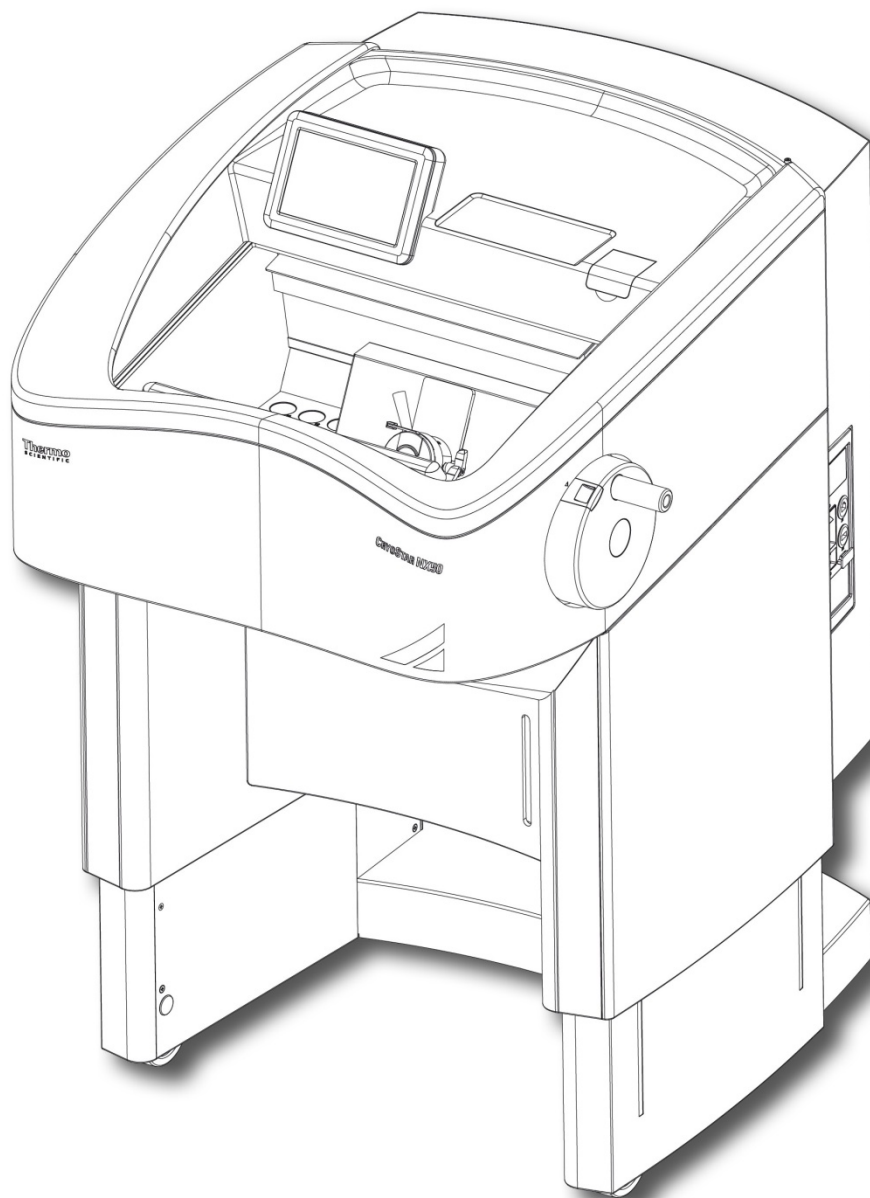


Thermo Scientific CryoStar NX50

Operator Guide

388149 Issue 2.0



Thermo
SCIENTIFIC

Company Information

Company Information

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Contact Addresses:

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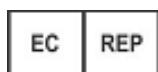
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This instrument conforms to the essential requirements of:

IVD Directive 98/79/EC

Important Note Regarding Instrument Variants

This document is designed for use with the Thermo Scientific CryoStar NX50 cryostat also referred to as the CryoStar NX50 throughout this Guide.

A range of optional features are available on this instrument and the instructions contained in this manual are not specific to any one variant. Thus some features described may not be available on your instrument.

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.



This symbol indicates that a surface is hot. If this symbol appears on the instrument, always refer to the operator guide.



Cold surface, if necessary, use gloves



This symbol is shown in the manual and on the instrument to indicate that hand injuries are possible due to moving parts. Take suitable precautions.



Cutting hazard, sharp edges, watch your fingers.



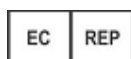
This symbol is used on the instrument, or in a document, to indicate that irritants or potentially harmful chemicals are present. Refer to the Material Safety Data Sheets for the products, and always use Good Laboratory Practice.



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.



Authorised European Representative.

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1 - Safety Information

Thermo Fisher 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 Fisher Scientific. 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.



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 is required to comply 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 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 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 Fisher Scientific.
- 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.

2 - Introduction

Intended Use



The Thermo Scientific CryoStar NX50 is a high-performance in vitro diagnostic cryostat designed to prepare tissue sections of frozen samples in medical, pharmaceutical and research laboratories. Only qualified and trained laboratory personnel may operate the CryoStar NX50.

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 improper operation.

Instrument Features

The CryoStar NX50 is a precision-engineered, ergonomically-designed, high-performance cryostat in modular design with a stainless steel cooling chamber. Some of its features are:

- Integrated ergonomic casing, with optional ergonomic height adjustment.
- Specimen cooling.
- Active knife cooling – not adjustable.
- Colour touch-screen user interface.
- Optional Cold D function consisting of an internal fumigation unit that applies Sanosil® (disinfection medium) into the user-accessible, operating areas of the cryo chamber.
- Optional Vacutome function.

Technical Specifications

Mechanical Specifications

Depth	100 cm (39.4 in)
Width	75.5 cm (29.7 in)
Height	93 cm (36.6 in) (Fixed version)
Height (adjustable version)	Adjustable range 82 - 112 cm (32.3 - 44.0 in)
Maximum Weight	200 kg (440 lb)

Electrical Specifications

Power Requirements	Dedicated line recommended.
	100V, 50/60Hz, 10A, +/-10%, 110-120V, 60Hz, 10A, +/-10%
	220-240V, 50/60Hz, 5A, +/-10%
BTU	1400 BTU/hour

Environmental Specifications

For Indoor Use Only	
Temperature (Operating Limits)	+5°C to +35°C (+41°F to +95°F)
Temperature (Recommended Operation)	+15°C to +30°C (+59°F to +86°F) Note Performance may deteriorate when operated outside of this range.
Temperature (Transport and Storage)	-20°C to +40°C (-4°F to 122°F) +70°C (158°F) for short exposure
Relative Humidity	Max. 60% RH up to 31°C
Altitude	Up to 2000 m (6,500 ft)
Pollution Degree	2
Over Voltage Category	II
Floor Loading Requirements	300 kg/m ² (660 lb/ft ²)
Safety Class	I
Sound Emission	<43 dB (A) - measured at 1m from instrument
Refrigerant	R404a, filling amount 400g

Cooling Specifications

Specimen Temperature Control	-45°C to +10°C (-49°F to +50°F) at +20°C room Temp. (decrease 0,7°C/1°C room temp. increase)
Blade holder Temperature Not displayed	-20°C to -25°C (-4°F to -13°F)
Cryobar Cooling	-57°C ±3-K (-70°F ±3K)
Defrosting Options	Programmed / Immediate

Microtome and Sectioning Specifications

Section Thickness Range	0.5 – 500 µm
Fine Section Thickness Range	0.5 - 100 µm
Fine Section Thickness Resolution	0.5 – 5 µm in 0.5 µm steps
	5 µm – 10 µm in 1 µm steps
	10 µm – 20 µm in 2 µm steps
	20 µm – 50 µm in 5 µm steps
	50 µm – 100 µm in 10 µm steps
Trimming Thickness Range	5 - 500 µm
Trimming Thickness Resolution	5 – 30 µm in 5 µm steps
	30 µm – 100 µm in 10 µm steps
	100 µm – 200 µm in 20 µm steps
	200 µm – 500 µm in 50 µm steps
Blade Retraction (Return Travel)	20 µm
Vertical Specimen Stroke	64 mm
Horizontal blade Movement	48 mm
Blade Approach	Manual, maximum speed: 3mm/s
Chuck Size	30, 40 mm (additional special sizes are available)
Specimen Orientation	x - and y - axes universal 8° with zero positioning; z - axis up to 360°
Coarse Feed	Motorized
Cutting Drive	Manual via hand wheel
Clearance Angle Adjustment	Disposable blade carrier 8- 16°
Vacutome Filter	approximately 500 ml

Cold D Specification

Reservoir Volume	1000 ml
Recommended Medium	Sanosil® S010 (5% H ₂ O ₂)

Default Settings

Counter Mode	0
Retraction	ON
Language	English
Fine	0.5 µm
Trim	5 µm
Chamber Light	100%
Screen Brightness	100%
Stepper Motor Initialization	Yes
Specimen Temperature	-20°C
Cryobar	OFF
Vacutome (optinal)	OFF
Disinfection (optional)	OFF
Disinfection, Cycle (Automatic)	ON (03:00 Night)
Defrost Cycle (Automatic)	ON (00:00 Night)
Section Counter	0
Section Sum	0

3 - Instrument Setup

Unpacking and Repacking

Safety Precautions



The CryoStar NX50 is heavy and requires a minimum of two people to safely unpack and manoeuvre it. Use safe lifting practices.



The CryoStar NX50 has a high centre of gravity and care should be taken when moving.



Do not tip the CryoStar NX50 more than 30° from the upright position.



After moving the CryoStar NX50, wait at least 8 hours before switching on to allow the refrigerant to settle - failure to do so may cause damage to the unit.

Note

The packing materials should be carefully stored for use in any future instrument shipment.

Unpacking Procedure

General Information:

- Inspect the packaging and the NX50 CryoStar on unpacking. If the packaging or instrument is damaged please contact your local Thermo Fisher Scientific representative.
- The CryoStar NX50 is delivered on a pallet. The sides of the instrument are encased in cardboard and cushioned with foam spacers inside the container. A wooden cover protects the top of the instrument.



On unpacking be aware of the weight (200 Kg/440 lbs) of the instrument. At least two people are required to safely move the instrument.

Handling:

- Place the crate on a flat surface while ensuring that there are no objects underneath the pallet.
- Remove the wooden cover from the crate but retain it for later use as a ramp.
- Remove the top foam spacer from the crate.
- Remove the exterior cardboard container by opening the clips.
- Remove the remaining foam spacers and the accessories carton. Place all the accessories carefully to one side.
- Remove the plastic cover from the instrument.
- Two wing-nuts are now visible at the front edges of the wooden pallet.
- Using the wing-nuts fix the wooden top of the crate to the pallet to serve as an unloading ramp for the instrument.
- The instrument can be moved on its castors. However, ensure that it does not roll off the pallet inadvertently.
- Screw in the two bails (part of the standard accessories) into the respective holes in the foot of the CryoStar NX50.
- Mount the transport belts (part of the standard accessories) with the bails.



To move the instrument from the pallet stand BEHIND (NOT in front) of the instrument.

- Carefully roll the instrument off the pallet and on to the floor.
- Move the instrument to the desired location while leaving space on the left- and right-hand.
- Keep all packing and transportation materials together in case of future need.

Chapter 3 – Instrument Setup

- In the future, if the instrument is transported by forklift truck, train, ship or aircraft it must be packed in the original shipping container with all transportation locks in place.

Repacking the Instrument

- To repack the instrument, follow the above instructions in reverse order.

Location & Setup

When deciding where to locate the CryoStar NX50, the following items must be taken into consideration:

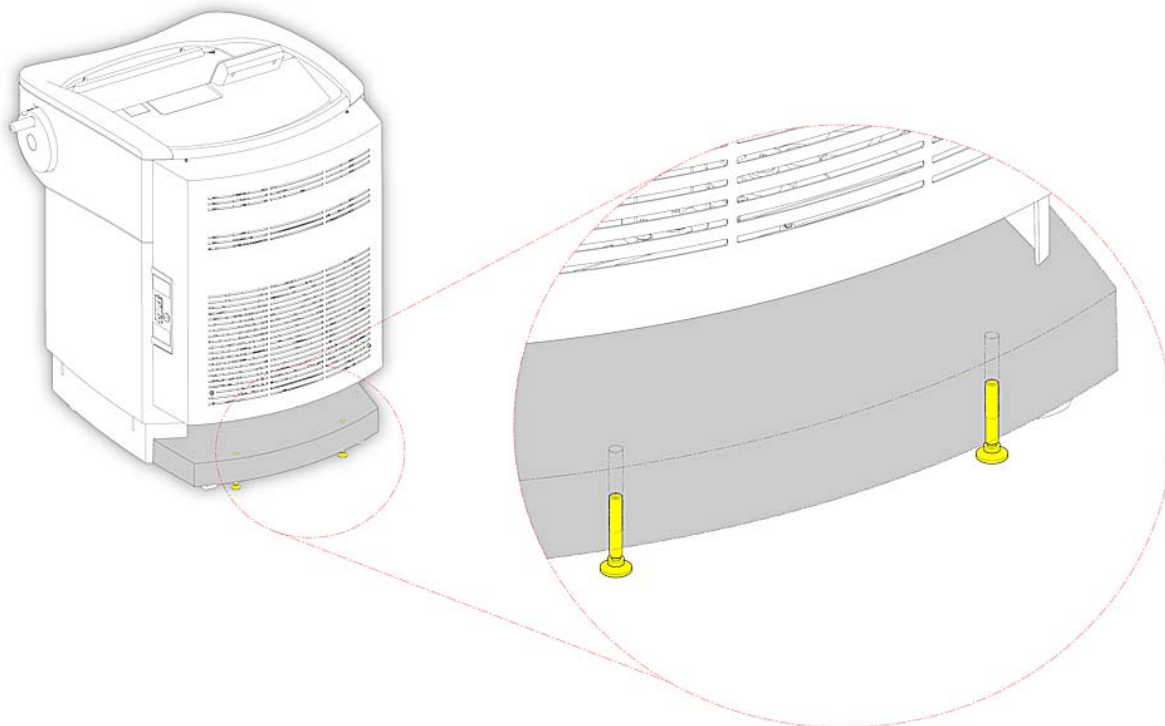
- Approximately 10 cm (4 in) must be allowed around the cooling system to allow free air flow.
- Approximately 10 cm (4 in) must be allowed between the wall and the rear panel.
- The vents on the sides of the rear panel must be unobstructed at all times.
- The mains power socket must be accessible at all times.
- The location must be free from draughts, open doors or air conditioning systems.
- The location must not expose the cryo chamber to direct sunlight.
- Enough room is available for height adjustment.

