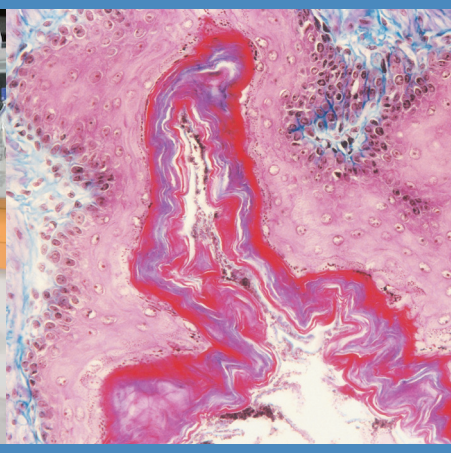
STP420D/STP420ES

Thermo Scientific
Tissue Processor

Instruction manual – English

387791 Issue 1.1



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Thermo SCIENTIFIC

STP420D/STP420ES

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387791 Issue 1.1

Figure 1. Thermo Scientific Microm STP420ES Tissue Processor.

Thermo SCIENTIFIC

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Thermo Fisher Scientific is the trading name of Microm International GmbH

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The STP420 meets the following CE Mark Requirements: In Vitro Diagnostic Directive 98/79/EC.

CE

C SA® US

01/12

This IVD equipment complies with the emissions and immunity requirements of IEC 61326-2-6:2006 and DIN EN 61326-2-6:2008. This equipment complies CISPR 11 Class B.

Do not use this device in close proximity to strong electromagnetic radiation (for example unshielded intentional RF sources), as these may interfere with the proper operation.

The electromagnetic environment must be assessed prior to the operation of the device.

This User Guide covers both models of the Thermo Scientific Microm STP420 Tissue Processor: the STP420D produced between 2006 and 2009, and the STP420ES produced from February 2010 onward.

The Thermo Scientific Microm STP420 Tissue Processor is referred to throughout this, and other supporting documents, as the STP420.

Welcome

Dear valued customer,

Thank you for your decision to buy this Thermo Scientific instrument.

Before turning on the STP420 for the first time, please read these operating instructions carefully to familiarize yourself with its proper operation and functions. Please store this manual next to the instrument for later consultation.

This User Guide will be supplied with each instrument. You can order further copies at the nearest Thermo Scientific sales office by giving the serial number of the instrument, the number of the User Guide and the date of issue. This User Guide is available in the following languages:

	Cat. No
German:	387790
English:	387791
French:	387792
Spanish:	387793
Italian:	387893

Please check the serial number on the type plate, which is placed on the left side panel of your instrument and enter this number here. This way, questions and service can be handled faster.

Serial No.: _____

Date of Purchase: _____/_____/_____

Contact Consumables: _____
(Phone)

Contact Maintenance: _____
(Phone)

Certification

Thermo Scientific herewith certifies that this instrument has been tested and checked carefully. Its technical data was verified before shipment to be in accordance with the published specifications.

The instrument complies with applicable international safety regulations.

Warranty

This Thermo Scientific product is warranted against defects in material and workmanship for a period of 1 year. Parts which prove to be defective during the warranty period will be repaired or replaced free of charge by Thermo Scientific. No other warranty is expressed or implied. Unauthorized modification or repair by third party persons will void the warranty.

The warranty will expire in case of improper or wrong use of the instrument and in case the warning and precautionary messages are not observed. Thermo Scientific is not liable for any occurring damage.

Errors and omissions excepted. Subject to amendment and improvement without further notice.

How to Use This User Guide

The User Guide is written for routine users of the STP420, and their supervisors. It is divided into a number of chapters that tell you how to operate the STP420, and appendices which give you further information. Familiarise yourself with the contents of the User Guide, and especially the section Safety Precautions below, before you start your daily routine work.

Symbols Used

The User Guide uses the following symbols for important safety and operational information:

Notes:
Special instructions regarding the operation of the instrument

WARNING OR CAUTION
Warning or Caution: Special precautionary measures to prevent damage to the equipment. Observe these carefully, to prolong the life of the instrument.

General Danger
Observe the Us er Guide strictly when this symbol is visible. Never override the safety features built in to the instrument.

Biohazard
There is potential danger from biological material.

Chemical hazard
Harmful chemicals are used with the instrument. Refer to the material safety data sheets for the chemicals used. Always act with common sense and in accordance with local laboratory procedures. Take suitable precautions.

Hot surface
Some of the instrument's surfaces become hot during use. They are marked with this warning symbol. Touching these surfaces might cause burns.

Safety Precautions

Your safety is at risk if you do not operate the instrument in accordance with this User Guide. You must observe the following precautions while operating the instrument. Failure to comply with these precautions violates safety standards and the intended use of the instrument. Thermo Scientific is not liable for misuse of the instrument and failure to comply with basic safety requirements.

Note!
Installation and Maintenance: The instrument must be installed and maintained by a fully authorized representative, and instruction in its use be given, by an authorized representative. All warranties and guarantees are null and void, if a third party installs or maintains the instrument.

Instrument Grounding

To avoid injury from electrical current, connect the instrument with the protective earthing conductor. The instrument has a three-wire ground plug. The power outlet must be connected to the protective earth and must meet the International Electrotechnical Commission (IEC) regulations. Do not cut, deform or remove any of the prongs from the power cord. You can not operate this device using an extension cord.

Mains Voltage

Never remove the instrument covers during operation. Only trained service personnel may replace components and make adjustments.
Unplug the unit before removing or opening the covers.
To prevent the instrument from malfunctioning, it must only be operated in a controlled electromagnetic environment. You must not operate transmitters (for example, mobile phones) in its close vicinity. In case of malfunctions or service.

Hot surface

Some of the instrument's surfaces become hot during use. They are marked with this warning symbol.

Closing the processing chambers

Do not attempt to operate the instrument if:

- An object is caught in the lid
- A hinge is damaged
- The latch is damaged
- The sealing surface is damaged

Make sure the locking mechanism is clean and functions properly, and that the seal inside the lid seats correctly.

Problems

Notify an authorized service technician if a problem or suspected problem occurs. The instrument must be serviced properly by a fully authorized representative to ensure it continues to comply with applicable safety precautions.

Flammable environments

Never operate the instrument in the presence of flammable gases. After filling up the reagents no ignition sources must be near the device or in its vicinity.

Malfunction hazard

To avoid severe software and/or mechanical failure, do not turn off the instrument without following the instructions in Section 3-1, Turning the Instrument On and Off. Any damage caused by not turning the instrument off properly is excluded from warranty, and any repair and/or service call will be charged.

Biological hazard

Specimens used during the intended operation of the instrument might be infectious. You are strongly advised to observe the general laboratory regulations concerning protection against danger of infection. You can find information on decontamination media, and their use, dilution and effective range of application, in the Laboratory Biosafety Manual: 1984 of the World Health Organisation.

Unhealthy or irritating substances

Small amounts of irritating aerosols are possible during the intended use of the instrument. To avoid risk to your health while you are in direct contact with the reagents or their residues, make sure there is sufficient ventilation, and always wear appropriate safety clothing (for example, protective glasses, laboratory gloves and so on).

Reagents

You must operate the stp420 only with the reagents listed in Appendix D, Approved Reagents.

Cleaning reagent – paraffin blockages

The cleaning reagent must only be Xylene or Clear-Rite3. Other Xylene substitutes (such as Toluol or others) might lead to paraffin blockages and must not be used. Any damage caused by using any cleaning reagent other than Xylene is excluded from warranty, and any repair and/or service call will be charged.

Environment

This product must comply with the EU's Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96.EC. It is marked with the following symbol:

Thermo Fisher Scientific has contracted with one or more recycling/ disposal companies in each EU member state, and this product should be disposed of or recycled through them.

You can find further information on Thermo Fisher's compliance with these directives, the recyclers in your country, and Thermo Fisher products which might help in the detection of substances subject to the RoHS directive, at:

www.thermo.com/WEEERoHS

Conventions

The User Guide uses the following conventions:

- Touch screen buttons are designated in bold, for example: "**Select Reagents**". If you are not sure what the button looks like, see Section 1-5-1 Buttons.
- The User Guide uses a number of Note and Warning symbols to draw your attention to important information – these are described above.
- The User Guide tells you to 'select' buttons. 'Selecting' a screen button is the same as clicking it with the mouse, or touching it with your finger or stylus.

Chapters

The chapters are as follows:

Chapter 1 Introduction

This chapter describes the equipment and its functions, identifies its parts, and explains its purpose. It also tells you how to use the touch screen.

Chapter 2 Setting up the STP420

This chapter describes unloading and placing the equipment, turning it on, preparing it for operation, and selecting a variety of options, such as language, reagent rotation and so on.

Chapter 3 Routine Operations

This chapter tells you how to perform routine tasks not covered in Chapter 1 or Chapter 2, including how to empty containers, replace filters, manage and replace reagents, create and edit protocols and so on.

Chapter 4 Troubleshooting and Errors

This chapter describes some common, easily resolved problems, error messages, and codes. It does not cover complex technical difficulties.

Chapter 5 Cleaning and Maintenance

This chapter gives you advice about cleaning and maintaining the instrument.

Chapter 6 Transportation and Final Shutdown

This chapter tells you how to ship the instrument safely, and how to dispose of it correctly when it is no longer required.

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Chapter 1
Introduction

1-1 Overview

The STP420 is a highly efficient, microprocessor-controlled instrument that automatically prepares tissue samples for laboratory testing, by fixing, dehydrating, clearing, and infiltrating them with paraffin. Processing is governed by protocols and reagent programs which you create and edit.

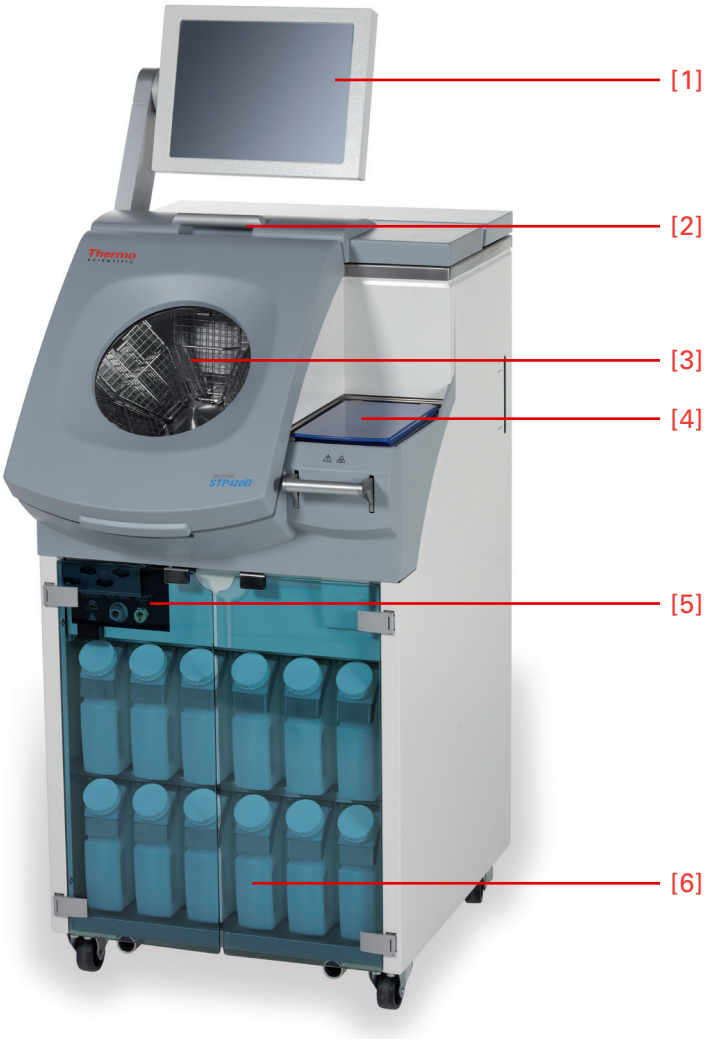


Figure 2a. General layout of the instrument.

