument for Repair or Routine Maintenance | 57 |
| Rocking Mode Function | 32 |

S

| | |
|--|----|
| Safety Information | 7 |
| Scope of Delivery Standard Equipment | 11 |
| Section Waste Tray with Integrated Arm Rest | 48 |
| Sectioning Instructions | 50 |
| Service Contract | 55 |
| Setting Section Thickness and Trimming Thickness | 24 |
| Setting the Cutting angle | 50 |
| Setting up the Microtome | 16 |

Thermo Scientific Rotary Microtome HM 340E

| | |
|------------------------------|----|
| Specimen Clamping | 36 |
| Specimen Course Feed | 27 |
| Standard Specimen Clamp..... | 37 |
| Symbols | 4 |

T

| | |
|----------------------------|----|
| Technical Data Sheet | 14 |
|----------------------------|----|

U

| | |
|---|----|
| Universal Cassette Clamp..... | 36 |
| Universal Cassette Clamp, Adjustable..... | 36 |

W

| | |
|----------------------------------|----|
| Warranty Statement | 8 |
| Working with the Microtome | 50 |