Note

These measures are intended to reduce the build-up of frost and maintain consistent cooling temperatures resulting in more favourable working conditions. Locations which have high humidity and / or high ambient temperatures outside of the range recommended in the Technical Specifications (Chapter 2) can reduce the performance of the instrument.

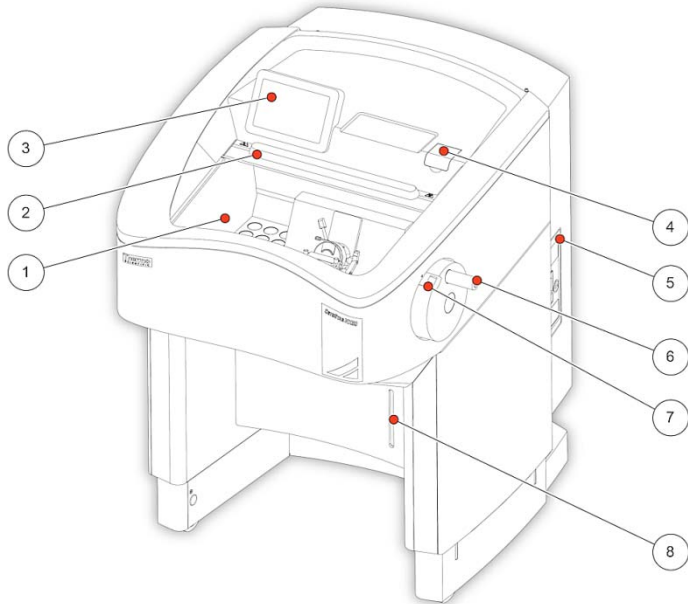


Once the CryoStar NX50 has been located in its final position, ensure the fixing bolts as shown in diagram below are tightened to prevent the unit from moving during operation.



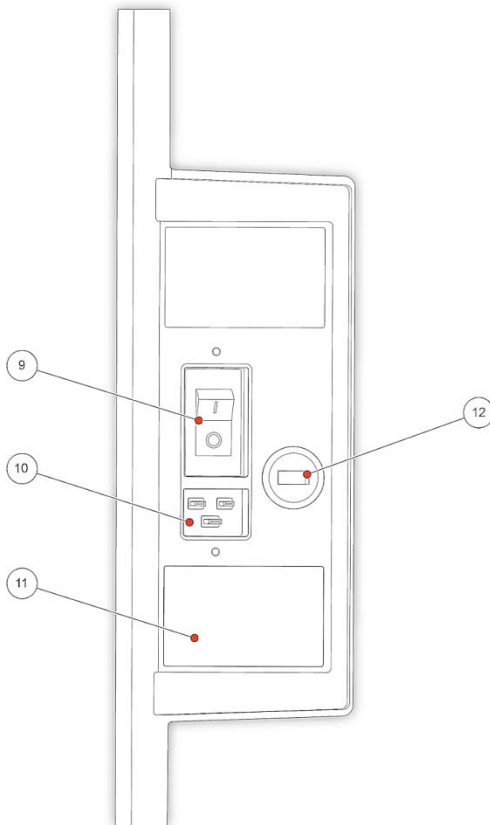
Identification of Parts

Overview



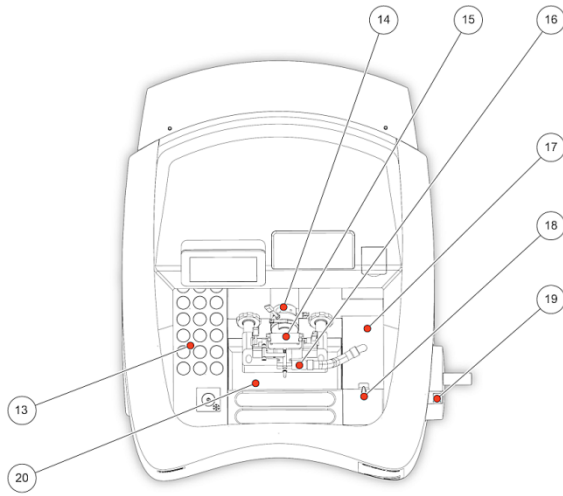
- 1 Cryo chamber
- 2 Cryo chamber Window
- 3 Touch Screen
- 4 Cold D Reservoir Cover
- 5 Connections Panel
- 6 Hand wheel
- 7 Hand wheel Mechanical Brake
- 8 Water Drain Reservoir Cover

Connections Panel



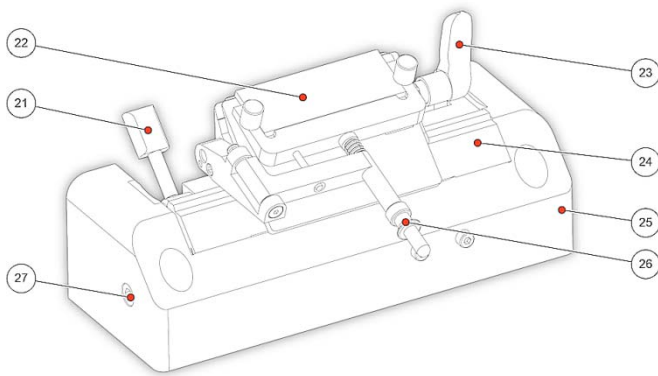
- 9 Power Switch
- 10 Power Socket
- 11 Rating and Serial Number Label
- 12 X2 – USB port (to be used with memory stick provided)

Cryochamber



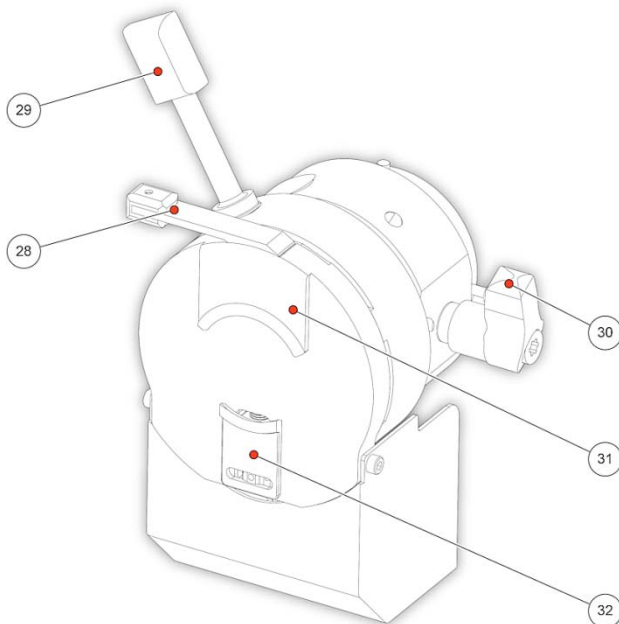
- 13 Cryobar and Cooled Storage Area
- 14 Specimen Head
- 15 Blade Holder with Anti-Roll Plate
- 16 Vacutome (optional)
- 17 Vacutome Filter Cover
- 18 Vacutome Filter Cover Release Knob
- 19 Handwheel Mechanical Brake Button
- 20 Section Waste Tray

Blade Holder



- 21 Lateral Adjustment Lever
- 22 Anti-Roll Plate
- 23 Blade Clamping Lever
- 24 Blade Holder Base
- 25 Blade Holder Base
- 26 Anti-Roll Plate Adjustment
- 27 Clearance Angle Adjusting Screw

Specimen Head NX50



- 28 Specimen Chuck Release Lever
- 29 Orientation Handle
- 30 Specimen Head Clamping Lever
- 31 Upper Specimen Chuck Jaw (Static)
- 32 Lower Specimen Chuck Jaw (Moving)

Set Up

Before sectioning, the blade holder and the cryo chamber should be at a stable temperature close to the desired cutting temperature. These temperatures should be selected to suit the consistency of the specimen.

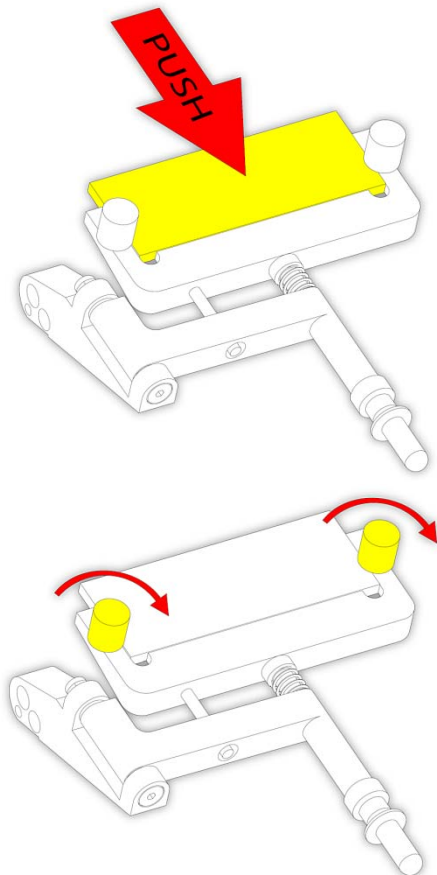
All tools which are in contact with the sections or which are used to manipulate the specimen must also be cooled to prevent the tissue from sticking to them. It is recommended all accessories are stored on the shelves or in the brush tray in the cryo chamber. The exceptions to this rule are the specimen chucks which should be kept at room temperature.

The Cryo chamber Window should be closed during periods of inactivity and while preparing specimens to avoid warm air entering the chamber. This will result in more favourable working conditions and limits icing.

If applicable, ensure that the Vacutome filter is properly inserted in the filter unit and is suitably maintained - see Cleaning and Maintenance.

Fitting or Exchanging the Anti Roll Plate

- The Anti Roll Plate is held in place by two black screws.



- Ensure that the gap clearance side of the Anti Roll Plate is facing towards the clamping plate.

- Position the Anti Roll Plate in the holder, gently pushing the glass to the bottom of the holder. Loosen the black screws if needed.

- Tighten the black screws.

Note

There are two usable edges on the Anti Roll Plate.

Fitting or Exchanging Low Profile Blades

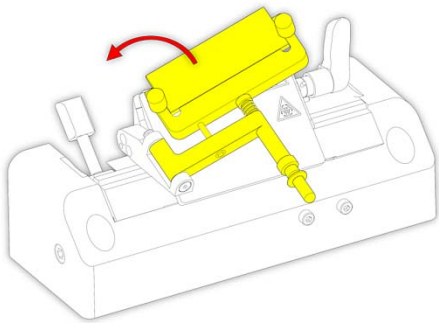


Microtome blades are extremely sharp and can cause severe injuries – always use good laboratory practice when handling them.

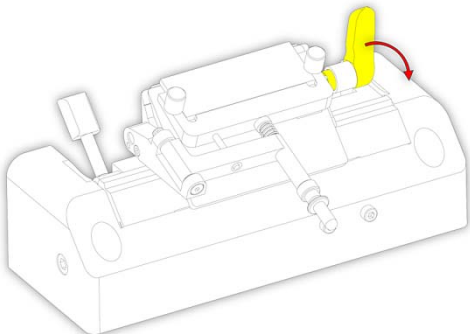
Always cover the blade with the blade/knife guard and activate then brake prior to making any adjustments to the blade/knife and specimen or changing the specimen.

The blade holder should be fitted with low profile blades (80mm x 8mm; 35° facet angle) as standard.

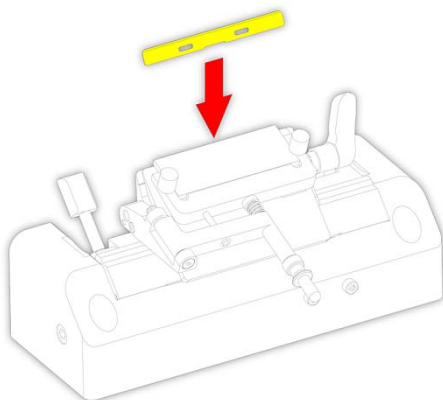
To fit or exchange low profile blades, only:



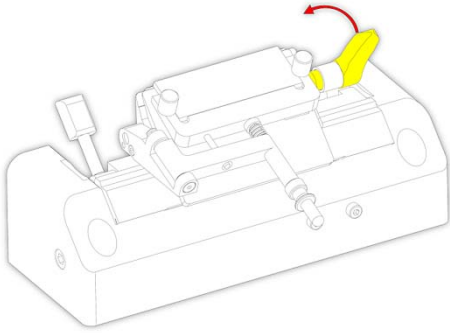
- Use the front handle to move the anti-roll plate to the side.