[1] Touch screen
[2] Paraffin reservoir
[3] Rotary chamber
[4] Biopsy chamber
[5] Reagent Managment Panel
[6] Reagent stations

General Safety

Only skilled or specially trained personnel must operate the STP420. You must strictly observe all the listed and marked safety measures, regulations and hygiene measures of your laboratory.

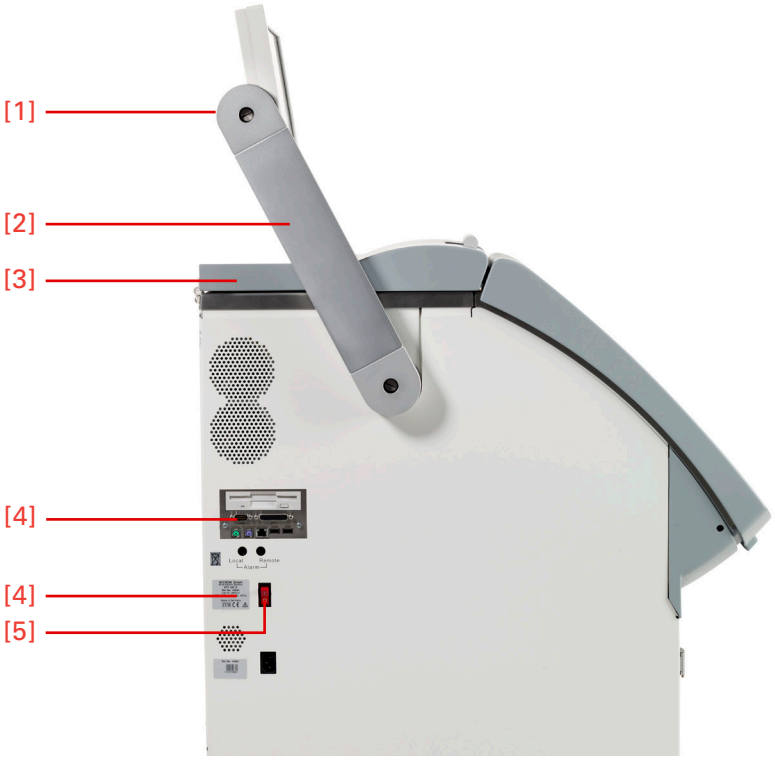


Figure 2b. General layout of the instrument.

[1] Interfaces (type I, covered)
[2] Touch screen moveable arm
[3] Toolbox Optional interfaces
[4] Interfaces (type II)
[5] Serial number plate
[6] Main switch

Interfaces

The STP420 has a console interface, which is located either on the left side of the device [4] or on the left side of the monitor [1].

1-2 Main Features

The STP420 incorporates:

- A touch screen monitor, incorporating an on-screen alpha-numeric keypad, allowing simple operation and programming from easy-to-follow menu displays (see Section 1-5 Touch Screen Monitor).
- Two temperature-controlled process chambers:
    - The rotary chamber, with a nose cone accommodating up to six baskets.
    - The biopsy chamber, accommodating one basket.
- Ten reagent stations, and two cleaning stations for the automatic cleaning process (see Section 1-9 Reagents and Reagent Lists).
- A heated paraffin reservoir with four heated paraffin containers (see Section 1-7 Paraffin Containers).
- An enclosed exhaust system with a condensation container (wash bottle) and active charcoal filter, to allow odor-free operation (see Section 1-8 Filter System).
- A versatile protocol system (see Section 1-10 Protocols):
    - You can define tissue processing protocols exactly suited to the needs of your laboratories and any special quality controls. You can adjust these protocols easily if your laboratory requirements change.
    - The processing protocols are stored on an integrated hard disk. The number of protocols you can store depends on the number of steps in each one. The fewer the steps, the greater the number of protocols you can store.
    - Each protocol step can be independently programmed for process duration, end time, and temperature, and for pressure, vacuum or pressure/vacuum cycles.
    - Protocols can easily be reloaded or edited.
    - The instrument monitors protocols, and issues progress messages during each step of the tissue processing run. You can then view and print a summary report after the run by connecting the USB to a remote printer.
- A delayed protocol facility for weekend or overnight runs (referred to as ‘protocol’ throughout the manual).

- A battery-buffered protocol and data storage.
- An acoustic and remote alarm.
- A battery-supported emergency system to secure specimens in the event of a power failure. In this case, the battery maintains complete system operation for five minutes. If full power does not return, the system goes into 'emergency' mode. The chamber continues to rotate for sixty minutes (Duration: 5 minutes, when paraffin has been filled). If power is then still not available, the instrument goes into shut-down mode with the tissues safely stored in reagent.
- Protection features and sophisticated software controls to guarantee that, in the event of a power failure or other problems during the infiltration process, specimens remain undamaged and the infiltration can be completed successfully.

1-3 Interfaces

A console with integrated interfaces is located on the left side of the device (see Fig. 3a) or on the left side of the monitor (see Fig. 3b).

Figure 3a. Interfaces (type II) on the left side of the instrument.

These are for the type II interfaces:

- **Modem COM 3:** For remote diagnostics and remote control of individual functions
- **LPT1:** Connector provided, but not intended for use
- **Mouse:** Not necessary, but can be connected to the PS-2 interface for service purposes
- **Keyboard:** Not necessary, but can be connected to the PS-2 interface for service purposes
- **RJ45/LAN:** To establish a connection to a service technician's laptop
- **Two USB ports:** For storing protocols on the USB data stick provided

Note!
*USB data sticks: Only use the USB data stick provided – others will not work. If the USB data stick provided does not work initially, shut down the STP420 (*Section 3-1-2 Turning the instrument off*), plug the USB into the USB port and turn the device on.*

- **3.5-inch floppy disk drive:** For storing protocols on a 3.5-inch (1.44 Mbyte) disk

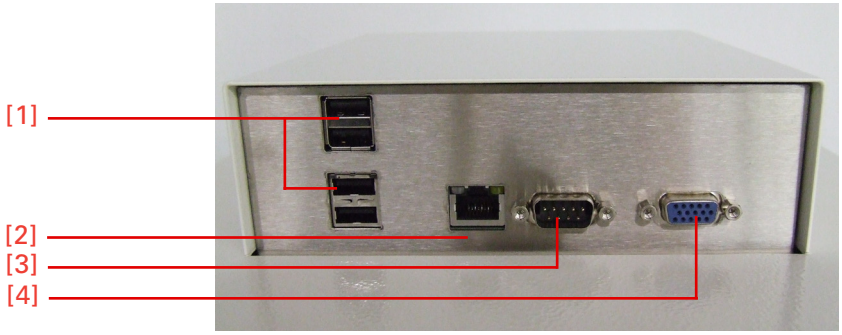


Figure 3b. Interfaces, type I, on the left side of the monitor.

[1] **4 USB-Ports** – for connecting the keyboard or mouse for maintenance purposes or for operating the device. In addition, the connectors can be used to transfer logs on a USB memory stick.
[2] **LAN** – to establish a connection to the laptop of a customer service representative.
[3] **COM1** – for remote diagnostics and remote access to each function.
[4] **VGA** – for connecting an additional monitor.

1-4 Operation Overview

For processing, tissue samples are placed into cassettes and loaded into the sample baskets. The baskets are then placed into the rotary or biopsy chamber, you select the menu button for the appropriate chamber, select the protocol, and then press **Start**. Alternatively, you can use a quick start button (see Section 3-10 Creating and Changing Quick Start Buttons) to start a protocol from the Standby screen.

There are up to seven baskets with lids.

- Each basket holds up to 60 cassettes if they are arranged in 'organized form' using the - The baskets without the inserts can accommodate 60 standard cassettes in a free/unorganized order. The cassetts must be removed from the holder individually.

- The loading capacity of the baskets is 54 cassettes when an organiser is used to divide the basket into "6 segments". All cassettes stand upright within the basket. The cassettes must be removed from the holder individually.

- The basket organisers giving a loading capacity of "33 cassettes" divide the basket space into 33 individual compartments. In this configuration the Cassettes are always held vertically with the front or rear accessible.

You can load up to six holders in the rotating section and one holder in the biopsy chamber for one run.

Processing starts after the system has carried out a successful self-test to check critical operating functions.

Note!
Self-test: If the self-test fails, the process aborts and you return to the initial screen.

Messages appear during a run to show which step the instrument is performing and the time elapsed in the protocol. The display also shows whether the process chamber is being filled or drained for each step. All error messages and relevant protocol information are displayed and can be viewed or exported as a summary report at the end of a protocol.

Exhaust fumes and particles which are environmentally harmful are confined in the instrument through a wash bottle and an active charcoal filter ventilation system.

1-5 Touch Screen Monitor

The STP420 is operated via a graphical user interface to the touch screen monitor. The PC and screen start automatically when you turn the instrument on, so you can start using the screen within a few minutes. An integrated screen saver turns off the monitor when not in use. This extends the length of the screen life. In order to turn the monitor on again, touch the screen.

When you first turn on the equipment, the touch screen monitor displays the 'Standby screen':

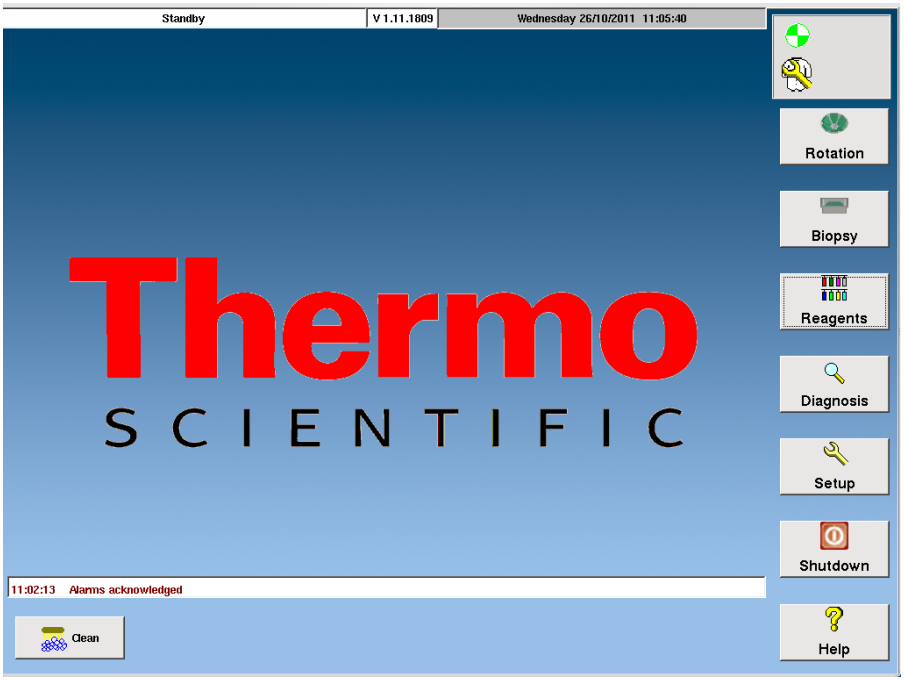


Figure 4. Stand-by screen after tuning-on the instrument.

On the right, at the top of the screen, is the Status window. For details of the Status window, see Section 1-5-3 Status window.

Towards the bottom of the screen is a message line. This always shows the last associated message and its time, for example:

Figure 5. General message line on the bottom of the screen.

On the right below the Status window are seven buttons for the main functions of the instrument.

As processing continues, different command buttons (see Section 1-5-1 Buttons) appear at the bottom of the screen, for example:

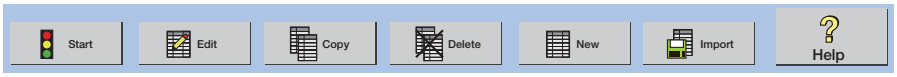
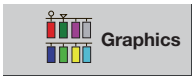
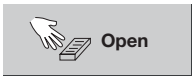
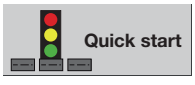


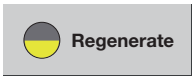
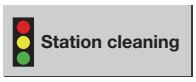
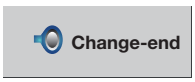
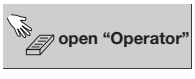
Figure 6. Example for different buttons taking the place of the general message line during processing.

1-5-1 Buttons

Note!
Some buttons will change the inscription if they are pressed. The current inscription indicates the current setting.

Button	Name	Description
Adjust time	Adjust Time	This button appears on the Setup screen, and lets you set the local time.
Biopsy	Biopsy	Use this button to access a predefined biopsy protocol.
STOP Cancel	Cancel	Press this to cancel a running protocol. The inscription and function of this button changes to Stop when the protocol runs.
Program end	Program end	This switches on or off the audible signal telling you a protocol has finished.
Cleaning	Clean	Use this to access cleaning cycle parameters, such as time, number of steps, and so on, or to add new clean cycle protocols.
000 Clear counter	Clear Counter	This resets the expiry or consumption counters for a given paraffin container or reagent bottle.
Copy	Copy	Press this to copy an existing protocol, so that you can edit it to create a new one.
Delete	Delete	Press to delete a programm
Delete	Delete Reagent	This button lights up after selecting reagents as a part of the reagent management, if a reagent station is highlighted on the screen. Pressing this button deletes the previously assigned reagent from that station.
Diagnosis	Diagnosis	This gives you access to all the message protocols, message codes, and hardware diagnostic functions. You can use this menu for information, for example, to export log files, but only appropriately skilled users (that is, 'technician' users, see Section 1-6 User Profiles) can carry out testing or make adjustments.
Drain	Drain	Use this to empty reagent bottles automatically.
Edit	Edit	Use this button to see and, if necessary, change protocol steps.

Button	Name	Description
	Edit Reagent	This button appears after you press **Setup**, as part of the reagent management process. It enables you to edit a reagent in the list.
	Export	Press this to save a defined reagent list or protocol to a floppy disk or USB data stick.
	Fill	Use this button to start refilling reagent bottles after emptying them automatically.
	Graphics	Press this to display protocol progress as a graphic.
	Help	All screens have an integrated, context-sensitive help function, where you can find text information relating to the functions displayed on the screen. Press **Help** to access the information, and press **Help** again to turn the help off.
	Import	Press this to retrieve a protocol from a floppy disk or USB data stick.
	Language	Press this button to choose a language. The default is English.
	List	Press this while a protocol is running, to see a list of predefined protocols.
	Lock	Press this button to change the screen status to 'Locked'.
	Manual	Use this button on the Reagent management screen if you want to redefine reagents.
	New	Use this to create a new protocol.
	New Reagent	This button appears after you press **Setup**, as part of the reagent management process. It enables you to add a new reagent to the list.
	Open	Open a chamber to reload specimens and continue a protocol.
	Process	Use this button to access process parameters you want to change.
	Quick start	This button enables you to create or change 'quick start' buttons.

Button	Name	Description
	Regenerate	Press this on the Reagent management screen to regenerate (that is, remove residues from) paraffin. The corresponding paraffin containers must be marked on the screen.
	Reagent List	Press this from the Reagent management screen to open the list of available reagents.
	Reagents	Press **Reagents** to access functions for reagent setup and management, and for the loading and drain stations. The corresponding paraffin containers must be marked on the screen.
	Reagent Setup	This button appears after you press **Reagents**, as part of the reagent management process. It enables you to create a reagent list.
	Rotation	Use this button to access a predefined rotation protocol.
	Setup	This button gives you access to a variety of adjustable settings, such as user level, language, date and time, volume, temperature units, quick start buttons and process settings.
	Shutdown	Press this button to shut down the instrument correctly, before turning the power off.
	Start	Press this button to start a predefined protocol.
	Table	Press this to display protocol progress as a table.
	User	This button allows change the user level.
	Station cleaning	This button is used to remove impurities from the fluid lines assosciated with individual Reagent stations.
	Change end	Turns on or off an audible signal that notifies you about the end of the automatic filling or emptying the process.
	Open “Operator”	This key can be used to open open the processing chamber during a protocol, allowing the addition of further cassettes. The instrument must be in “User” or “supervisor” mode. The biopsy and rotation chambers are independantly selectable; with the command applying to all protocols in the respective chamber.

1-5-2 Using the touch screen

You can carry out every operation from the touch screen.

A virtual numeric keypad is available for entering numbers, and an alpha-numeric one for text and numbers.

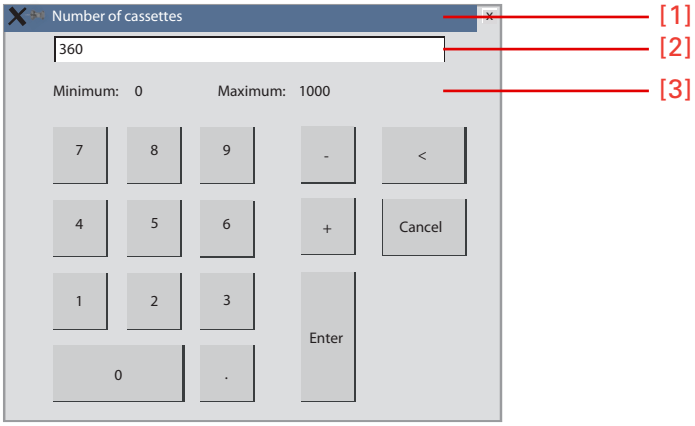


Figure 7. The numeric keypad.

[1] Title bar
[2] Input field
[3] Maximum and minimum possible values

- The title bar tells you the parameter to enter in the input field, directly below it.
- Maximum and minimum possible values for the parameter appear immediately below the input field.
- The instrument checks that the value you enter is valid. Confirm your entry by pressing **Enter**.

Note!
Invalid entries: Entries that fall outside the valid limits are shown in red and cannot be confirmed by pressing **Enter**. *In this case, use the* < *key to delete digits.*

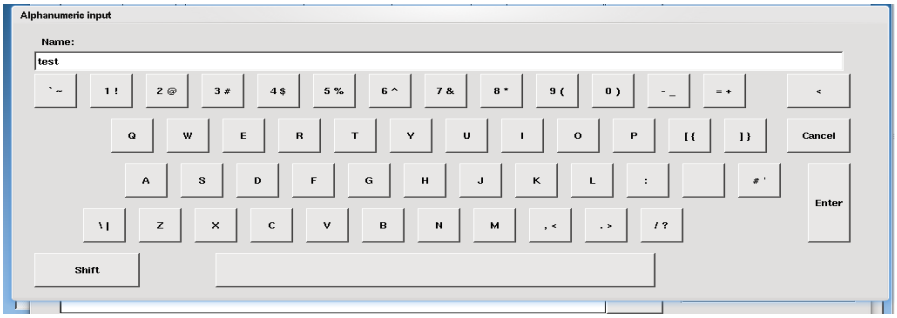


Figure 8. The alpha numeric keypad.

Use this to enter combinations of letters and numbers, for example, for protocol names, reagent names, and passwords.

Note!
Password security: For security, as you type the password in, the input field displays asterisks (*) rather than your typed characters.

Note!
Upper case: Press **Shift** *for upper case letters. Upper case remains active until you press* **Shift** *again.*

1-5-3 Status window

The Status window displays different icons, depending on the condition of the instrument.

The main indications are:

STANDBY
The wheel spins to indicate communication between the user interface and the instrument control. When the instrument has started, the wheel icon is blue, and during this time no user interaction (for example, unlocking the chamber lid) is possible. When the instrument is ready for operation, the icon turns from blue to green.

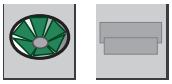
ALARM
An audible signal will indicate an error, the end of the cycle or the lack of some supply. The alarm icon also serves as a button to acknowledge an alarm.

In the event of an alarm, the touch screen displays warning messages and an audible warning sound can be heard. Press the alarm bell icon to turn this off.

MELTING POINT TIMER
This icon is visible while the paraffin is melting. While it is displayed, paraffin is not available for processing tissue specimens. As soon as the paraffin is ready, the icon disappears.

Note!
Molten paraffin: You can add molten paraffin to speed up the melting process. The melting timer can be turned off when you made sure that the paraffin had melted. To turn it off use the melting timer icon.

USER LEVEL
This indicates the current user level (see Section 1-6 User Profiles).



ROTARY CHAMBER AND BIOPSY CHAMBER
Whenever a protocol runs, the icon of the relevant chamber is displayed.

If a protocol is canceled or terminated, a red “STOP” signal will appear on the icon.

If a chamber is opened during a run (for example, to reload specimens), the appropriate icon is replaced with a ‘hand’ icon.

1-6 User Profiles

To change user access, and its associated passwords and functions, press the **User** icon on the status window. Four levels of User Access are available:

Symbol	Status	Description
	Locked	At this level, all functions are locked. No operations are possible. To avoid inappropriate entries via the touch screen during a protocol run, the instrument reverts to this user level as soon as a protocol first step starts.
	User	This level is not password protected, and all operations for a normal protocol run are possible: • View stored logs • Opening chambers to add specimens, when no program is running • Start and stop logs (but not altering protocols) For a comprehensive list of the tasks that 'users' can perform, see "Appendix B User and Supervisor Permissions".
	Supervisor	This level is password protected. At this level: • All normal operations are possible • You can define protocols and reagent lists • You can open chambers when a program is running (for example, to add more specimen – The 'supervisor' is free to pass this option for the User level.) For a comprehensive list of the tasks that 'supervisors' can perform, see "Appendix B User and Supervisor Permissions".
	Demo	This mode simulates processing, and is for demonstration purposes only (for example, at trade fairs and so on)
	Technician	This level has special protection. To access it, you need a 'technician dongle'. The dongle must be inserted into one of the two USB ports. Only trained and certified service staff are given this device. With the dongle in place, you have access to all the instrument's functions: • You can check all hardware functions • You can alter the instrument parameters

Technican Access

Operate at 'technician' level with great care. Inappropriate operations at this level might cause malfunctions and damage to the instrument.

1-7 Paraffin Containers

The STP420 has four paraffin containers, situated in the upper part of the instrument behind the processing chambers. The containers are constantly heated as long as the instrument has power.

Each container is marked with 'silver ring' fill lines: to use one chamber only, fill the containers to the lower line. You must fill both paraffin tanks up to the line in order to use the two chambers simultaneously. Heating is applied to the containers from below, and via a heating core in the middle of each container. The initial paraffin melts, with the entire volume melting in approximately nine hours. Subsequently, melting takes approximately four hours.

You can clean the drain mesh or remove objects that fall into the tank when you lift the heat distribution device. First, drain the paraffin from the tank to avoid dirt getting into the filter system.

Heating Elements
Do not operate the instrument if any of the paraffin container heating elements have been removed.

1-8 Filter System

The filter systems of the STP420 comprise an air filter system and a reagent filter.

The reagent filter consists of a blue sponge positioned below the metal screen at the bottom of the rotary chamber. It captures floating material and debris and prevents them from entering the reagent tubing system.

The STP420 air filter system consists of a wash bottle and an active charcoal filter:

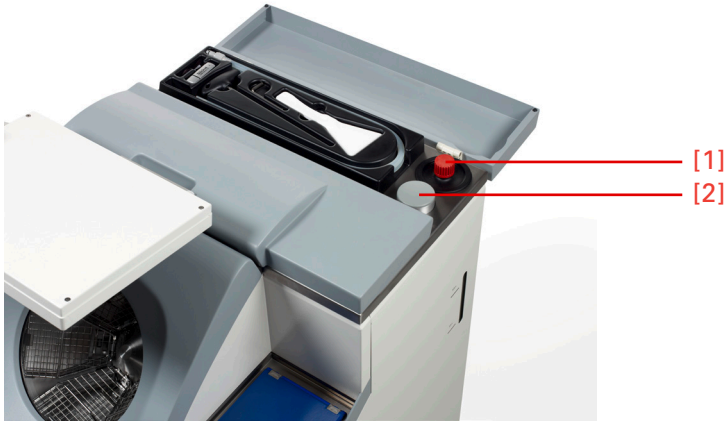


Figure 9. Location of the filter system.