- Pull the blade clamping lever towards the front of the instrument to release the clamping plate.



- Carefully slide a low profile blade into the middle of the slot, ensuring that the blade is equidistant from the ends of the slot.

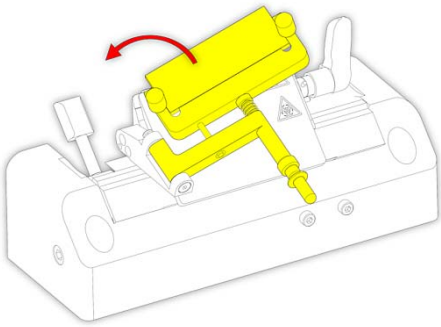


- Push the blade clamping lever towards the back of the instrument to clamp the blade in position.

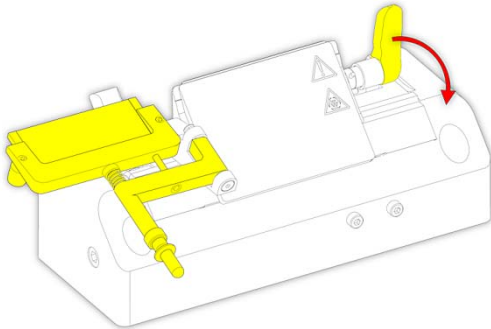
Removing Used Blades with the Magnetic Blade Tool

The magnetic blade tool allows the user to remove used blades from the blade holder in a safe way.

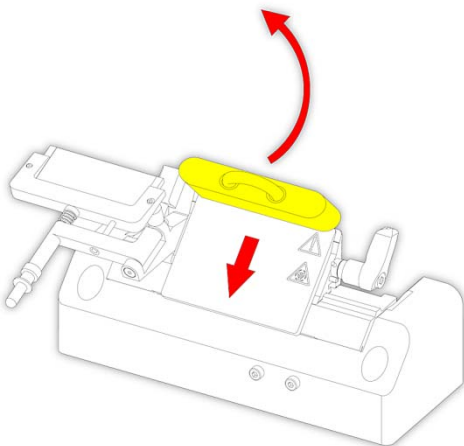
Remove the used blade with the magnetic blade tool:



- Use the front handle to move the anti-roll plate to the side.



- Pull the blade clamping lever towards the front of the instrument to release the clamping plate.



- Move the magnetic blade tool over the blade.
- Carefully lift the blade out of the blade holder and dispose of it in accordance with laboratory regulations.

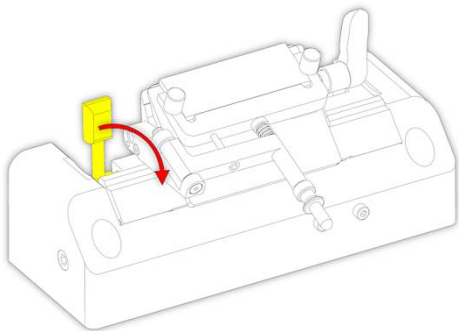
Blade Positioning and Orientation



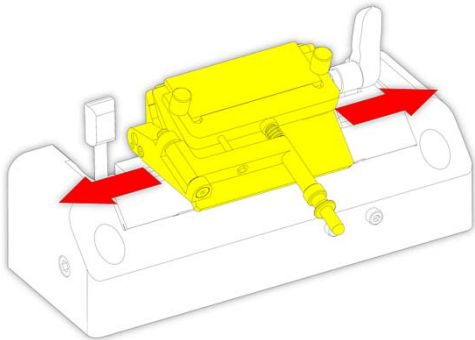
Always cover the blade with the knife/blade guard and activate the brake prior to making any adjustments to the assembly.

If the cutting area of the blade is no longer usable, the upper part of the blade holder can be moved without removing the blade.

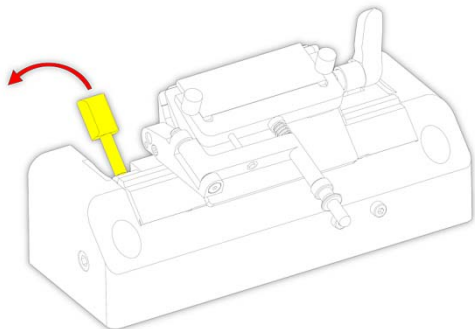
To move the upper part of the blade holder:



- Loosen the lateral adjustment lever.



- The upper part of the blade holder should now be free to move left and right.
- Move it either to the left or to the right until the desired area of the blade is directly below the specimen head.



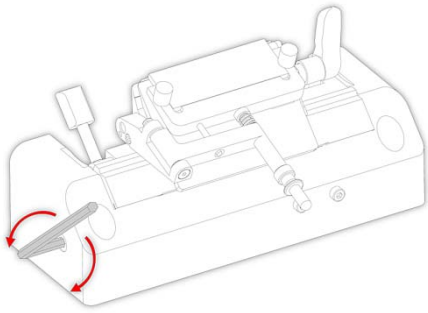
- Move the lateral adjustment lever forward to secure the upper part of the blade holder in the new position.

Adjusting the Cutting Angle

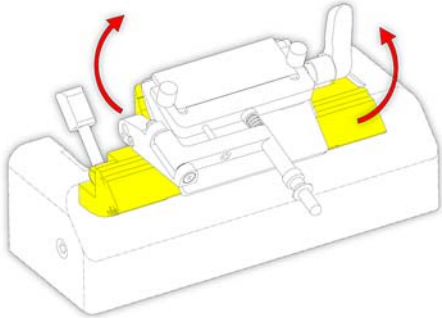
The cutting angle can be adjusted. The recommended cutting angle is approximately 10° for Thermo Scientific low profile blades.

Note

The factory preset cutting angle is 10°, this value is the recommended cutting angle for Thermo Scientific low profile blades. The minimum angle is 8°, the maximum angle is 16°.



- Loosen the clearance angle adjustment screw on the lower left side of the blade holder using the Allen key 5mm provided



- Gently push both sides of the blade holder base to select the desired angle.



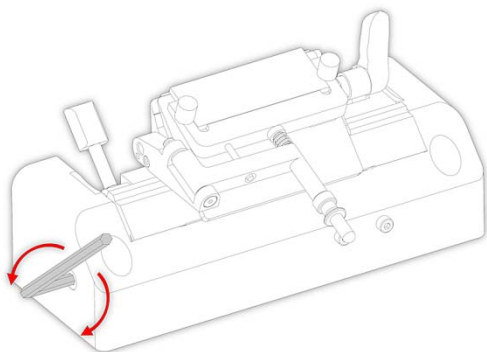
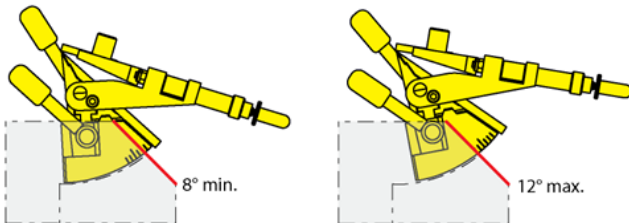
The surface of the blade holder base may be cold. Use gloves if necessary.

Note

The clearance angle can be read on the scale on the left side on the upper part of the blade holder.

Note

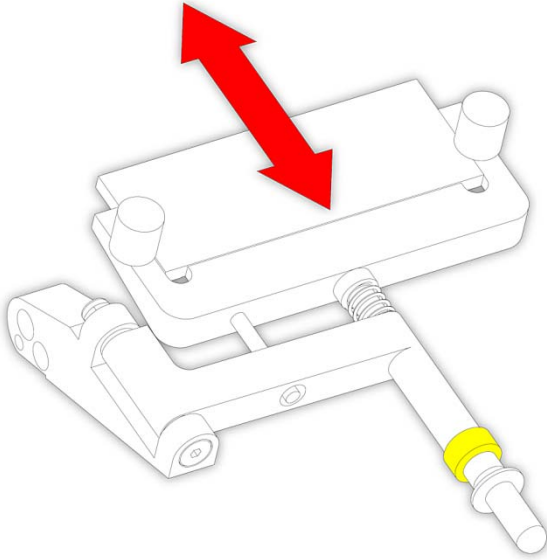
10° is indicated by the longer increment in the middle of the scale.



- Re-tighten the clearance angle adjusting screw to fix the selected clearance angle.

Adjusting the Anti-Roll Plate

The fine adjustment of the anti-roll plate is carried out using the knurled screw.



- To raise the height of the Anti Roll Plate, turn the screw anti clockwise.
- To lower the height of the Anti Roll Plate, turn the screw clockwise.

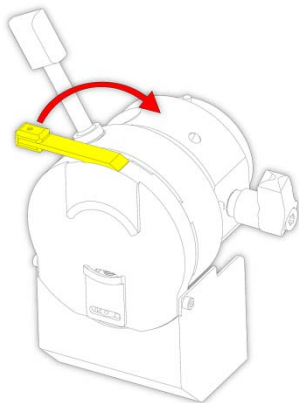
Note

Always adjust the height of the Anti Roll Plate in small increments.

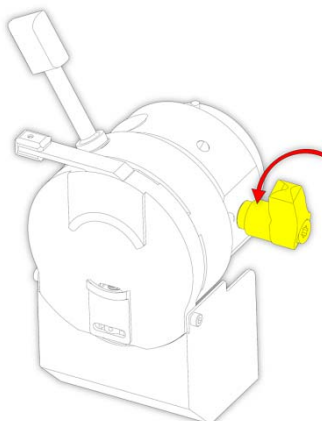
Specimen Setup

Before sectioning can begin, the specimen must be correctly clamped and oriented in the specimen head.

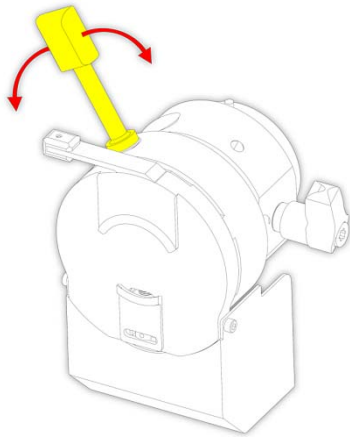
To clamp and orient the specimen:



- Loosen the specimen chuck release lever and insert the specimen chuck into the jaws of the specimen head.
- Push down on the specimen chuck release lever again to allow the jaws to grip the chuck.



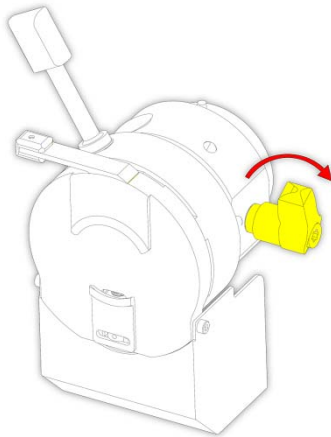
- Loosen the specimen head clamping lever to allow adjustment of the specimen parallel to the cutting edge.



- Use the orientation handle to orient the specimen on the x- and y-axes.

Note

The orientation handle will click into place when the centre position has been reached.



- Tighten the specimen head clamping lever again.

For further specimen orientation, the specimen chuck can also be rotated by 360° as described below:

- Loosen the specimen head clamping lever slightly.
- Rotate the chuck as required.
- Move the specimen head clamping lever back to its original position.
- After the specimen is adjusted, set the cutting window limits if an optional vacutome is installed – see “Setting the Cutting Window”.
- Use the motorized coarse feed to position the blade close to the specimen.
- Use the Forward knife movement button to move the blade holder towards the specimen.



To avoid severe damage ensure that the blade does not crash into the specimen.

Filling with Disinfectant to Perform the Cold D Function (optional)

The Cold D function is an integrated system for the delivery of disinfectant (Sanosil®) into the cold chamber.

This method of disinfection provides an even distribution of the disinfectant throughout the CryoStar NX50 chamber.

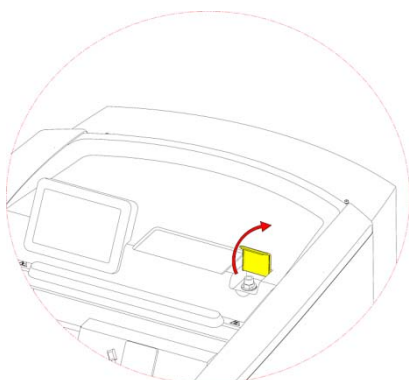
The Cold D cycle takes 50 minutes to complete. This cycle can be aborted at any time although precautions should be taken as the chamber has not been completely disinfected.



To avoid frosting of the chamber, Cold D should not be used more than 2 times per day plus one cycle overnight.

Filling the Cryostat with Disinfectant Solution (Sanosil®)

To load the cryostat with disinfectant:



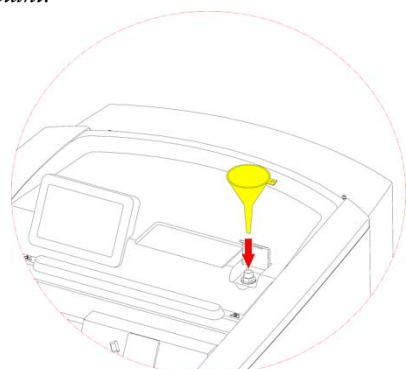
- Open the Cold D reservoir cover to access the filling inlet of the disinfectant tank.