[1] Wash bottle
[2] Charcoal filter

Air contaminated with reagent vapor is not released directly into the ambient air. It is pumped through the chamber and separated from the solvent vapors in two steps:

- The pumped air is guided through the wash bottle, which is filled with water. The water-soluble constituents of the vapors (for example, alcohol) are completely condensed in this bottle.

- Then the air is passed through the large active charcoal filter, which filters any vapor still remaining.

Note: idle time can be adjusted in order to avoid vapors escaping from the chamber on opening. The idle time value will determine how long fresh air is pumped into the chamber after cleaning and before the lid is released for opening. See sections 3-7-3

Note!
Filter elements: For the best filtering results, make sure you observe strictly the following replacement intervals:

- *Wash bottle: After five program runs, or once a week (see* Section 3-3 Filter System Maintenance*)*
- *Active charcoal filter: After approximately six months (see* Section 3-3)
- *Reagent filter: twice a week* (*see* Section 5-3 Rotary and Biopsy Chamber Cleaning Cylce)

1-9 Reagents and Reagent Lists

For effective reagent management, you must amend the predefined reagent list as part of setting up the STP420. See Section 2-6 Adjusting Reagents and Reagent Lists for details.

You must then assign reagents specifically to each of the ten reagent stations and two cleaning stations (see Section 3-4 Assigning Reagents and Paraffins to Stations).

Follow these rules when using reagents:

- Handling reagents: Handle the reagents used with the instrument according to your laboratory's regulations.
- Transporting reagents: Carry the reagents in the reagent bottles in such a way as to avoid spilling any reagent.
- Storing reagents: Store reagents in an external, suitable room, according to your laboratory's regulations.

CHEMICALS
Always use reagents only in accordance with the manufacturer's safety data sheets (MSDS).

1-10 Protocols

Protocols are key to the successful and efficient use of the STP420. The STP420 has a predefined protocol list, which you can change to suit your needs.

Refer to “Appendix F Preferred Protocols and Best Practices”, before you start using the STP420.

A protocol consists of a sequence of one or more steps, each of which treats the tissue specimens with one specified reagent.

The sequence of protocol steps is determined by the tissue specimen processing you want. You can include as many steps as are necessary in any given protocol.

You can store a variety of different protocols in the instrument, for both the rotary chamber and the biopsy chamber, depending on the different processing you want to carry out.

Note!
Number of protocols: Generally, the number of possible protocols and protocol steps you can store is limited only by the storage capacity of the built-in hard disk.

Protocol timing

Protocols are normally designed to run only for the defined processing time, plus the necessary additional times for filling and draining reagents in the chambers, heating, and pressure build-up.

However, specimen processing is usually carried out over night. In these cases, you are advised not to store the specimens in the hot paraffin all night, but use the extra time for additional fixation of the specimens. For these cases, you can define a fixed end time at which the protocol will finish. You can define a ‘wait’ step in the protocol, for example, in the formalin step, and utilize extra time to ensure that the last protocol step finishes at the programmed end time.

For details about executing predefined protocols, see Section 3-5 Starting a Protocol.

For details of the types of protocol steps available, and how to create a protocol, see Section 3-7 Editing and Creating Protocols.

Chapter 2
Setting up the STP420

Transporting the STP420

The instrument must *only* be transported upright.

To set up the STP420:

1. Unpack the equipment (see Section 2-1 Unpacking the STP420).
2. Select a site (see Section 2-2 Selecting a Site for the STP420).
3. Transport the STP420 to its correct location (see Section 2-3 Transporting the STP420 to Its Site).
4. Prepare the equipment and turn it on (see Section 2-4 Preparing the STP420 and Turning It on).
5. Set the various processing options, such as language, date and time, user level, and so on (see Section 2-5 Setting the Processing Options).
6. Create an initial reagent list (see Section 2-6 Adjusting Reagents and Reagent Lists).

2-1 Unpacking the STP420

Note!
Carefully inspect the shipping packaging for any signs of shipping damage (check the 'tip indicator') as soon as the equipment is delivered. If there is any visible damage, do not open the packaging. Contact the delivery carrier immediately to report any damage. Also contact Thermo Scientific or your local dealer as soon as possible.

Note!
The instrument must be installed, and instruction be given, by a fully authorized representative of Thermo Scientific. All warranties and guarantees are null and void, if the instrument is installed by a third party.

To unpack the STP420:

1. Open the packaging by following exactly the instructions affixed to the surface of the transport packing.

2. After unpacking, store all the packing materials (that is, the cardboard box, wooden pallet, polystyrene, plastic bag and so on) in a dry condition.

3. In the event of factory service becoming necessary, the instrument must be returned to Thermo Scientific in its original packaging. This packaging is especially designed to transport the STP420 safely, and to minimize the risk of transport damage.

4. Ask Thermo Scientific or your local authorized representative to fix a date for the initial turn-on, and for instructions.

2-2 Selecting a Site for the STP420

Note!
To avoid harm to the instrument or users, make sure the site you choose for the STP420 conforms to the following requirements.

- The main switch on the left side of the instrument must always be accessible.
- The STP420 uses flammable liquids, so the site must be free from sparks or open flame.
- The site must be a stable, flat floor space large enough to accommodate the instrument's dimensions and weight.
- If possible, you must be able to see the wash bottle scale oval window on the right-hand side, so it can be checked weekly without moving the instrument.
- Make sure there are no vibrations, direct exposure to sunlight, or large temperature variations. Refer also to the Operating Conditions in "Appendix E Technical Data".
- Because the instrument has an exhaust system with internal fume control, the site does not need a fan or exhaust vent for safe operation. However, you can connect a 50 mm diameter hose for external fume extraction, if required.

The socket on the rear has an outer diameter of about 51.5 mm. The hose NW 50 (e.g. HT connection hose DN-50) needs to be attached to the socket. It can be connected to the downstream suction connection of a fume hood or an exhaust system.

Description of the air duct

The air is sucked via a customized suction connection of an aspirator hose. It flows through the perforated back wall of the upstream suction nozzle and between the glass panels of the installation site.

The stronger the vacuum extraction, the more air flows between the glass panels of the unit, and through the reagent tubes and the aggregation part for suction.

Technical Data

Recommended flow rate	about 7 m^3/h (up to 20 m^3/h)
Air velocity in the hose NW50	about 1 m/h (up to 3 m/h)
Flow noise	negligible, <20 dB (A)
Monitoring of air flow	on site if desired
Flow resistance of about 2 to 5 Pa/me depending on the quality hose	about 2 to 5 Pa/m depending on the quality hose

The flow resistance in the STP420 is negligible (<0.01 Pa at 1 m3/h). The required negative pressure does not depend on the STP420, but on the flow resistance of the suction hose. In the laboratory, the permanent negative pressure must be maintained at the connection point of the fume hood or the exhaust system, and be lowered according to the tube length and flow rate.

FORMALDEHYDE
You must exercise caution when opening the lid of the rotational chamber if it contains formaldeyhyde, to avoid exposure.

- To guarantee sufficient ventilation, make sure the instrument can be sited the following distances from walls or other instruments:
    - Rear: 30 cm/12 inches
    - Left side: 30 cm/12 inches
    - Right side: 20 cm/8 inches
- All interfaces for peripherals (for example, remote alarm system) are located on the left side of the device. These must be easily accessible.
- The site must have a heat emission no greater than 1200 W. Make sure the site has adequate means to dissipate heat.
- There must be a suitable power source for optimal operation. Emergency power is also recommended.

Note!
The equipment has a 1.5m/60-inch power cord, with a three-wire ground plug.

2-3 Transporting the STP420 to Its Site

Carrying or transporting the STP420

When carrying or transporting the instrument, make sure no pressure is applied to the side walls, or to the front or rear of the instrument.

Carrying the STP420 using lifting equipment

If necessary, use more than one person to make sure the instrument does not tilt to the right or left.

You can move the instrument:

- On rollers
- Using the transport handles
- Using lifting equipment

These are described in the following three sections.

2-3-1 Moving the STP420 using rollers

The STP420 has four rollers, suitable for moving the equipment over an even floor (see Fig. 10):

Keep the instrument upright, and push it, holding the right and left sides. Never move the device by holding the locking lever of the biopsy chamber or the handle on the rotating chamber lid. Otherwise, the locking mechanism may be damaged.

Figure 10. Moving the equipment over an even floor.

2-3-2 Carrying the STP420 using the transport handles

Use the transport handles to carry the instrument.

1. Use screws to fasten the largest of the three transport handles to the rear wall of the instrument (see Fig. 11)

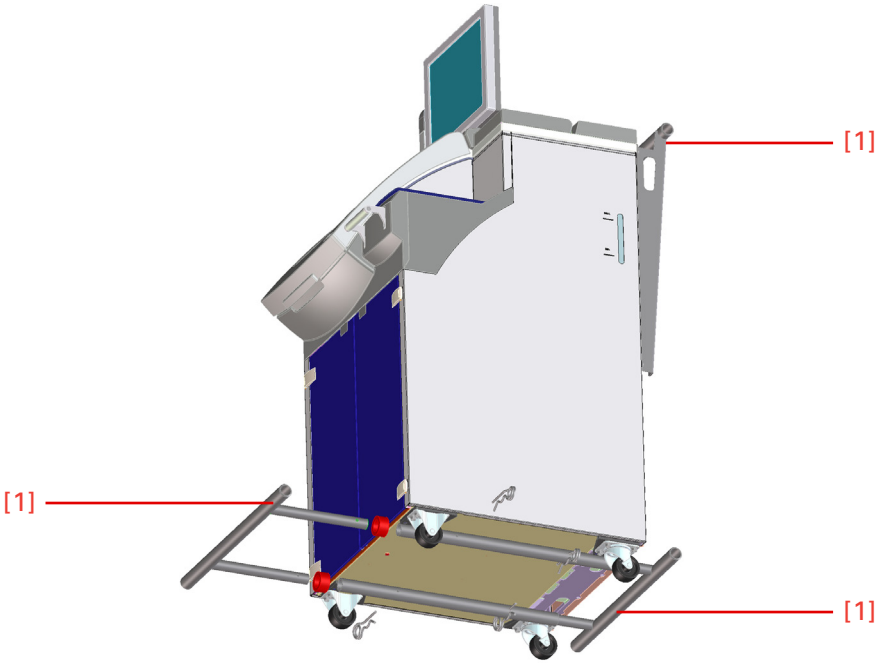


Figure 11. Position of the transport handles.

[1] Transport handle

2. If the lower transport handles are not attached, push them into the receptacles and secure them using the clip connectors.

Clip Connectors
Ensure that the clip connectors lock correctly in place.

3. Lift and carry the instrument using the upper and lower transport handles.

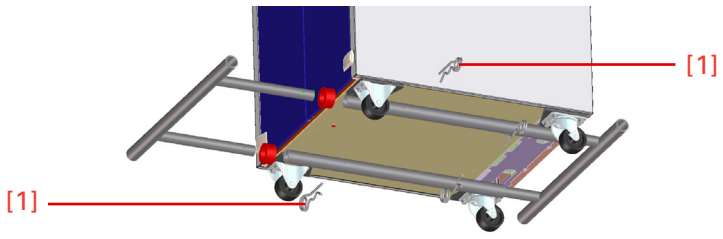


Figure 12. Position of the clip connectors.

[1] Clip connector

2-3-3 Moving the STP420 using lifting equipment

When transporting the instrument using a lift-truck or a fork lift, first completely repack the instrument, following the Unpacking Instructions found on the shipping container.

CARRYING USING LIFTING EQUIPMENT

If necessary, use more than one person to make sure the instrument does not tilt to the right or left.

2-4 Preparing the STP420 and Turning It on

Note!
Responsibilities: The operator of the equipment is responsible for the tissue samples; the special conditions for their processing, pre-treatment and, if necessary, storage; the instrument controls for operating the device correctly and safely; and for any special equipment, materials, and reagents for operating the instrument.

INITIAL TURN-ON
Before turning on the instrument for the first time, check that the power supply voltage to be used matches the power requirements indicated on the type plate. Before you turn the instrument on, you must always be sure that it is in a suitable condition.