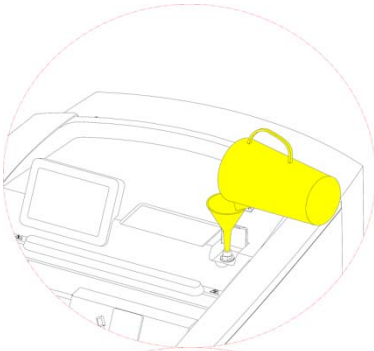
Before filling the tank, check the shelf life and the hazardous substance warnings on the disinfectant.

Note

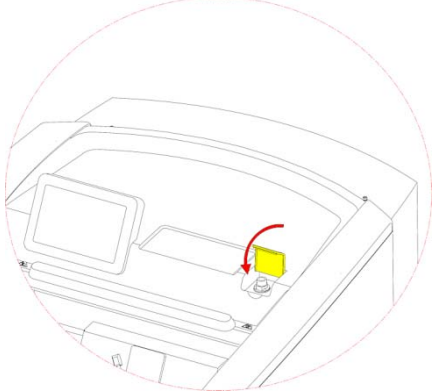
Always follow the manufacturer's instructions for handling, storage and disposal of the disinfectant as well as the information provided by the manufacturer concerning any precautionary measures to be taken in the event of an accidental release or spillage of the disinfectant.



- Place the funnel into the inlet.



- Empty the contents of one litre Sanosil into the tank.



- Close the reservoir cover.

Note

The maximum capacity of the disinfectant tank is 1 litre, which is sufficient for approximately 13 Cold D cycles. When first filled approximately 10 Cold D cycles can be performed before refilling is indicated. This is because the system must be primed when first used.

If the fluid level in the disinfectant tank is too low, an error message will be shown on the touch screen display.



Dispose of the empty disinfectant bottle in accordance with laboratory regulations.

4 - Operation

Switching On



Before switching on the instrument for the first time, ensure that the power requirements indicated on the rating label correspond to the power supply voltage being used.



No other instruments should be connected to the circuit used for the CryoStar NX 50, as the compressor needs high surge currents when started.

- Insert the supplied power cord into the power socket and then connect the power cord to the mains supply.
- Install the blade holder if necessary.
- Close the heated window.
- Turn on the power switch.

Note

The default setting of the specimen head temperature is -20°C.

Note

The cooling phase for the chamber will take approximately 4 to 5 hours to reach the operating temperature.

Switching Off

Switch off the instrument by using the main switch at the back of the instrument on the right hand side. The window must be opened when you switch the CryoStar NX50 off in order to evaporate the water into ambient air.

System Interfacing

Using the Touchscreen

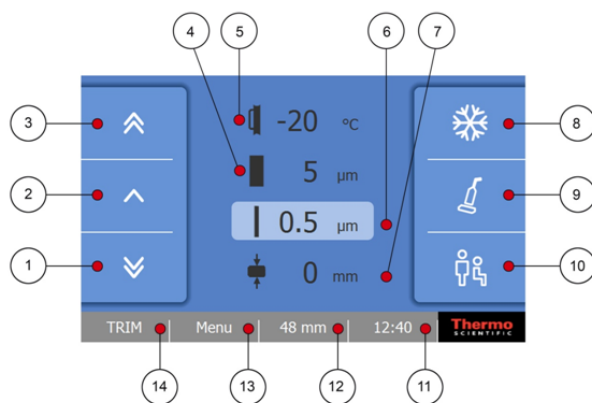
The CryoStar NX50 has an embedded touchscreen user interface which is used to set all preferences.



Avoid using sharp or pointed objects to press buttons on the touchscreen. It is recommended a clean finger is used to operate the touch screen. However, if you require a stylus, the eraser tipped end of a pencil is suitable.

Main Screen

The Main screen appears after the instrument has been switched on.



- 1 Backward blade/knife holder movement
- 2 Forward blade/knife holder movement
- 3 Fast forward blade/knife holder movement
- 4 Trimming thickness
- 5 Specimen head temperature
- 6 Fine thickness
- 7 Cutting/Vacutome window (optional)
- 8 Cryobar button
- 9 Vacutome function button (optional)
- 10 Height Adjustment button (optional)
- 11 Time/Date
- 12 Multi function button
- 13 Menu button
- 14 Trim advance button

- Press the required key to activate / deactivate the function or to display the options screen for the selected function - See Setting Preferences.

"OK" Button



- Press the "OK" button to save any changes to specific settings

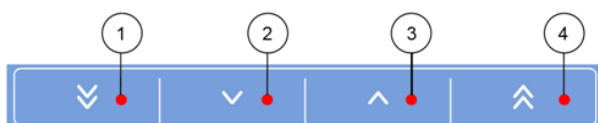
"Back" Button



- Press the "Back" button to return to the previous menu without saving any changes

"Arrow" keys

- The "Arrow" keys are used in several menus to increase or decrease values.
- Use the arrow keys to adjust the value to the required setting.



- 1 Decreases the selected value by multiple steps
- 2 Decreases the selected value by 1 step
- 3 Increases the selected value by 1 step
- 4 Increases the selected value by multiple steps

Note

The number of steps by which the 'multiple step' increase / decrease buttons alter the selected value by will vary depending on the function utilised.

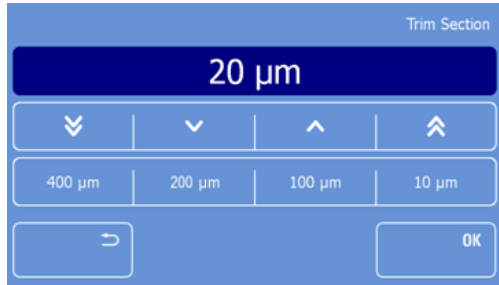
Trimming and Fine Section Thickness

To set the trimming section thickness:



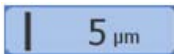
- Press the "**Trimming Thickness**" button on the Main screen.

- The Trim Section screen will be displayed.



- Either select one of the preset values (400μm, 200μm, 100μm or 10μm) or adjust the value using the arrow keys
- For details of the thickness steps see Technical Specifications
- Press "**OK**" to confirm the setting and to return to the Main screen
- Press the "**Back**" button to exit back to the Main screen without saving the changes

To set the fine section thickness:



- Press the "**Fine Section Thickness**" button on the Main screen.

- The Fine Section screen will be displayed.



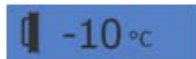
- Either select one of the preset values (100μm, 50μm, 10μm or 5μm) or adjust the value using the arrow keys

- For details of the thickness steps see Technical Specifications
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button to exit back to the Main screen without saving the changes.

Temperature

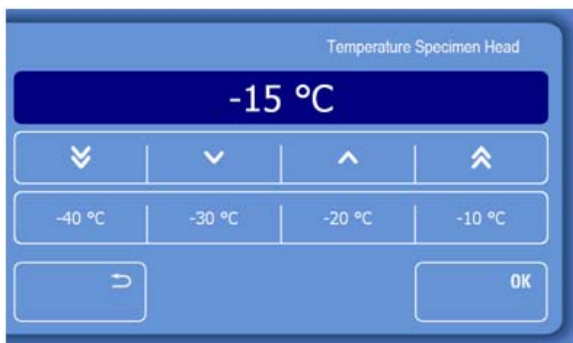
The specimen head is actively cooled and the user can adjust the temperature independently.

Setting the temperature of the specimen head



- Press the "**Specimen Head Temperature**" button on the Main screen.

- The Temperature Specimen Head screen will be displayed.



- Either select one of the preset temperatures (-40°C, -30°C, -20°C or -10°C) or adjust the temperature using the arrow keys.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button to exit back to the Main screen without saving the changes.

Note

The new set temperature is displayed in white on the Main screen until the temperature is reached.

Chamber temperature

- The CryoStar NX 50 provides good sectioning quality with a variable controlled specimen temperature down to -45°C +/-2°C and a uniform chamber temperature of -25°C +/-2°C at ambient temperature of +20°C. The compressor runs continuously to maintain the chamber temperature and the evaporator ensures good air flow through the chamber.
- Both the maximum temperatures for the object head temperature and the chamber temperature will be influenced by ambient temperature by -0.7°C increase for every 1°C ambient temperature increase.
- For example at +25°C ambient the maximum specimen temperature would be -41°C +/- 2°C and the chamber temperature -21°C +/-2°C.

Note

The user sets the desired specimen temperature depending type of specimen.

Cutting Window

The cutting window allows the user to customise this setting for each specimen.

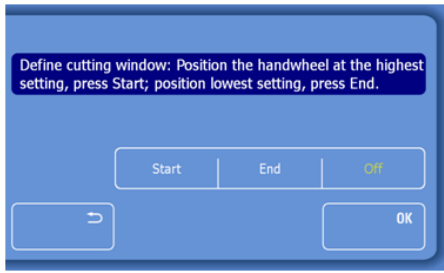
Note

The optional Vacutome function only operates when a cutting window has been set.



- On the Main screen press the "**Cutting Window**" button.

Chapter 4 - Operation



- The Set Cutting Window screen will be displayed.

To set the lower limit of the cutting window

- Turn the hand wheel so that the lower edge of the specimen is positioned slightly above the blade edge.
- Press the "Start" button.
- The lower limit should now be set and the "Start" button is highlighted in yellow.

To set the upper limit of the cutting window

- Continue turning the hand wheel clockwise so that the upper edge of the specimen is positioned slightly towards the end of the specimen (10 - 20%).
- Press the "End" button.
- The "End" button is highlighted in yellow.

Next Steps

- Press "OK" to confirm the setting and to return to the Main screen.
- Press the "Back" button to exit back to the Main screen without saving the changes.

Note

A cutting window should only be set during the downward stroke.

Knife Assembly Positioning

Backward fast (3mm/sec) button



- Press the button for 1 sec to move the blade holder away from specimen head a short distance.
- After about 2 seconds the head moves back automatically.
- Press the button again to stop the movement immediately.

Forward (1mm/sec) button



- Press the button to move the blade/knife holder in direction to the specimen.
- The blade/knife holder will only move while the button is pressed.
- It will stop immediately if not pressed.

Forward fast (3mm/sec) button



- Press the button to move the blade/knife holder quickly in direction to the specimen.
- The blade/knife holder will only move while the button is pressed.
- It will stop immediately when released.

Quick Freezing of the Specimen

The cryobar provides on-demand, quick freezing of specimens.

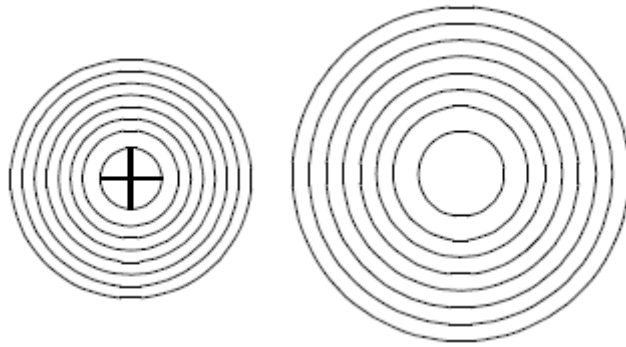
Note

When the cryobar is activated, it will take approximately 2 - 3 minutes for the cryobar to reach the maximum temperature of -57 ± 3 °C at an ambient temperature of 20°C.

The cryobar remains active for approximately 10 minutes indicated by the timeline display below the Cryobar button on the screen.

The specimen is frozen onto the specimen chuck using a freezing compound and the cryobar.

To ensure optimal adhesion of the specimen to the chuck, store the chucks at room temperature prior to use and for best quality freezing some alcohol can be added to the freezing port of the cryobar.



- Press the "Cryobar" button on the Main screen to activate it
- The "Cryobar" button is highlighted in blue when the function is activated and a time line below the symbol will indicate the elapsed time

- To turn off the Cryobar function, press the highlighted "Cryobar" button again

Vacutome and Cleaning Mode (optional)

The Vacutome system provides an active vacuum that aids in chamber cleaning and stretching of sections.

Note

The user sets the desired value depending upon the intended function (stretching or cleaning process), section thickness and the size of the specimen.

Note

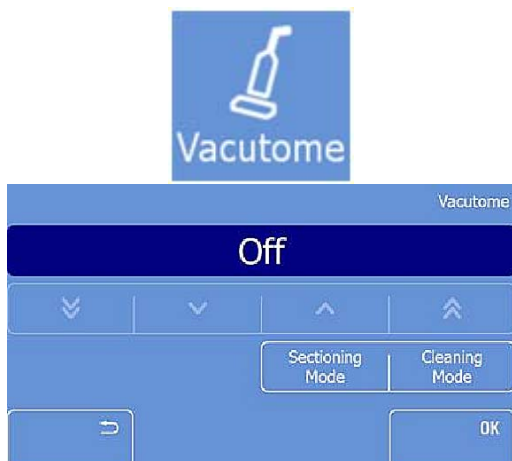
The vacuum applied for stretching sections and/or disposing of section waste is only active within the cutting window. Outside of the cutting window, the selected vacuum is turned off by means of a valve.

Note

After 5 minutes of inactivity the vacuum will automatically switch off. When activity resumes the vacuum will automatically switch on. The vacuum takes approximately 2 seconds to reach full efficiency.