To prepare the equipment for operation for the first time, you must:

1. Fill the reagent bottles with reagents (see Section 2-4-2 Filling the reagent bottles manually).
2. Turn the equipment on (see Section 2-4-1 Turning on the power).
3. Fill the paraffin containers with pellets, flakes or liquid paraffin (see Section 2-4-3 Filling the paraffin containers).
4. Fill the wash bottle with distilled water (see Section 2-4-4 Filling the wash bottle).

2-4-1 Turning on the power

1. Plug the equipment in.
2. Turn on the main switch on the left side of the equipment.

Note
Wait until the color of the propeller icon in the upper right corner of the screen changes from blue to green and rotates. Only then, is the device fully booted and ready for operation.

TURNING THE EQUIPMENT OFF
Never turn the instrument off without following the instructions in Section 3-1 Turning the Instrument On and Off.

2-4-2 Filling the reagent bottles manually

1. Remove the reagent bottle by applying pressure on the bottle holder located on the front of the bottle (A) and simultaneously pulling the front of the bottle (B):

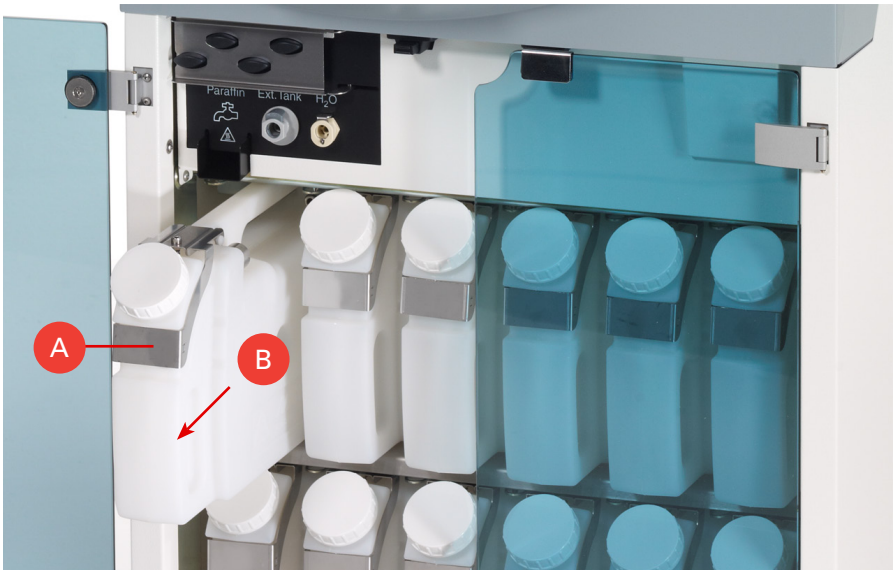


Figure 13. Moving the reagent bottles.

2. Fill the bottles with the appropriate reagents, according to your required reagent bottle designation (see Section 2-6 Adjusting Reagents and Reagent Lists).

The reagent bottles are marked with two filling lines: The lower line corresponds to 3.8 liters (1 US gallon), the upper one to 5 liters (1.32 US gallons).

If you intend operating with one chamber only, you need only fill the bottles to the lower line.

If you intend operating with two chambers simultaneously, you *mus*t fill the bottles to the upper line.

FILLING THE BOTTLES
Make sure you keep to the prescribed filling levels, when filling bottles with fresh reagent.

3. Use the metal tags provided, or label the bottle clip with the name of the reagent, and insert the filled bottle into its correct location. Make sure you hear the 'click' that confirms it is correctly placed.

Note!
Automatic filling: Once the STP420 is turned on, you can fill the reagent bottles automatically (see Section 3-6-3 Automatically replacing reagents*).*

Note!
Reagents are held in bottles with quick-connect terminals to prevent any spillage.

2-4-3 Filling the paraffin containers

1. Open the paraffin lid, and make sure the heating cores are in place:

Figure 14. Location of the paraffin containers.

PARAFFIN CONTAINERS
Do not operate the instrument if any of the paraffin container heating cores have been removed.

2. Fill each container with paraffin pellets, up to the 'maximum' mark inside the container.

3. Check regularly that the paraffin has all melted, then top up the container. Wait, then check the paraffin has melted and top up the container a second time:

   For initial setup: Total melt time for the initial fill and two additions, using pellets, is approximately 9 hours. During this time the melting timer will be running. A protocol can be started only after the melting timer set off or was turned off. You can achieve shorter melt times by using flakes or liquid paraffin. If liquid paraffin is used for filling, the melting timer can be turned off. Wait at least 30 min after switching on the timer before you start the first protocol to ensure that all pipes and valves have reached the required operating temperature.

   For subsequent refills, after a container is emptied: Total melt time for the initial fill and two additions is approximately 4 hours.

Note!
If the temperature of a paraffin stove drops more than 4° when paraffin is being refilled, the corresponding temperature of the oven must be increased by 5° for the next 2 hours in order to accelerate the melting.

Note!
Paraffin level: You must make sure that the fully melted paraffin is at the correct level. If needed, add liquid or solid paraffin.

Note!
Paraffin pellets: It takes approximately 4 kg of pellets to fill each container.

4. Check the status window at top right of the monitor. The 'melting timer' indicates that the paraffin is still melting. When this disappears, the paraffin is ready for operation. When you are sure that all the paraffin is liquid, you can reset the melting timer. Press the melting timer icon and **Delete/Turn off**.

5. Now go to Section 2-4-4 Filling the wash bottle.

2-4-4 Filling the wash bottle

Note!
Water level: You can see the filling height of the water inside the bottle in the oval window on the right side of the instrument. If you have access to the rear of the instrument, shining a flash light through the rear panel can help you determine the water level more easily.

1. Open the rear cover above the wash bottle:

Figure 15. Step 1 for filling the wash bottle.

[1] Rear cover
[2] Screw cap

2. Remove the screw cap from the wash bottle and insert the funnel provided into the opening.

3. Fill the bottle with clean distilled water (approximately 800 ml) until the water level can be seen in the lower area of the oval window:

Figure 16. Step 2 for filling the wash bottle.

[1] Upper area
[2] Lower area

WATER LEVELS

Fill the wash bottle only as far as the lower area of the window, as the water level inside the wash bottle increases as a result of filtering. Once you see the level in the upper portion of the window or five messages were logged you must replace the water filter. After the log of the 5th message a reminder will be displayed. Check the level regularly. The maximum mark on the window must not be exceeded. See Section 3-3-2 Emptying water from the wash bottle. By pressing the button “Remind Later” the reminder can be postponed as often as it is necessary. It appears, however, after the log of each new message until the counter is reset with OK. Note! You can reset the counter only when you have a “Supervisor” access.

4. Replace the screw cap on the wash bottle and close the rear cover.

5. Next, go to Section 2-5 Setting the Processing Options.

2-5 Setting the Processing Options

All the parameters you use to operate the STP420 are created via the Setup screen. This screen lets you adjust parameters, and create and edit 'quick start' buttons.

To access the Setup screen, select **Setup** on the Standby screen. The Setup screen appears and immediately displays the Process settings screen:

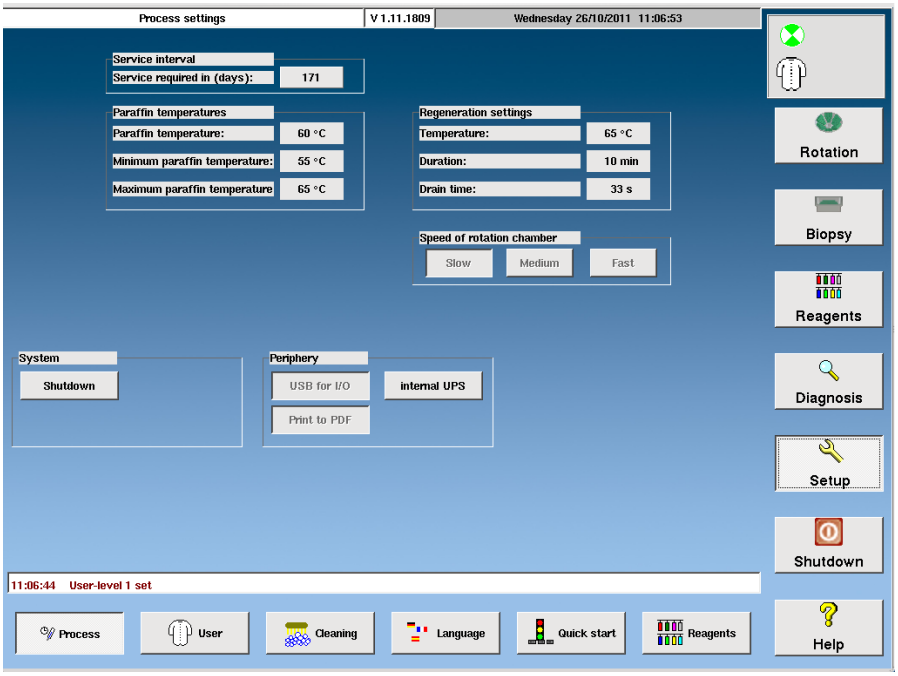


Figure 17. Operating the "Setup" screen.

From the Process settings screen, you can:

- Shut the system down properly (see Section 3-1 Turning the Instrument On and Off)
- Select the language (see Section 2-5-1 Selecting the language)
- Set local time (see Section 2-5-2 Setting local time (real time clock))
- Adjust the audible volume of signals (see Section 2-5-3 Adjusting the audible volume)
- Set the pressure units (see Section 2-5-4 Selecting the pressure units)
- Set the temperature units (see Section 2-5-5 Selecting the temperature units)
- Access the cleaning cycles (see Section 5-1 Rotary and Biopsy Chamber Cleaning Cycle)

- Edit processing parameters (see Section 2-5-6 Editing processing parameters):
  - Paraffin temperature
  - Regeneration values
  - Chamber rotation speeds
  - User level (see Section 1-6 User Profiles)
  - Peripherals
- Edit reagent groups (see Section 2-5-7 Editing reagent groups)
- Set up 'quick start' buttons (see Section 3-10 Creating and Changing Quick Start Buttons)

2-5-1 Selecting the language

Note!
Default language: The preset language for international users is English. Follow the steps below only if you need to change this.

You can choose to operate the instrument in English, German, French, Italian, or Spanish.

To change the language:

1. On the Process settings screen, select **Language**, to display the Standby screen.
2. Select the language you want.

Thereafter, all indications and messages on the screen appear in the language of your choice. You do not need to restart the instrument.

Note!
Changed language: It takes approximately 10 seconds for the new language to implement. Wait a short time, while the instrument adjusts, before entering new settings.

2-5-2 Setting local time and date

1. On the Process settings screen, select **Language**, to display the Standby screen.
2. Select **Adjust time**, on the left of the screen. The Time screen appears.

Note!
Adjusting the time: You can only adjust the time if you have 'supervisor' access.

3. Touch the hour or minute box and enter the correct time using the virtual keyboard.

Note!
You must use a 24-hour clock.

4. Use + and - buttons to select the desired date.

5. Touch **OK** to save changes or **Cancel** to return to the "Language Settings" screen.

Note!
There is no automatic switch from summer to winter time.

Note!
If English is selected as language, you can set the date format to "International" or "U.S.".

2-5-3 Adjusting the audible volume

1. On the Process settings screen, select **Language**, to display the Standby screen.

The volume slider appears below the language options:

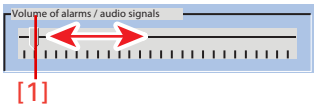


Figure 18. Adjusting the audible volume with slider [1].

To decrease the volume, move the slider to the left.

To increase the volume, move the slider to the right.

To turn the volume off, move the slider as far left as it will go.

2-5-4 Selecting the pressure units

You can choose between pounds per square inch (PSI) and bar/millibar (bar/mbar).

1. On the Process settings screen, select **Language**, to display the Standby screen.

2. Select **Pressure in psi** or **Pressure in bar**, as appropriate. The button legend indicates the system in use.

2-5-5 Selecting the temperature units

You can choose between Celsius and Fahrenheit.