- The Vacutome system is provided with two different-length nozzles. The longer nozzle is optimized for use in specimen trimming and aids in removal of debris from the cyrochamber. The shorter nozzle is optimized for use with the anti-roll plate in appropriately stretching specimens.

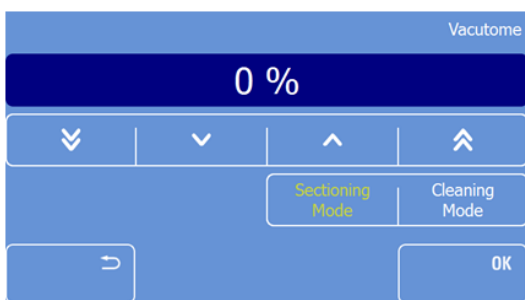
- A longer vacutome hose is supplied for cleaning the cryochamber.



- Press the "**Vacutome**" button on the Main screen
- The Vacutome screen will be displayed

Activate the Vacutome

To activate the Vacutome:



- Press "**Sectioning Mode**" to display the Vacutome settings screen
- Use the arrow keys to increase or decrease the Vacutome suction value - the default setting is 100%.
- Press "**OK**" to confirm the setting and to return to the Main screen
- Press the "**Back**" button to exit back to the Main screen without saving the changes

Note

When the Vacutome is activated the "Vacutome" button on the Main screen will appear yellow.

Turning Off the vacutome function



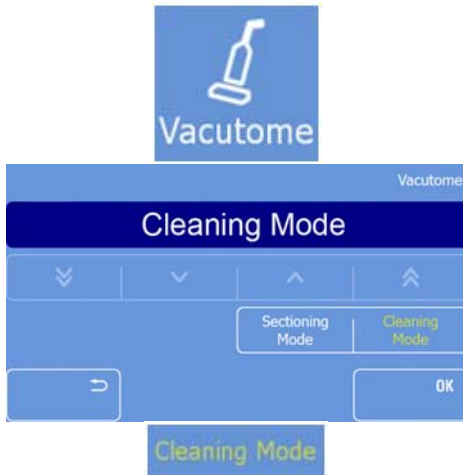
- Press the yellow "**Vacutome**" button on the Main screen
- Press the yellow "**Sectioning Mode**" button on the Vacutome screen - the button will now appear white
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button to exit back to the Main screen without saving the changes.

Turning On the cleaning mode

To activate the cleaning mode, press the "**Vacutome**" button on the Main screen:

Note

Use the cleaning hose for cleaning the CryoStar NX50 chamber.



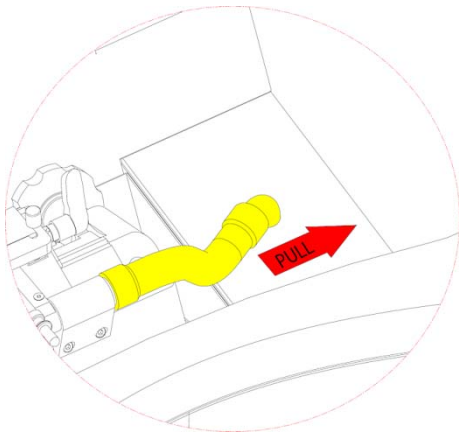
- The Vacutome screen will be displayed
- Press "**Cleaning Mode**" to activate this mode

Note

The "**Cleaning Mode**" button turns yellow to indicate that this function is now activated.

The cleaning mode will switch off automatically after 10 minutes.

To clean the cooling chamber, remove the Vacutome hose from the nozzle plug and then:



- Wash and dry the cooling chamber using a cloth or paper towel, and appropriate cleaning agents.
- Attach the hose extension (standard accessory 435560) to the Vacutome hose and vacuum clean the small parts. The hose extension provides enough length to reach all parts of the cooling chamber.

Turning Off the cleaning mode

To deactivate the cleaning mode:

- Press the yellow "**Vacutome**" button on the Main screen.
- Press the yellow "**Cleaning Mode**" button on the Vacutome settings screen - the button will now appear white.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button to exit back to the Main screen without saving the changes.
- Re-attach the Vacutome hose to the blade holder.

Height Adjustment (optional)

The CryoStar NX50 has an optional electronic height adjustment which enables the user to raise or lower the CryoStar NX50 to a convenient working height.



Ensure that the area to the rear of the CryoStar NX50 is free of obstructions to avoid damaging the instrument when the height adjustment is in use.



Do not lean on the instrument when the height adjustment is carried out to avoid damage to the instrument.



Ensure that the power cord is free to move.

To adjust the height of the CryoStar NX50:



- Press the "Height" button on the touch screen
- A sliding menu will appear
- Use the arrow buttons to raise or lower the cryostat to the required level
- Press "OK" to confirm the adjustment. The sliding menu disappears after approximately 3 seconds if "OK" is not pressed

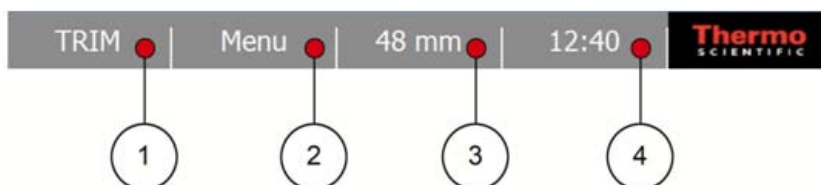


Continuous use of the height adjustment for longer than 1 minute will result in a pause of 9 minutes before the function can be used again.

Multi Function Bar

The multi function bar provides the user access to useful information and functions.

The Multi Function Bar is located at the bottom of the Main screen.



- 1 TRIM key
- 2 Menu
- 3 Multifunction Button
- 4 Time/Date

Time and Date

To toggle between Time or Date indication:



- Press the "Time / Date" button.

Note

When there is an outstanding service message, a wrench symbol is displayed instead of the Date / Time button.



- Press the Wrench symbol to see the service message and follow the instructions

Multi Function Button

The Multi-Function button provides to the user additional information on the sectioning process.



- Three different indications can be displayed by pressing this button

Remaining Distance to the Front End Position



- This button indicates the remaining distance to front end position of the blade holder.

Section Thickness Sum



- This button indicates the total section thickness sum of all the sections cut.
- To reset this value, press this button and keep it pressed for approximately 3 seconds.

Note

It is recommended to reset the section thickness sum if a new specimen is mounted in the specimen head for sectioning.

Section Counter



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

- To reset the section counter, press the Section Counter button for approximately 3 seconds to reset it to zero.

Menu

The "**Menu**" button provides access to submenus for adjustments, settings and the user guide.

To enter the Menu screen:



- Press the "**Menu**" button.
- The Menu screen will be displayed.
- Arrow symbol – this provides access to second Menu screen for Time/Date setting and on-line Operator Guide.

Language

To set the Language:



- Press the "**Menu**" button on the Main screen.
- Press the "**Language**" button.
- The Language screen menu will appear.

- Select the desired language by pressing the respective button.
- Press "**OK**" to save the changes and to return to the Main screen.
- Press the "**Back**" button three times to return to the Main screen without saving the changes.

Standby

When the CryoStar NX50 is switched on but has been inactive for 1 hour, it will automatically enter the Standby mode. The CryoStar NX50 maintains the user adjusted temperatures for specimen head during Standby.

In Standby mode the chamber light switches off and the touch screen displays the Thermo Scientific logo.

To enter the Standby-mode manually:



- Press the "**Menu**" button on the Main screen.



- The Menu screen will appear.
- Press the touch screen to exit the Standby.

Defrost

Inevitably, when working on the microtome the dry cold air of the cryo chamber mixes with the warm humid air outside the chamber. Frost forms on the finned evaporator. The increasing thickness of the frost reduces the efficiency of the evaporator. For this reason, the daily defrosting is necessary.



During defrosting, remove the specimens from the cryo chamber, as the temperature inside the chamber will increase. Do not leave or store specimens inside the Cryostar NX50 over a long period of time.

Note

Set the time of the daily defrosting on the control panel. The period of the defrosting takes maximum 1 hour and varies according to the thickness of the frost.

Note

Possible frost build-up on the microtome or on the knife carrier is not removed by defrosting the instrument. However, the frost recedes after defrosting as now the evaporator is fully efficient again.

Note

In addition, the instrument is equipped with an immediate defrosting function. The immediate defrosting takes maximum 1 hour.

Immediate Defrosting

To start the defrosting immediately:



- Press the "**Menu**" button on the Main screen.

- The Menu screen will be displayed.



- Press the "**Defrost**" button.



- The Defrost screen menu will be displayed.
- Press the "**Back**" button three times to return to the Main screen without starting the defrosting.
- Press the "**Now**" button to start the defrosting immediately.
- The Defrosting screen will appear, showing the progress of the defrosting and the actual temperature of the evaporator.

To abort the defrosting:



- Press the "**Abort**" button on the Defrosting progress screen.
- The Main screen will appear, displaying an error message.

Note

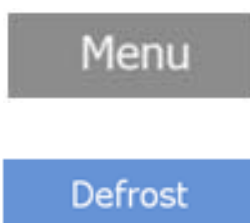
The Defrosting cycle can be aborted at any time.

Programming the Daily Defrost Cycle

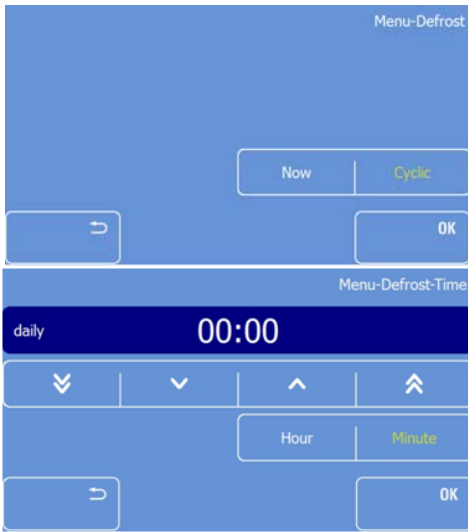
Note

The time for the daily defrost cycle should be programmed outside of the normal working hours to avoid delays in the workflow.

To program the Daily Defrost Cycle:

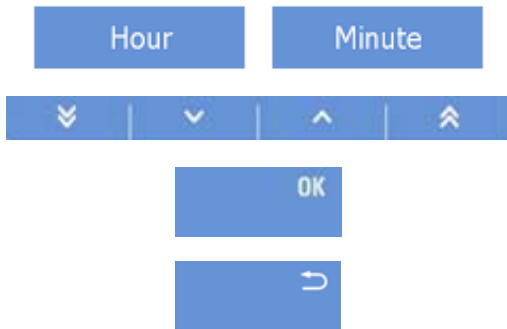


- Press the "**Menu**" button on the Main screen.
- The Menu screen will be displayed.
- Press the "**Defrost**" button.



Note

The standard setting for the daily defrost cycle is daily at 00:00 a.m.

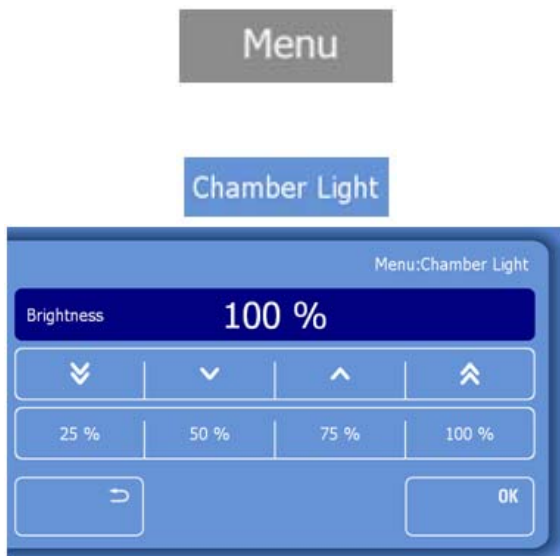


Note

The daily defrost only defrosts the evaporator fin and to prevent cutting issues a total defrost should be performed at least every 6-8 weeks. Also check the liquid waste container at least once a week for liquid accumulation.

Chamber Light

To adjust the brightness of the chamber light:



- The Defrost screen menu will be displayed.
- Press the "**Time**" button.
- The Defrost-Time screen menu will be displayed.

- To change the standard setting, press the "**Hour**" and / or the "**Minute**" button.
- Adjust the time by using the arrow keys.
- Press the "**OK**" button to confirm your settings.
- Press the "**Back**" button three times to return to the Main screen.

- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

- Press the "**Chamber Light**" button.

The Chamber Light screen menu will be displayed.

- Select one of the preset values (25%, 50%, 75% or 100%) or adjust the brightness using the arrow keys.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button twice to exit back to the Main screen without saving the changes.

Note

To switch off the chamber illumination, select 0% and press OK.

Screen

The brightness of the Screen can be adjusted.

To set the Screen brightness:



- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

- Press the "**Screen**" button.

The Screen menu will be displayed.

- Select one of the preset values (25%, 50%, 75% or 100%) or adjust the brightness using the arrow keys.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button twice to exit back to the Main screen without saving the changes.

Display Lock**Note**

The display lock is used to avoid unwanted changes to the settings of the cryostat.

To activate the Display Lock:

- Press the "**Menu**" button on the Main screen.

The Menu screen will appear.

- Press "**Display Lock**" to activate the display lock immediately.

To deactivate the Display Lock:

- Press the "**Lock**" Symbol three times.

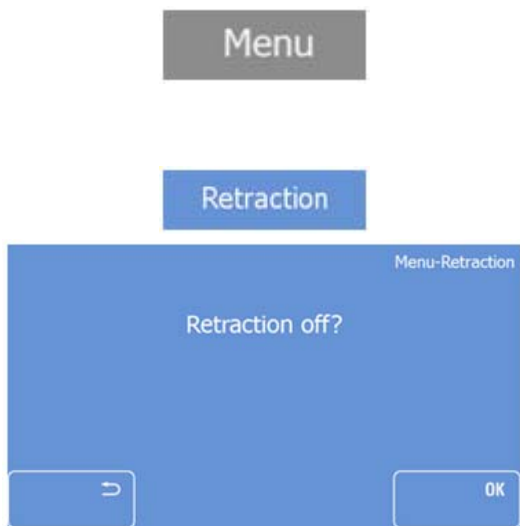
Note

The symbol changes its colour (red - yellow - green) each time it is pressed.

Retraction

If required, the Retraction function can be turned off.

To toggle the retraction on or off:



- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

- Press the "**Retraction**" button.
- The Retraction screen menu will be displayed.
- Press the "**OK**" button to turn off the Retraction and to return to the Main screen.
- Press the "**Back**" button three times to return to the Main screen without saving the changes.

To turn on the Retraction:

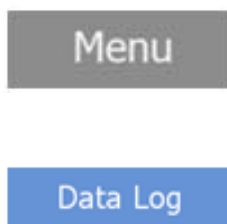


- Enter the Retraction menu screen as described above.
- Press the "**OK**" button on the Menu: Retraction screen to turn on the Retraction and to return to the Main screen.
- Press the "**Back**" button three times to return to the Main screen without saving the changes.

Data Log

The Data Log records all events and error messages on the cryostat. The Data Log file can be exported to the original USB-Stick for Service purposes in case of a malfunction.

To enter the Data Log:



- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

- Press the "**Data Log**" button.



The Log screen will be displayed.

Note

To access a password is required, please contact your local Thermo Fisher Scientific representative.

After entering the password (Service only) Data Log screen will be displayed.

- Use the scroll bar on the right side to scroll through the Data Log.
- Insert the original USB-Stick.

Note

The "Export" button is now highlighted in white.

- Press the **Export** button to transfer the log data to the original USB-Stick.
- Press the **Back** button three times to return to the Main screen.

Note

The Data Log file can only be exported to the USB-Stick supplied with the instrument.

Factory Settings

If required, the instrument can be reset to the default settings.

To restore the Default Settings:



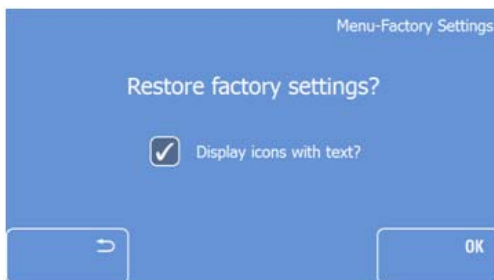
- Press the **Menu** button on the Main screen.

The Menu screen will be displayed.



- Press the **Factory Settings** button.

The Factory Settings screen will be displayed.



- Press the **OK** button to restore the factory settings and to return the Main screen.

- Press the **Back** button three times to return to the Main screen without restoring the factory settings.

Note

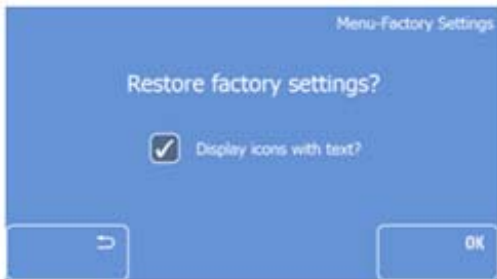
A message appears on the Main screen to inform the user that the factory settings have been restored. The message disappears after approximately 3 seconds.

Chapter 4 - Operation

Display icons with text

The text underneath the Main screen icons can be switched off if required.

To switch the text off:



Pressing **OK** will reset the instrument to the factory settings.

- Enter the Factory Settings screen as described above.
- Uncheck the box and press the "**Back**" button three times to save the changes and to return to the Main screen.

Service

This submenu is only available to service technicians.

User Guide

This function contains an electronic version of this user guide.

To activate the User Guide:



- Press the "**Menu**" button on the Main screen.

The menu screen will appear.

- Press the arrow key.

A second menu screen will be displayed.

- Press the "**User Guide**" button.

The User Guide screen menu will be displayed.



- Use the scroll bar on the right side or the two arrow keys to scroll through the manual.
- Press the "**Home**" button to return to the first page of the User Guide.
- Use the arrow keys to browse forward or backwards through the User Guide.
- Press the "**Back**" button twice to return to the Main screen.

Time and Date

Note

A Cold D cycle must finish before the time or date can be adjusted.

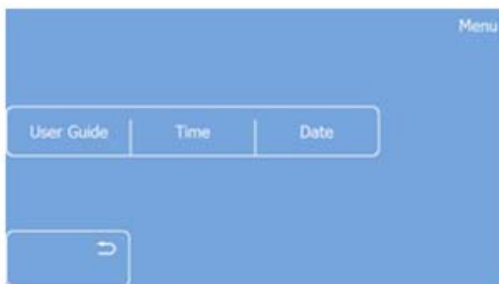


- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

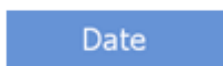


- Press the arrow key.



A second Menu screen will be displayed.

Set the Date



- Press the "**Date**" button.

The Date screen will appear.



Set the Day



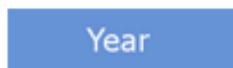
- Press the "**Day**" button to highlight it.
- Use the arrow keys to select the desired day and date.

Set the Month



- Press the "**Month**" button to highlight it.
- Use the arrow keys to select the desired month.

Set the Year



- Press the "**Year**" button to highlight it.
- Use the arrow keys to select the desired year.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button three times to exit back to the Main screen without saving the changes.

Change to ISO format



- Press the "**ISO**" button to toggle between the full date format and the ISO format.
- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button three times to exit back to the Main screen without saving the changes.

Setting the Time



- Press the "**Menu**" button on the Main screen.

The Menu screen will be displayed.

- Press the arrow key.

A second Menu screen will appear.

- Press the "**Time**" button.

The Time screen will be displayed.

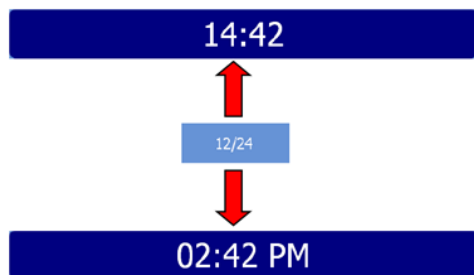
Set the minutes

- Press the "**Minute**" button to highlight it.
- Use the arrow keys to select the desired minute.

Set the hour

- Press the "**Hour**" button to highlight it.
- Use the arrow keys to select the desired hour.

Set the time format



- Press the "**12/24**" button to toggle between the 12 and 24 hour modes.

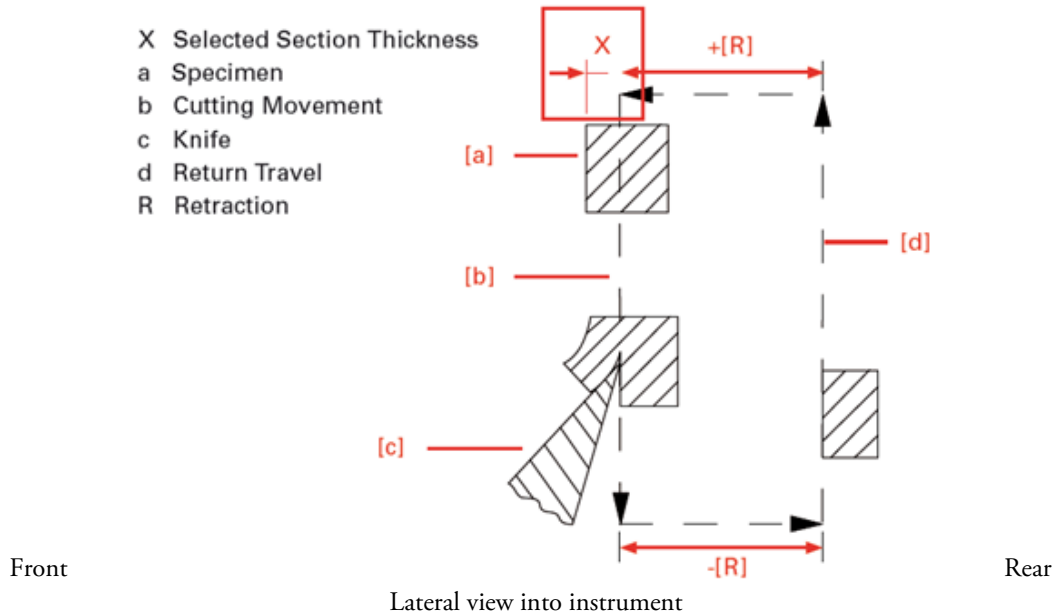
Note

The 12/24 button is highlighted in yellow if the 12h mode is active.

- Press "**OK**" to confirm the setting and to return to the Main screen.
- Press the "**Back**" button three times to exit back to the

Sectioning Procedures

Cutting Movement and Retraction



Note

The retraction prevents the surface of the specimen being damaged during the return stroke of the specimen head.

Note

The retraction can be switched off - see "Switching the Retraction On - Off".

Note

The retraction distance required is 20 µm and cannot be changed.

Trimming and First Cuts

After the specimen orientation and the blade angle have been set, trimming can be carried out using the trimming function.

Trimming



Note

Turn the hand-wheel in a clockwise direction to begin trimming.

- Press the "Trim" button to move forward the blade holder using the preset trim value.



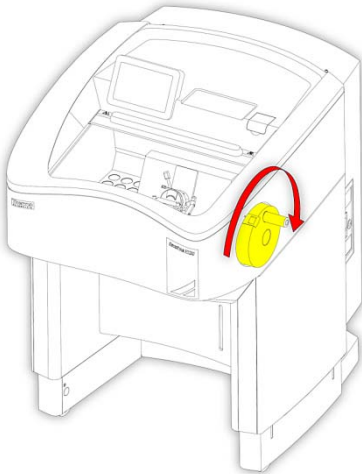
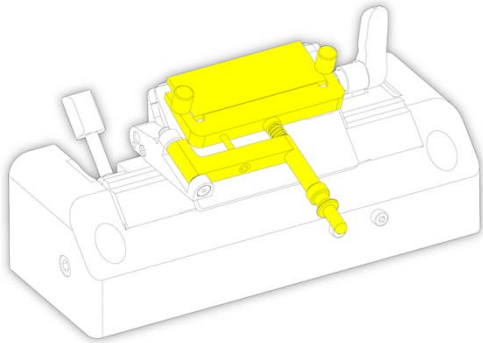
Note

The blade holder will move forwards by the preset trim thickness value every cycle.

Note

The Trim button operates independently of the handwheel. You do not need to turn the handwheel to use the Trim button.

Sectioning and Taking Off Sections



- Set the desired section thickness - see Cutting Thickness.
- Set the desired vacuum level - see Vacutome and Cleaning Mode.
- Place the anti-roll plate against the blade.
- Turn the hand wheel in a clockwise direction to carry out sectioning.

Note

The section slides into the space between the blade and the anti-roll plate.

- Use the handle to move the anti-roll plate assembly away from the specimen.
- The section should remain on the clamping plate.
- Arrange specimen section gently with a brush.
- Transfer the specimen onto a glass microscope slide with help of adhesion forces.

Hand brake Lock

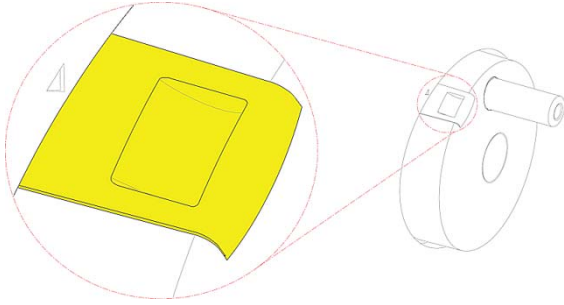


Before placing or removing a specimen on the specimen head, or adjusting the orientation, always ensure that the mechanical hand brake lock is engaged. The hand brake lock will prevent unintended movement of the specimen head.



When the instrument is turned off, the mechanical hand brake lock has to be activated.

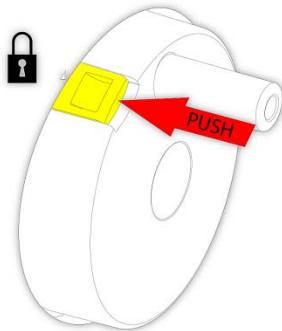
Mechanical Hand brake lock



- The mechanical hand brake lock acts as a safety device, especially when the instrument is turned off. The mechanical hand brake lock can be activated by a slider on the handwheel.

To activate the mechanical hand brake lock:

- Bring the handwheel handle into a 12 o'clock position.

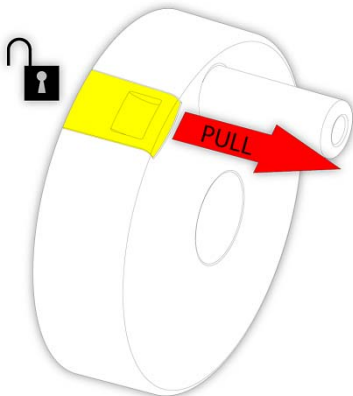


- The slider for the hand brake lock can now be pressed into the locked position.