1. On the Process settings screen, select **Language**, to display the Standby screen.

2. Select **Temperature in °C** or **Temperature in °F**, as appropriate. The button legend indicates the system in use.

2-5-6 Editing processing parameters

The Process settings screen displays preset values for the paraffin temperatures, regeneration settings, and rotation chamber speed. You can adjust these if you have the right user access.

When you have adjusted the processing parameters, touch **Enter** to save your changes or **Cancel** to return to the original display.

1. If necessary, adjust the paraffin temperatures:

    a. At the upper left of the Process settings screen, touch the value box next to the paraffin temperature.

    b. Use the virtual numeric keyboard to enter the value you want.

For example:

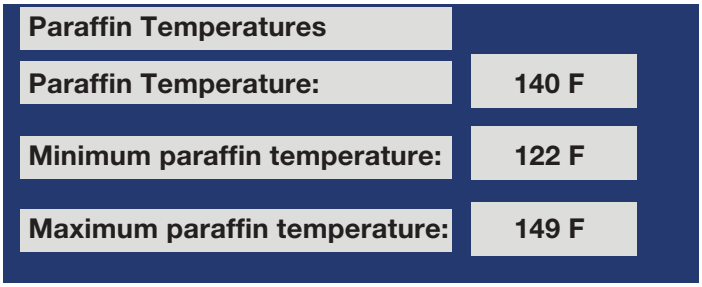


Figure 19. Editing the paraffin temperatures via the process settings.

Note!
Maximum and minimum temperatures: The maximum and minimum paraffin temperatures are default settings you cannot change.

2. If necessary, adjust the paraffin regeneration settings according to your laboratory's specific requirements:

    a. At the upper right of the Process settings screen, touch the value box for the Regeneration temperature.

    b. Enter a value no greater than 70°C using the keyboard.

    c. Follow the same procedure to change the Regeneration time and Drain time.

3. Under 'Speed of rotation chamber', press the rotation speed you want.

4. In the 'periphery' part of the screen, choose between:

    - **USB for I/O:** Select this to switch between storing protocols on a plugged in USB data stick or onto an inserted 3.5-inch floppy disk.

    Note!
    The option to save to 3.5-inch floppy disk is not available for devices with monitor interface.

    - **Print to PDF:** Select this button to print protocols to a file as PDF. The button legend indicates the sytem in use.

    Note!
    For devices with monitor: interfaces can print data as pdf only and save them on USB.

    If you print to PDF, the PDF files will be stored automatically to the selected I/O device.

    - **External UPS:** Turn this option on when the STP420 is connected to an external uninterrupted power supply.

USB DATA STICKS
Use only the USB memory stick supplied with the STP420, by inserting into the left hand side of the instrument (option II). Others will not work.

2-5-7 Editing reagent groups

Note!
Editing reagent groups: You can only edit reagent groups if you have 'supervisor' access.

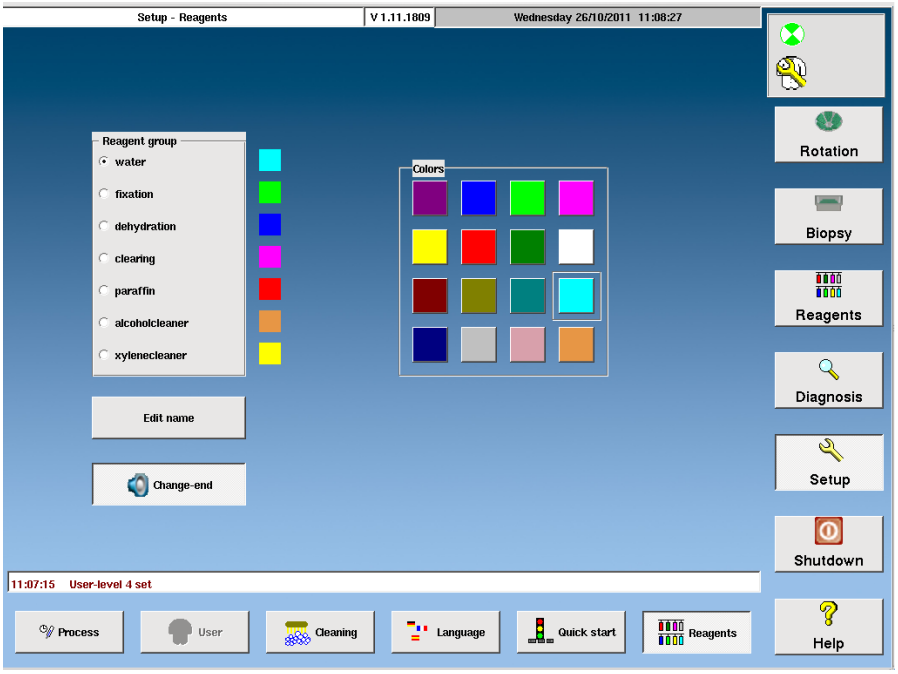


Figure 20. "Supervisor" screen for editing reagent groups.

You can change the name and color associated with a reagent group, and switch on or off an audible process end signal.

1. Select **Setup** from the Standby screen. The Process settings screen appears. Select **Reagents** from the sub-menu.

2. To edit a reagent group name:

    a. Under Reagent group, check the group you want, to select it.

    b. Select **Edit name** below the list of groups. The alpha-numeric keypad appears.

    c. Use the keypad to enter the new reagent group name.

    d. On the keypad, select **<** to erase characters, or **Enter** to confirm the name.

3. To change the color associated with a reagent displayed on the screen:

    a. Under Reagent group, check the group you want, to select it.

    b. Select a color from the display under Colors in the middle of the screen.

4. To switch on or off the audible signal which tells you when an automatic fill or drain has finished, select **Change-end**, below the group list.

Note!
Change-end button: If the audible signal is on, the button appears active. Press it to turn the signal off, and press it again to toggle between on and off. The instrument is preset with the signal on.

Note!
The default name alcohol cleaner and Xylene cleaner can not be changed. Changing them could cause a malfunction.

2-5-8 Remote alarm

The device offers the possibility to connect an external alarm circuit, which in the event of a catastrophic failure triggers a remote alarm. This can be, for example, a phone call or an alarm in a distant room. The STP420 is ready to do a potential-free switching contact. The corresponding alarm systems are commercially available. Please contact your local sales representative for more information.

A time frame can be chosen during which no external alarm will sound.

1. Select the language of the process settings to display the **"Language Settings"** screen.

2. On the left side of the screen select the time frame **"Set ext. Alarm"**. A screen for setting the time frame will appear.

   Note!
   Setting the frame only if you have "Supervisor" access.

3. Press the hour or minute field for the start time and enter the desired time using the virtual keypad. Follow the same procedure for setting the end time.

   Note!
   You must use a 24-hour clock. Factory setting is from 00:00 to 00:00, meaning that the remote alarm is always on.

4. Touch **OK** to save changes or **Cancel** to return to the **"Language Settings"** screen.

2-5-9 Changing the password

You can change the password to the supervisor level.

- In a standby screen, select **Settings**, then change the **user name** and **password**.

- Enter the new password and press **Enter**.

- Repeat the new password and confirm by pressing **Enter** again.

Note!
You must be logged in as supervisor to change the password.

Note!
There is no way to reset the password to the factory setting. Therefore, remember the new administrator password.

2-6 Adjusting Reagents and Reagent Lists

You can edit, add or delete reagents, and edit and create reagent lists.

2-6-1 Editing the predefined reagent list

1. On the Standby screen, select **Reagents**. The Reagent management screen appears.

2. Select **Setup**, in the lower part of the screen. The Reagent setup screen appears, showing a predefined list of reagents you can use for protocols:

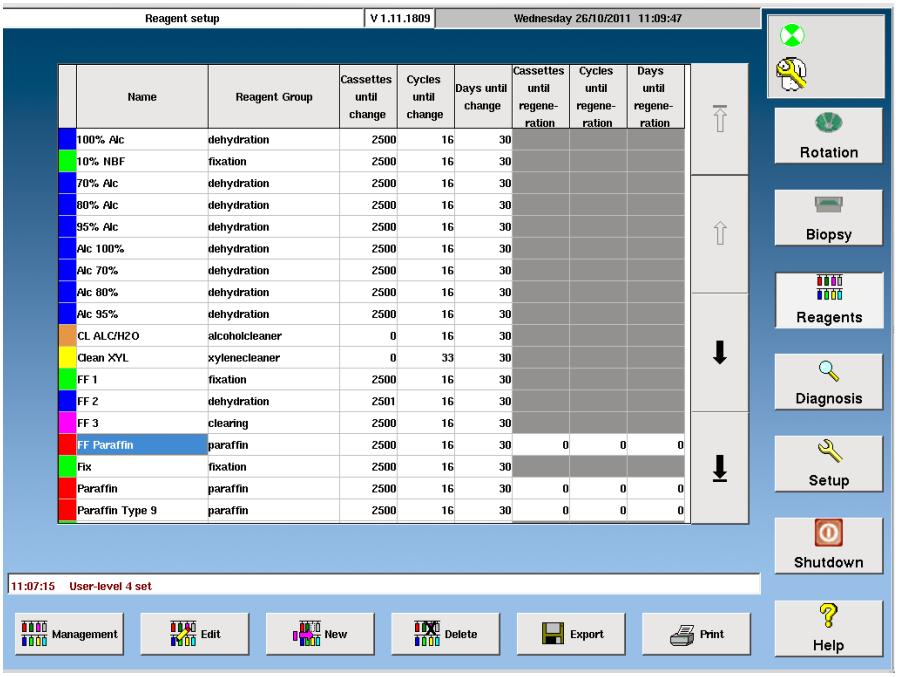


Figure 21. Reagent setup screen.

Use the buttons at the bottom of the screen to edit the list, if required, as shown below.

Note!
List editing: For safety reasons, you can only change the list when no protocol is running. Functions which are not yet available are shown in gray.
You can only edit a list if you have 'supervisor' access.

3. Touch the reagent you want to edit.

Note!
Editing reagents: You cannot edit a reagent that is assigned to a reagent bottle.

4. Touch **Edit** at the bottom of the screen.

5. Touch the name box, type the reagent name you want using the virtual keyboard, then select **Enter**.

6. Touch the reagent group you want.

7. Touch **Flammable** button in order to mark the reagent as flammable. In the case of protocols running these reagents the chamber will be emptied brfore the lid is unlocked.

8. Touch the value boxes next to each reagent management property to assign values using the virtual keyboard, then select **Enter**.

9. Touch **OK** to save the changes.

   Note!
   When the reagent is used to edit a stored protocol the OK button is not available and you can not save the changes.

Note!
All used reagents must be allocated to a reagent category. Using these categories, the STP 420 can predict if the sequential steps in a single protocol use reagents that are incompatible with each other, such as water and paraffin, and issue a signal.

Note!
Even when using compatible reagents, the device might not issue a warning message if the tissue samples are damaged. Note that when defining the protocols always use the General Procedures for Tissue Embedding and tissue-specific reagent compatibility. Use the reagent category "dehydration" for isopropanol and substitutes of the reagent scale "Clearing", which are miscible with water

CLEANING REAGENTS
The two last groups listed, cleaning alcohol and cleaning Xylene, are used for cleaning the chambers and the valves. Do not rename these reagents or the cleaning protocol will not run.

FLAMMABLE REAGENTS
If Flammable is checked, the instrument drains the reagent before the lid is released, when you try to open the chamber.

Note!
Cassettes, Cycles, Days until change: Use these to define the shelf life of the reagent. When one of these limits is reached, you must replace the reagent.

Note!
The shelf-life values of purification reagents may be changed only by service technicians.

Note!
Shelf life: The instrument displays a warning symbol when one of these limits has been reached, for example:

Figure 22. Example for a warning symbol on reagent container.

Note!
Paraffin limits: You can also use this process to change the paraffin regeneration cycle limits for the paraffin containers (see Section 2-6-1 Editing the predefined reagent list*, step 9).*

2-6-2 Creating a new reagent

Note!
Creating a new reagent: You can only create a new reagent if you have 'supervisor' access.

1. Select **New**.
2. Touch the name box that appears at the top of the property box.
3. Type the reagent name using the virtual keyboard.
4. Touch **Enter**.
5. Assign the required reagent group by touching a group name in the list.
6. Touch **Flammable** button in order to mark the reagent as flammable. In the case of protocols running these reagents the chamber will be emptied brfore the lid is unlocked.
7. Touch the value boxes next to each reagent management property to assign values using the virtual keyboard.
8. Touch **Enter**.
9. Touch **OK** to save the changes.

All used reagents must be allocated to a reagent category. Using these categories, the STP 420 can predict if the sequential steps in a single protocol use reagents that are incompatible with each other, such as water and paraffin, and issue a signal.

Note!
Even when using compatible reagents, the device might not issue a warning message if the tissue samples are damaged. Therefore, when defining the protocols always use General Procedure Guidelines for tissue processing and tissue-specific reagent compatibility.

2-6-3 Deleting a reagent

1. Touch the reagent you want to delete.
2. Touch **Delete**. A communication box appears.
3. Select **Yes** to delete the reagent or **No** to cancel the command.

Note!
Deleting reagents: You cannot delete a reagent that is assigned to a reagent bottle.

2-6-4 Saving the reagent list

Note!
Saving the reagent list: You can only save the reagent list if you have 'supervisor' access.

Save the list of defined reagents to the USB data stick or 3.5-inch floppy disk (as a backup):

1. To export the list of defined reagents, either insert an MS-DOS-formatted floppy disk into the floppy disk drive, or a USB data stick into an available USB ports.
2. Select **Export** in the lower part of the screen. The list is stored on the floppy disk or USB data stick under the filename 'Reagenzien.csv'.

Note!
The option to save to disk is not available for devices with monitor interface.

Chapter 3
Routine Operations

3-1 Turning the Instrument On and Off

3-1-1 Turning the instrument on

Turning the instrument on is described in Section 2-4-1 Turning on the power, in “Chapter 2 Setting Up the STP420”.

3-1-2 Turning the instrument off

TURNING THE INSTRUMENT OFF

To avoid any severe software and/or mechanical failure, do not turn the instrument off without following the instructions below. Any damage caused by not turning the instrument off properly is excluded from the warranty and any repair and/or service call will be charged.

To turn the instrument off correctly:

1. First Press the button **Shutdown** in the bottom right of the monitor, and confirm with **Yes**.

2. The device shuts down. At the end of this process is on the screen: “Shutdown Complete”

   Among them appear the lines:
   “[558.469503] SysRq: Emergency Sync”
   “[559.472008] SysRq: Emergency Remount R / O”

3. Wait until you see this message, then press the red switch on the left side of the device..

Note!
Shutting down: Press the toggle switch only when the messages above have appeared.

3-2 Filling and Emptying the Paraffin Containers

3-2-1 Filling the paraffin containers

Filling the paraffin containers is described in Section 2-4-3 Filling the paraffin containers, in “Chapter 2 Setting Up the STP420”.

3-2-2 Emptying the paraffin containers

Empty the paraffin tank with the help of the connection console on the front panel over the reagent station:

1. Open the glass door for access (see Fig. 23, A).
2. Tighten the connection rail by pulling the tension rod down and out completely (see Fig. 23, B).

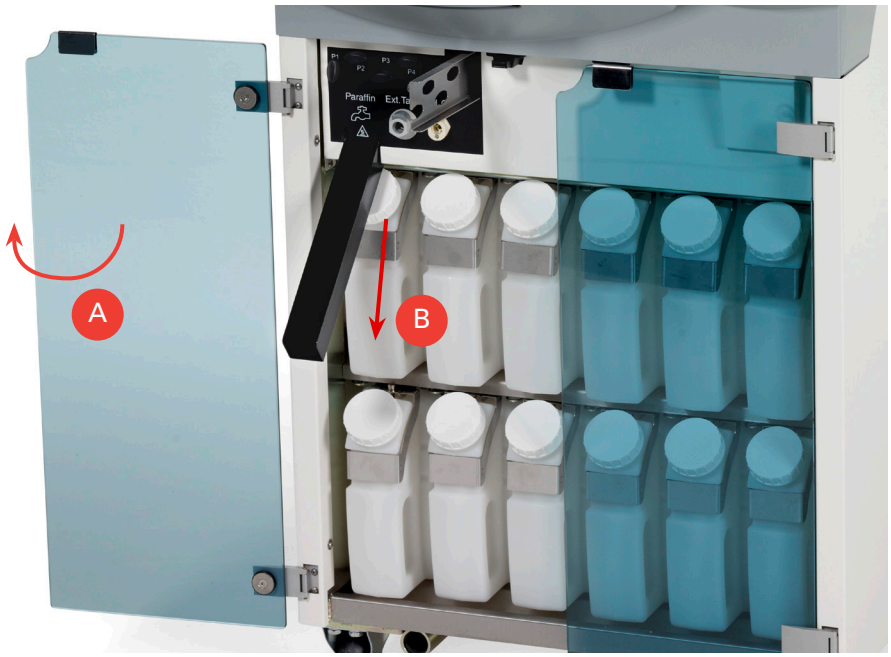


Figure 23. Access the paraffin containers.

3. Open the protective cover (see Fig. 24, A).
4. Place a container beneath the drain rail.

5. Open the desired paraffin tab - P1, P2, P3 or P4 (see Fig. 24, B and C):

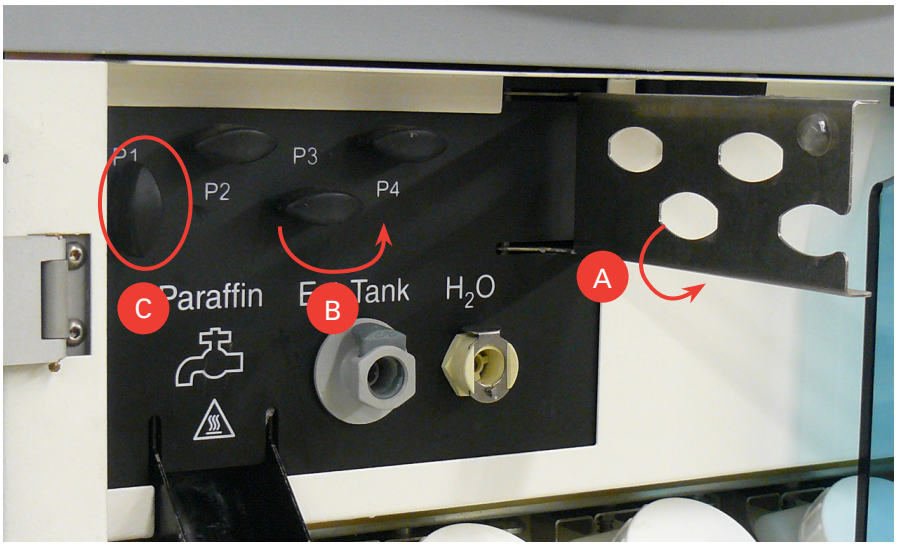


Figure 24. Open the paraffin tab.

6. Completely empty the paraffin container.

7. Lock the paraffin tab closed again (see Fig. 25).
   Let the paraffin drip for a short time so there is no paraffin left in the drain.

Figure 25. Close the paraffin tab.

8. Push the rail back into the device.

9. Close the protective cover.

3-3 Filter System Maintenance

3-3-1 Filling the wash bottle with water

Filling the wash bottle is described in Section 2-4-4 Filling the wash bottle, in “Chapter 2 Setting Up the STP420”.

3-3-2 Emptying water from the wash bottle

You can see the height of the water inside the wash bottle in the oval window on the right side of the instrument. If you have access to the rear of the instrument, shining a flash light through the rear panel can help you determine the water level more easily.

To empty water from the wash bottle:

1. Open the rear cover and remove the wash bottle screw cap (see Fig. 26, A).
2. Open the glass door of the reagent cabinet.
3. Place an empty container, with a liquid capacity of approximately 2 liters, in front of the instrument.
4. Insert the drain hose into the container. You can identify the drain hose by its color. It is the same color as the H2O connector on the device (see Figure 26 B)
5. Attach the other end of the drain hose to the H_2O connection. Press it firmly until it locks (see Fig. 26, B):

A B

Figure 26. Empty the wash bottle.

Connecting the drain hose

The filter water starts to drain immediately as soon as the connecting piece has been locked onto the H_2O connection, so you *must* make sure the end of the drain hose is in the container *before* you connect to the instrument.

6. Let the used filter water drain into the container until the wash bottle is completely empty.

7. Detach the drain hose by pressing the metal piece downward on the connection and pulling the hose off. The connection automatically closes.

8. Dispose of the used filter water according to your laboratory's regulations.

9. Refill the wash bottle with distilled water (see Section 2-4-4 Filling the wash bottle)

3-3-3 Replacing the active charcoal filter cartridge

Note!
Charcoal filter: The active charcoal filter cartridge has an effective life of approximately six months. After that, you must replace it completely. After 300 hours usage an on-screen prompt will appear to replace the filter (see Appendix A spare standard accessory).

You can defer change by selecting the "Remind Later" button. The prompt will appear again before the next protocol is started and can be deferred or acknowledged with "OK".

Note!
You can reset the counter only when you have "Supervisor" access.

To replace the charcoal filter

1. Open the cover behind the paraffin containers, with an upward movement.

2. Firmly pull up the filter cartridge:

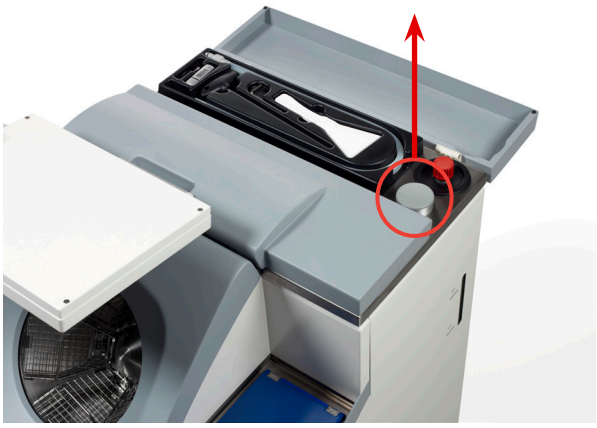


Figure 27. Pulling out the filter cartridge.

3. Insert a new filter cartridge, making sure it locks correctly into place.

3-4 Assigning Reagents and Paraffins to Stations

3-4-1 Assigning reagents

Note!
Assigning reagents: You can only assign a reagent if you have 'supervisor' access.

You can assign the reagents in your reagents list to specific stations. These stations must be empty and not previously assigned.

Note!
Assigning reagents: You can only assign reagents if there is no protocol running.

1. Select **Reagents** on the Standby screen. The Reagent management screen appears:

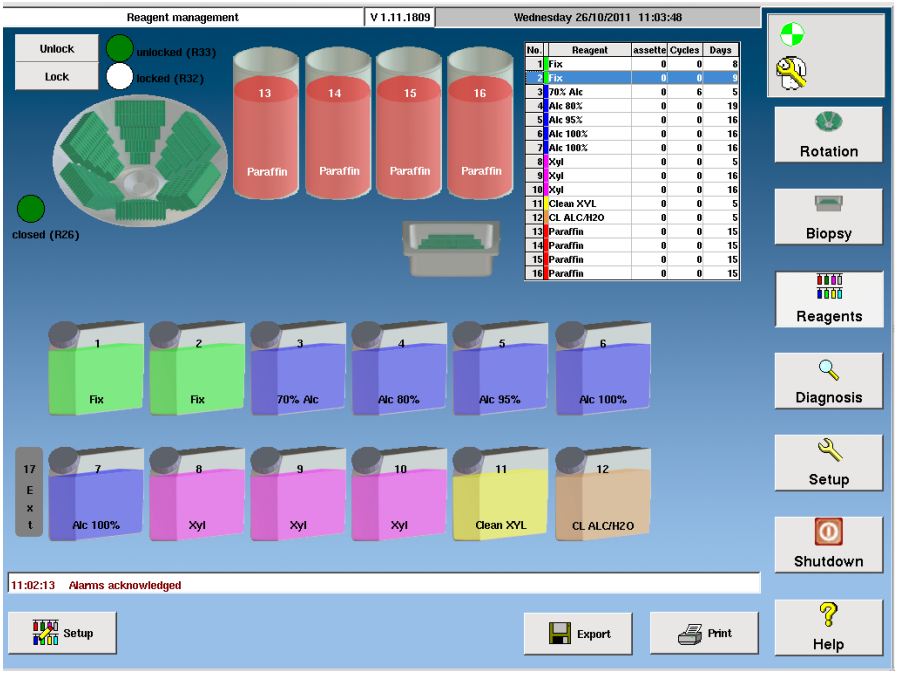


Figure 28. The Reagent management screen.