Note

If the slider is not in the correct position to lock, keep the slider pressed and move the handwheel slowly forward and backwards until the slider is locked.

To unlock the mechanical Handwheel look:



- Pull out the hand brake lock switch.

Cold D (optional)

Starting the Disinfection (Cold D) Function



The Cold D function allows the user to disinfect the cryo chamber with Sanosil. Disinfection is either on-demand or pre-programmed.

The Cold D cycle takes 50 minutes to complete.



The window of the cryo chamber must always be closed before starting and during a Cold D cycle.

Note

If the window is not closed, the warning “Window not closed” will be displayed.



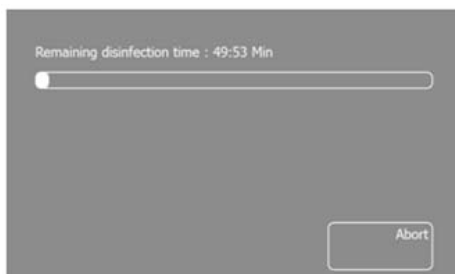
Before starting the Cold D function, remove all specimens from the cryo chamber.



- Press the “**Menu**” button on the Main screen.
- Press the “**Disinfection**” button.
- The Disinfection screen will appear.
- Press “**Now**” to start the disinfection immediately.
- Press the “**Back**” button to return to the Main screen without starting the disinfection.

Note

Pressing the “**Now**” button, immediately starts the disinfection of the cryostat chamber, regardless of the programmed times.



- The Disinfection Remaining Time screen will appear.

Note

After the disinfection cycle is completed, the Disinfection Remaining Time screen will disappear and the Main screen will be displayed.

Note

A small amount of liquid and, occasionally, a small amount of icing remain in the cryo chamber following completion of a Cold D cycle. These by-products of the Cold D cycle will normally evaporate from the cryo chamber within a period of three hours. The liquid droplets can be removed with a paper towel and, if necessary, any icing can be removed with an alcohol spray. Neither the liquid droplets nor the icing will prevent the use of the cryostat immediately after completion of a Cold D cycle.

Note

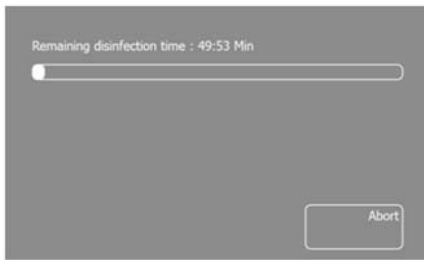
Any occasional build-up of crystalline material in the cryo chamber can also be easily removed with an alcohol spray and paper towel.

Aborting the Disinfection

Note

The disinfection process can be aborted at any time to facilitate an urgent frozen section.

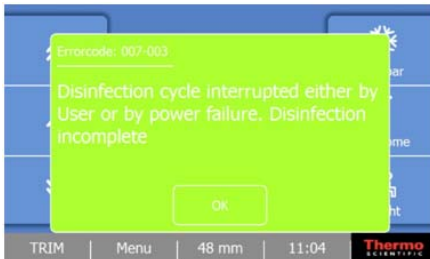
To abort the disinfection process:



- Press the "**Abort**" button on the Disinfection Remaining Time screen.

Note

If the Disinfection cycle was aborted, an error message appears on the Main screen.



- Press the "**OK**" button to remove the error message.

Note

An interrupted Cold D cycle will not adequately disinfect the cryo chamber. However, the instrument can be used immediately afterwards.

Programming Cold D

In addition to running the on demand Cold D cycle automatic Cold D cycles can be programmed.

Follow the directions below to activate (or deactivate) the automatic Cold D feature.

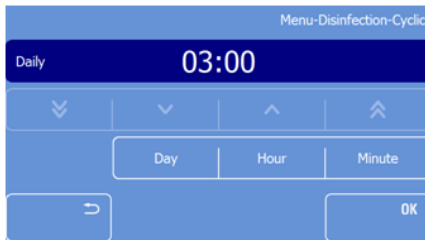


- Press the "**Menu**" button on the Main screen.
- Press the "**Disinfection**" button.



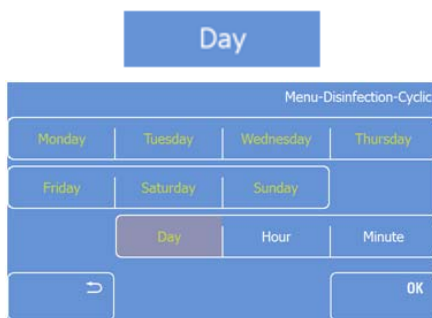
- In this menu, the user can specify the day(s) and the specific time when the Cold D process should automatically be carried out.

- The Disinfection screen menu will be displayed.



- Press the "Cyclic" button.
- The Disinfection-Cyclic screen will appear.

To set the Day:



- Press the "Day" button.

The Disinfection day selection screen will appear.

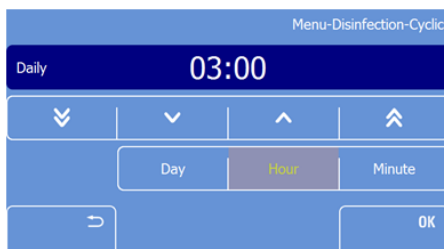
Note

The default setting is every day, from Monday to Sunday at 3:00 am.

- Press the weekdays on which the automatic disinfection should not be carried out.

Note

Deactivated weekdays will turn white.



- Press the "Hour" and "Minute" button and use the arrow keys to adjust the time at which the Cold D cycle should start.

- When all settings have been done, press "OK" to save the settings and to return to the Main screen.
- Press the "Back" button to return to the Setting screen without saving the changes.

5 - Troubleshooting

Troubleshooting Tables

Problem	Possible Reason	Advice
Sections fold or crumple	1. Specimen is too warm.	Lower specimen temperature Note <i>Care should be taken when using freezing spray in a cryostat with fresh tissue.</i> Tip – use freezer spray on clamp plate and blade to confirm.
	3. Anti-Roll plate too low.	Raise Anti-Roll towards specimen.
	4. Anti-Roll plate and/or clamp plate dirty.	Clean with absolute alcohol & dry thoroughly.
Section rolls up under the Anti-Roll plate	1. Specimen is too cold.	Raise specimen temperature.
Specimen curls after lifting ARP	1. Anti-Roll plate & clamp plate too warm.	Move Anti-Roll plate against blade/knife holder Tip – use freezer spray on clamp plate and blade to confirm.
	2. Blade blunt.	Change blade.
Sections tear or crack	1. Specimen too cold.	Raise temperature.
	2. Blade damaged or dirty.	Change blade.
	3. Specimen frozen too rapidly or specimen overly large.	
Specimen and section chatter	1. Knife holder not correctly clamped.	Check & tighten all stages of knife holder.
	2. Blade incorrectly clamped.	Blade clamping force can be increased by tightening clamp screw at the rear of

Problem	Possible Reason	Advice
		the top stage.
	3. Specimen incorrectly clamped.	Check specimen is securely mounted and clamped in specimen head jaws. Check there is no debris or ice on the back of the chuck or on specimen head.
Sections thick-thin	1. Check knife holder and specimen correctly clamped.	
	2. Ensure specimen is securely attached to the Cryo cassette/chuck.	
	3. Temperature of specimen incorrect.	Raise or lower temperature.
	4. Blade not sharp.	Change blade.

Tips for Successful Sectioning

For optimal sectioning, the following points should be followed:

- Check the condition of the blade edge; move it horizontally to the left or right side to obtain a sharp cutting edge.
- Check adjustment of anti-roll plate and correct it, if necessary.
- Ensure that the edge of the anti-roll plate glass is clean and free of debris.
- Carefully remove frost from the front and the rear part of the blade, from the anti-roll plate and the clamping plate (i.e. with ethanol).
- Tighten all clamping screws and clamping levers on the blade holder and specimen head.
- Select the appropriate specimen temperature according to the specimen type - see Optimum Temperature Ranges for Sectioning Different Types of Fresh Specimens.
- Allow time for the temperatures within the chamber to stabilise.
- Select the appropriate freezing compound (Neg50).
- Avoid excessive use of freezing compound.

Note

If the specimen was frozen with liquid nitrogen or similar freezing techniques, the specimen must be allowed to adjust to the cutting temperature.

- Adjustment of proper clearance angle. Select a clearance angle of 8-16°. The preset clearance angle is 10°.
- Select an appropriate cutting speed: The harder the material, the slower the cutting speed!
- Take care when bringing knife and specimen together.



During defrosting, remove the specimens from the cryo chamber, as the temperature inside the chamber will increase. Do not leave or store specimens inside the cryostat over a long period of time. Due to a power failure or other unexpected malfunctions of the instrument, the specimen might be damaged.

How to avoid malfunctions when working with the Vacutome

- Accurately adjust the cutting and suction window to the specimen size, to avoid inadvertent disposal of good sections.
- Adjust the suction vacuum setting according to the size of the specimen and the selected section thickness.
- Ensure that the specimens are cooled sufficiently to avoid that sectioning waste sticking and blocking the suction hose of the Vacutome.

Note

If the sectioning waste blocks the suction hoses of the Vacutome, it can be removed by using the attached hose cleaner. During this cleaning, the Vacutome should be operated with maximum power to guarantee that the released sectioning waste is removed.

Sectioning Temperature Guidelines for Fresh Tissues

The values given below are a guideline, collated from experience and published materials.

Specimen Type	Specimen Temp
Adipose Tissue	-30°C or below
Bone Marrow	-20°C
Brain	-12°C
Breast	-25°C
Breast with Fat	-30°C or below
Cervix	-20°C
Connective Tissue	-16°C
Gut	-20°C
Heart	-18°C
Kidney	-15°C
Lip	-13°C
Liver	-13°C
Lung	-15°C
Lymph Node	-13°C
Muscle	-16°C

Chapter 5 - Troubleshooting

Omentum	-35°C
Ovary	-20°C
Pancreas	-20°C
Prostate	-20°C
Skin	-16°C
Skin with fat	-25°C
Spleen	-16°C
Testis	-10°C
Thyroid	-15°C
Uterine curetting	-7°C
Uterus	-20°C

6 - Cleaning and Maintenance

Cleaning the Touch Screen Display

- Use commercially available cleaning tissues or use a soft towel slightly wet with water to clean the Touch screen.



Do not use household cleaner or chemicals (i.e. Xylene) for cleaning of the touchscreen to avoid severe damage.

Shutting Off for Cleaning

The frequency of cleaning the cryostat depends on how often the instrument is used.

Preparations:



See recommended disinfection procedure – Appendix B

- Remove the blade out of the blade holder and store it in safe place.
- Remove the cold section waste by using the vacutome cleaning mode.
- For this, remove the vacuum hose from the front side of the blade carrier.
- Attach the cleaning nozzle to the vacutome hose.
- Remove the filter unit and dispose of the vacutome filter together with the section waste and/or the micro filter according to the respective lab regulations.

Cleaning and care of the Blade Holder

- Carefully clean and dry the dismantled blade holder.
- As there is condensate humidity inside the microtome, dry the microtome components inside the cooling chamber very carefully. For this, use a hair dryer.

Note

For the examination and readjustment of the microtome a routine maintenance should be performed by trained service technician once a year.

Emptying the Defrosting and Cold D Liquids

The liquids from the daily defrosting cycle as well as the liquid of a Cold D cycle is collected in a bottle, located in the base of the cryostat.



The liquids from the daily defrost and Cold D cycle might be hazardous. Wear protective clothing – see recommended disinfection procedure.

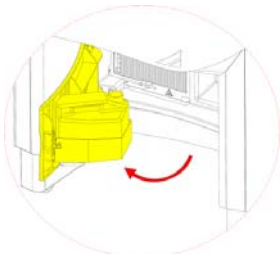
Note

The capacity of the bottle is 2.5 Litres (approximately 0.66 Gallons).

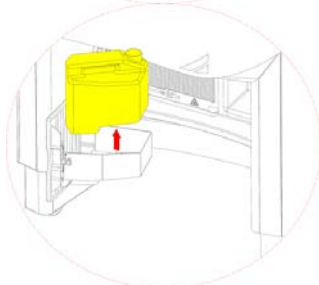
Note

It is recommended to empty and disinfect the bottle once a week during the routine cleaning procedure.

To empty the Defrosting Liquid Bottle:



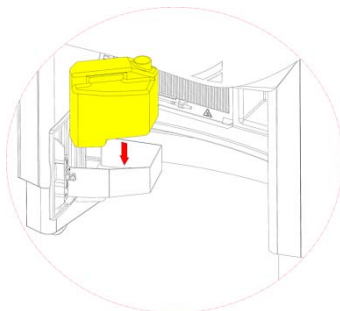
- Open the front door pull out the bottle from the rack.



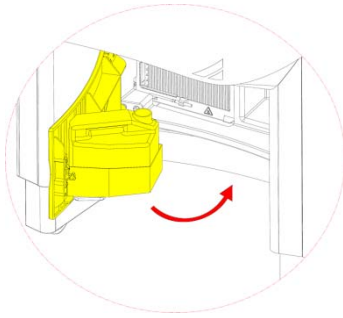
- Pull out the bottle from the rack.
- Dispose of the liquid in accordance with the laboratory regulations regarding hazardous waste and clean the bottle.

Note

After cleaning the bottle, it is recommended that a small volume of Sanosil® is added.



- Wipe out any liquids from the rack.
- Put the bottle back into the rack.



- Close the door.

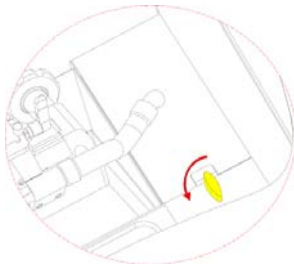
Exchange the Vacutome Filter Bag

The Vacutome Filter Bag collects all section waste which has been removed with the vacutome function.

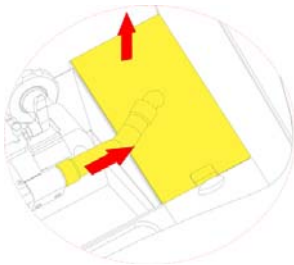


Section waste can be hazardous. Dispose of the used vacutome filter bag in accordance with the laboratory regulations.

The Vacutome Filter Bag is placed under the cover on the right hand site of the cryochamber.

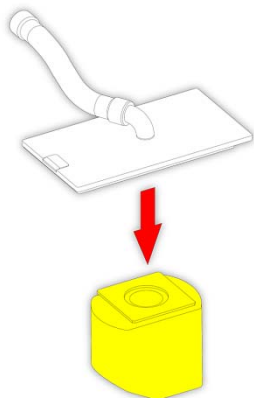


- Open the lever of the cover.



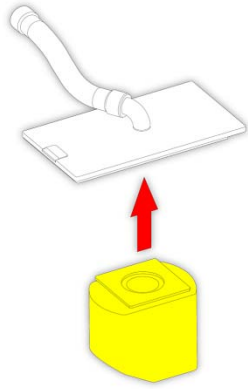
- Remove the vacutome hose and lift off the cover.

- Clean the vacutome hose with a flexible brush.

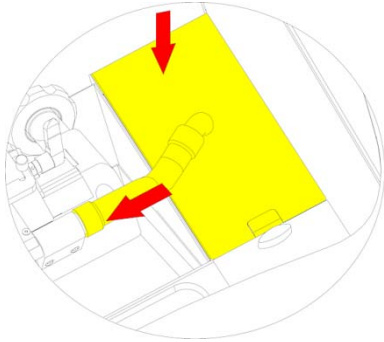


- Slip off the old vacutome filter.

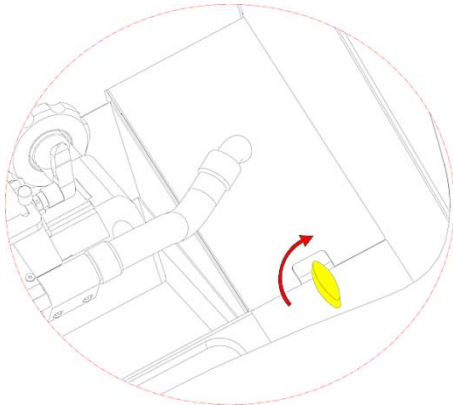
Chapter 6 – Cleaning and Maintenance



- Replace the vacutome filter for a new one.
- Clean and disinfect the empty vacutome filter chamber with disinfectant.
- Replace the cover, rear end first.



- Reattach the vacutome hose.

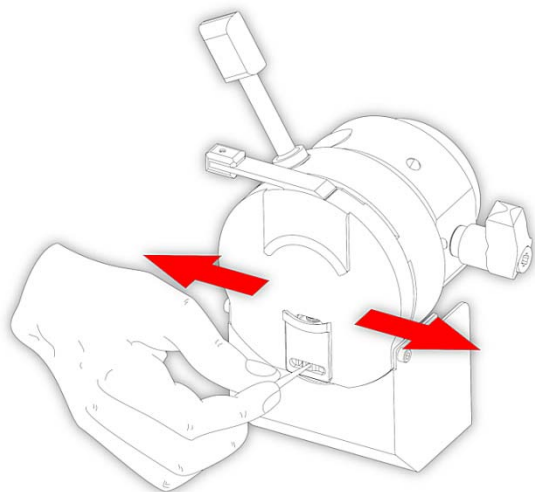


- Lock the cover with the lever.

Adjustment of the Movable Specimen Head Jaw

The clamping mechanism can be adjusted if the chucks are not clamped properly.

- Lock the handwheel brake.



- Turn the adjusting ring by using the pin, provided with the standard accessories.
- Turn the pin counter clockwise to increase the tension of the moveable clamping jaw.
- By turning the pin counter clockwise, a click can be heard as a pin moves over the teeth on the ratchet wheel. After two clicks, stop turning and check the clamping tension with a specimen chuck. If the tension is not sufficient, increase the tension by a further click and re-test the clamping tension.
- Repeat this procedure until the right clamping tension is reached.

Transportation of the Instrument

Conditions for the Transportation of the Instrument

To experience trouble-free function of the instrument after transportation, please note the following measures for transportation preparation.

In addition, the conditions for storage and transportation must be observed during the entire transportation - see Technical Specifications.



Disinfect the instrument before the transportation and remove all section waste and tools out of the chamber – See recommended disinfection procedure (Appendix B).

Shutting down the instrument for transportation:

- Turn off the instrument.
- Unplug the unit.
- Remove the blade from the blade holder.
- Remove the section waste tray, the brush shelf, the blade holder and all other accessories as well as tools from the cryo chamber.
- Dispose of the defrosting and Cold D liquids in accordance to the laboratory regulations and clean the bottle. - see Emptying the Defrosting and Cold D Liquids.

Chapter 6 – Cleaning and Maintenance

- Remove the defrosting liquid bottle.

Note

Clean and disinfect all accessories according to the respective applicable lab regulations and transport them in dry condition.



Any transportation of the instrument requires original packaging materials.

Note

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

- Clean and disinfect the cryo chamber - see Recommended Disinfection Procedure (Appendix B).
- Unscrew the hand wheel handle for transportation if necessary.
- Keep the heated sliding window closed during transportation.

Note

If the new site of installation can be reached in less than half an hour, keep the sliding window closed so that the cryo chamber does not heat up. This avoids the formation of condensation water inside the chamber.



Two people are necessary for the transport of the instrument.

Bringing the instrument back into service



After moving the CryoStar NX50, wait at least 8 hours before switching on to allow the refrigerant to settle – Failure to do so may cause damage to the unit.

- Install the blade holder, the section waste tray and the brush shelf.
- Attach the hand wheel handle again, if necessary.
- Plug in the instrument.
- Turn On the instrument.
- After the instrument is turned on and it has reached the set temperatures, the instrument is ready for operation again.

Note

If the blade holder was heated up to ambient temperature, it needs approximately 4-5 h in the chamber at -20°C to -25°C to be able to section specimens again.

Transportation of the instrument outside closed buildings

- Turn off the instrument.
- Unplug the unit.
- Remove the blade from the blade holder.
- Remove the section waste tray, the brush shelf, the blade holder and all other accessories as well as tools from the cryo chamber.
- Dispose of the defrosting and Cold D liquids in accordance to the laboratory regulations and clean the bottle. - see Emptying the Defrosting and Cold D Liquids.
- Remove the defrosting liquid bottle.

Note

Clean and disinfect these accessories according to the respective applicable lab regulations and transport them in dry condition.

- Clean and disinfect the cryo chamber - see Recommended Disinfection Procedure (Appendix B).

Note

Let the cryo chamber dry out at least 48 h to avoid condensation water remaining in the chamber.

- For repacking of the instrument - see Unpacking and Repacking.

Taking back the instrument for the repair or routine maintenance

Repair or maintenance work is normally carried out at the site of installation. If this is not possible, the instrument can be returned to Thermo Fisher Scientific; contact your local Thermo Fisher Scientific representative.

- After the final shutdown of the instrument, we recommend contacting a local recycling company for disposal according to local regulations.
- To be applied in the countries of the European Union and other European countries with a separate collecting system within the waste management.
- The marking of the product and/or the respective literature indicates that, after its final shutdown, it must not be disposed of 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 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.

Appendices

Appendix A - Spares and Accessories

Description	Part Number
Knife and Blade Holder	
Standard Knife Holder	705950
Disposable Blade Holder for high profile blades	705940
Disposable Blade Holder for low profile blades	705840
Heat Extractor	524510
Specimen Chucks	
Ø 20 mm	715530
Ø 30 mm	715600
Ø 30 mm, red	715870
Ø 30 mm, green	715880
Ø 30 mm, blue	715890
Ø 30 mm, gold	715900
Ø 40 mm	715610
Ø 60 mm	715620
Cryo-Molds	
10 mm	570400
15 mm	570380
22 mm	570390
Brushes	
Brush, flat 12mm	334160
Small brush, magnetic	334171
Large brush, magnetic	334172
Pipe brush 400 x 25 x 14 mm	202180
Coarse filter for use with Vacutome (pk of 25)	281000
Nozzle (for trimming)	336090
Nozzle (for sectioning)	336080

Description	Part Number
Cleaning Hose complete	435560
Blade handling tool	419500
Sanosil S010 (5l)	175200
Anti Roll Plate	449980
Knife Guard	460380
Allen Key, 5 mm	362260
Allen Key, 6 mm	362120
Waste Tray	512990
Brush Shelf	410540
Hose Extension w/nozzle, vacutome	435560
Adjusting pin	242530
UK power cord	313940
European power cord	313960
US power cord	313950
Japan power cord	313930
Australian power cord	313920
China power cord	313910
Operator guide English	388148
Operator guide German	388149
Operator guide Italian	388150
Operator guide French	388151
Operator guide Russian	388156
Operator guide Dutch	388168
Operator guide Chinese	388154
Operator guide Spanish	388152
Operator guide Japanese	388153
Measuring jug	334220
Funnel	334240
USB Stick	612050

Appendix B - Recommended Disinfection Procedure

Cold D + Sanosil®

Disinfection of the cryostat chamber as per protection level 2 as per the Regulation of Biological Substances Act (BioStoffV; GBGI. I S. 50; 1999 S. 2059) and the Technical Regulations on Biological Substances (TRBA 10; 09/1999).

Universal Precautions

All specimens can be potentially infectious; because of this universal precautions should always be followed when handling cryotome specimens and cryostats.

Definition of Disinfection

Disinfection is the destruction of pathogens by physical or chemical means. It is not as fully effective as sterilization. Disinfection destroys most recognized pathogens, but not necessarily all microbial forms, such as bacterial spores.

Disinfection Procedure for the CryoStar cryostat

- Wear appropriate protective clothing: double gloves, gown, mask and protective eye wear.
- Remove all disposable blades and knives from the chamber and disinfect them separately.
- Using a paper towel remove all tissue trimmings and waste material from the cryostat chamber.
- Bring the cryostat chamber to room temperature before beginning the disinfection process.
- Use 5% Sanosil® as the disinfection agent. Spray the solution throughout the chamber, let sit for 20 minutes, drain, and then wipe with absorbent towels.
- Dilute bleach (5%) may be used as an alternative to 5% Sanosil®.
- Spray the chamber surfaces with 70% alcohol. Allow the solution to sit for 10 minutes, drain, and again wipe all surfaces with absorbent towels.

Sanosil® can be ordered by the manufacturer and/or the local dealers in the respective countries or by your respective Thermo Scientific contractual partner (cat. no. 350150).

www.sanosil.ch



To guarantee functionality and reliability of the disinfection unit, it is highly recommended to use only Sanosil. When using other disinfection media, Thermo Fisher Scientific Microm International GmbH assumes no liability concerning functionality and disinfection effectiveness.

Appendix C - Cold Disinfection Certificate



Labor für Mikrobiologie und Ökotoxikologie

Priv. Doz. Dr. Ingo Maier

CERTIFICATE

We certify that the

Cold Disinfection in CryoStar™ NX70/NX50 cryostats

manufactured by

Microm International GmbH
Otto-Hahn-Strasse 1a
69190 Walldorf, Germany

has been successfully evaluated for
 antibacterial, antituberculous, antifungal and antiviral efficacy
 and found to significantly improve instrument safety.

Tests on microbial inactivation were carried out in analogy to the standard methods of the German Society for Hygiene and Microbiology and the European norms DIN EN 13697:2002-01 and DIN EN 14563:2009-02 and on virus inactivation in analogy to the guideline of the German Association for the Control of Virus Diseases and the Robert Koch Institute as well as the European Norm DIN EN 14476:2007-02.

Using Sanosil® containing 5 % hydrogen peroxide or a solution of 5 % hydrogen peroxide as disinfectants the test bacterium *Staphylococcus aureus* was inactivated by > 99,996 (> log₁₀ 4.5). *S. aureus* was used as a surrogate organism in a series of parallel studies. The combined results allow the conclusion that the bacteria *Enterococcus hirae*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Mycobacterium terrae* and *M. avium* are inactivated by 99.5 to 99.999 %, the yeast *Candida albicans* by 99.98 % and that the infectious titers of BVDV and BPV viruses are reduced by 90 % in the standard cold disinfection routine (20 min fogging/50 min total contact period) according to the test report of August 3, 2011.

Amtzell, 9 February 2012


 Ingo Maier, PhD


 Ulrike Hüppeler, PhD



eco scope Labor für Mikrobiologie und Ökotoxikologie Priv. Doz. Dr. Ingo Maier
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