2. Select the reagent station you want on the touch screen to activate it. The station selected is marked with a frame, for example:

Figure 29. Frame marking the selected reagent.

The buttons in the lower part of the screen change to display the available functions.

3. Select the reagent you want from the list of available reagents and touch **OK** to assign it to the station you selected.

4. Reagent: Select the desired reagent from the available list and click OK, to assign to the selected station.

5. You can now fill the station bottle with the selected reagent in one of two ways:

    - Manually: By refilling the reagent bottle

    - Automatically: Using the 'automatic filling' function (see Section 3-6-3 Automatically replacing reagents)

Note!
If the desired reagent station has a reagent already assigned, pressing the "Manual" button will assign it as an empty bottle, pressing "Delete" will confirm this reassignment. Only then is the "reagent" key available. Pressing the "Manual" button again will once more mark the selected reagent station as full.

3-4-2 Accessing paraffin station functions

To access the functions for a specific paraffin container:

1. Select **Reagents** on the standby screen. The Reagent management screen appears (see Fig. 28).

2. Select the paraffin container you want on the touch screen. The selected container is marked with a frame, for example:

Figure 30. Frame marking the selected paraffin container.

The buttons in the lower part of the screen change to display the available functions. These are:

- **Regeneration:** The regeneration function is designed to work when isopropanol (not ethanol or Xylene) is used for dehydration and clearing. If you select **Regenerate**, a special protocol starts in the rotary chamber. All the paraffin in the container is treated at an increased temperature and with a vacuum. This evaporates residues of other reagents. You can change the regeneration limits for the paraffin (see Section 3-9 Paraffin Regeneration Program).

- **Deleting the expiry counter:** Select **Clear counter** to reset the expiry counter for the selected container, for example, after refilling the container with fresh paraffin.

3-5 Starting a Protocol

Refer to “Appendix F Preferred Protocols and Best Practices”.

3-5-1 Running a protocol

1. On the standby screen, select the appropriate chamber by selecting either **Rotation** or **Biopsy**. If no protocol is currently being processed in this chamber, a list of predefined protocols appears:

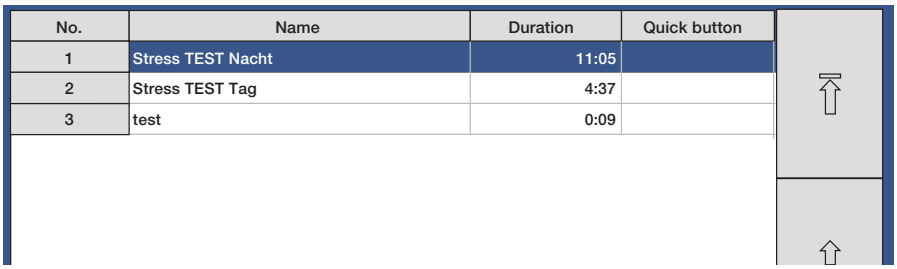


Figure 31. Detail of the initial screen for starting a protocol.

   - If a protocol is already running in this chamber, the running program will be displayed.
   - Depending on the situation, different command buttons appear at the bottom of the screen.

2. Select a protocol from the list and touch **Start** in the lower part of the screen to start it.

Note!
Protocol duration: The time the protocol is expected to end is displayed on the screen, taking into consideration the heating and reagent changing times.

3. In case a wait step is already defined in the protocol, you can select **No** to change the defined fixed end of the protocol. This corresponds to the definition of a fixed end time of a protocol - the protocol will remain longer in the predefined wait step.

   - The **No** button appears only if a wait step was predefined in the protocol.
   - Select **Yes** to go ahead and start the protocol.

Note!
Start time: If the start time is too late for the protocol to run and complete within the remaining time, the end date automatically changes to the next day, and the time box appears in red to indicate the postponement.

Note!
Unavailable reagents: If a protocol uses predefined reagents which are not available in the instrument, the screen displays an error code and the protocol is cancelled.

4. Insert the appropriate number of cassettes into the chamber and press **Enter**.

    - If you do not press **Enter** within two minutes, the chamber fills with formalin to preserve the specimens. During a rotation protocol, the holder rotates, but the program does not start and the device emits an audible alarm. The program does not start, and an audible alarm sounds.

    Note!
    If no declared reagents, such as formalin or fixatives are used, the reagent can be filled in the first step of the protocol.

5. You can press **Cancel** to cancel the protocol. If the protocol is active the option **Cancel** will change to **Stop**.

    - You can press **List** to see the list of defined protocols.

    - Select **Edit** to modify the reagents, duration, temperature, pressure/vacuum, and drain time parameters for protocol steps that have not been processed yet (see Section 3-7-1 Editing a protocol).

Note!
Editing protocols: You can only edit a protocol if you have 'supervisor' access.

- Press **Open**, to open the chamber. If you want to add more specimens while a protocol is running, see Section 3-5-2 Adding more specimens while a protocol is running.

Note!
Opening and cancelling: If you select **Open** *or* **Cancel***, the screen asks a number of 'user' questions before proceeding.*

If the reagent is marked as flammable in the reagent setup, the entire reagent inside the chamber is pumped back to the reagent bottle, and atmospheric pressure is released, before the chamber is unlocked.

After you have inserted the specimens, touch Continue in the current step. To show that the protocol has been interrupted, the chamber icon in the Status window is overlapped by a hand icon (see Section 1-5-3 Status window*).*

Note!
Open the chamber during pumping: If you press **Open***, while a reagent is pumped, the pumping process will be completed first.*

6. When the predefined time has elapsed and the last protocol step has completed, the specimens remain in the last reagent.

- Select **Open** to open the chamber without draining the reagent.
- Select **Terminate** to start draining the final reagent and release the chamber for opening.

Protocol progress

The touch screen displays protocol progress either as a graphic or as a table.

From the start the device performs a protocol of various self-tests, including a pressure test. When the chamber is not closed properly, the screen displays an error code.

When the preparatory tests are completed successfully, the protocol first step starts.

To prevent misuse of the device, the touch screen is locked. and will show the “Locked” icon (see Section 1-6 User Profiles) in the Status window (see Section 1-5-3 Status window):

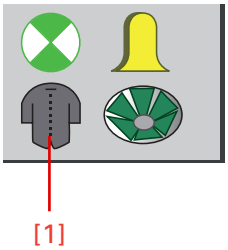


Figure 32. Display of the “Locked“ icon.

[1] Locked

3-5-2 Adding more specimens while a protocol is running

The addition of more samples during a protocol run extends the process by the same amount of time that the interruption lasts.

1. From the main menu, select **Rotation** or **Biopsy**, as appropriate.
2. Select **Open**.
3. Select **Yes** in response to "Do you really want to open the chamber?"

FLAMMABLE REAGENTS
If the reagent is marked as flammable in reagent management, the instrument drains the reagent before the lid is released, when you try to open the chamber.

4. Press **OK** in response to "Rotation/biopsy chamber lid is unlocked and can be opened".
5. Open the lid, add the cassettes, and close the lid.
6. Select **Continue**.
7. Select **Yes** in response to "Do you want to continue the program?"

The chamber fills with reagent, as necessary, and the process continues.

Note!
The "Open User" or "Open supervisor" applies to all protocols in each chamber (see section 3-7-3 Creating a new protocol).

Note!
After you have pressed Continue, a start-up procedure runs for a short time. you can not finish the protocol during that.

Note!
If the protocol does not continue after 2 minutes, a message appears on the screen and an alarm will sound.

3-6 Cleaning Baskets and Replacing Reagents

3-6-1 Running a cleaning cycle

1. Hang all the empty holders that were used in the embedding cycle in the holder basket located in the rotation chamber or place the unused holder in the biopsy chamber.

2. Close the lid and press the **Clean** quick start button on the Standby screen. The 'Select chamber' dialog appears.

   - A "quick clean" of recently used chamber(s) performed by default.

3. Press **OK** to confirm.

4. The text box shows the estimated finish time. Press **Yes** to confirm.

Note!
After 50 cycles of quick-cleaning you must perform an extended cleaning cycle ("standard cleaning"). A reminder will appear on the screen.

3-6-2 Manually replacing reagents

Note!
Reagent: An integrated Reagent Management System monitors the usage of reagents based on the valuesset for the maximum number of cartridges, cycles or days and alerts you about the necessary replacement of reagents.

1. Remove the reagent bottle by pushing the metal tab on the front of the bottle (A) and simultaneously pulling the bottle (B) forward:

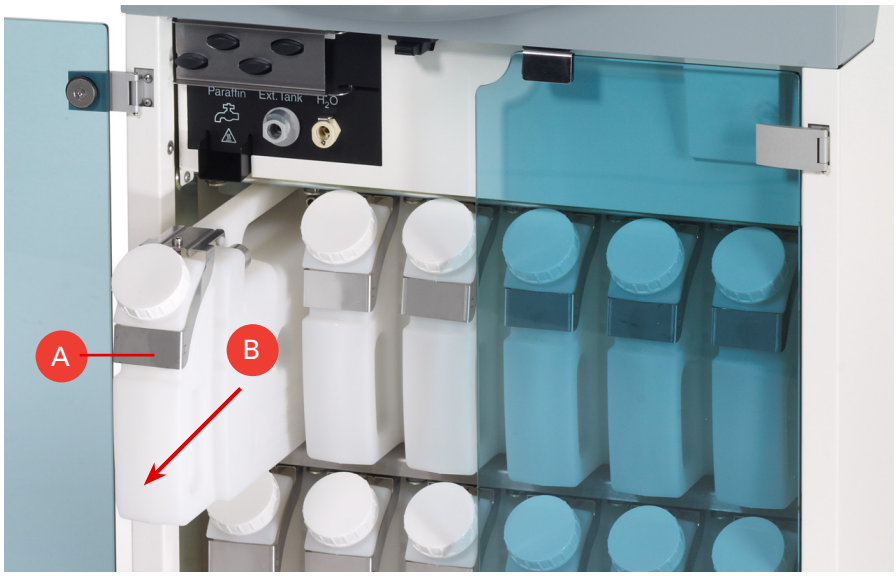


Figure 33. Removing the reagent bottles.

2. Use the handle to carry the reagent bottle to a suitable place for emptying it.

3. Remove the cap and empty the used reagent into an appropriate waste container.

4. Clean the emptied bottle with a suitable cleaning agent, if necessary, and then rinse it thoroughly again.

5. Refill the bottle with the appropriate reagents, according to the levels marked on the side.

   The reagent bottles are marked with two filling lines, US gallons on the left and liters on the right.

   If you intend operating with one chamber only, you need only fill the bottles to the lower mark.

USING TWO CHAMBERS
If you intend operating with two chambers simultaneously, you must fill the bottles to the upper mark.

6. Reinsert the filled bottle into its correct location. Make sure you hear the 'click' that confirms it is correctly placed.

7. Inform the system that you have replaced a reagent:

   a. Press **Reagents**.

   b. Press the appropriate reagent container icon on the screen. The icon is marked with a frame, for example:

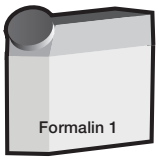


Figure 34. Frame marking a selected reagent.

   c. Press **Clear Counter**.

3-6-3 Automatically replacing reagents

Note!
Replacing reagents: You can only replace reagents automatically if you have 'supervisor' access.

Note!
Draining and refilling reagents: Reagent stations drain and refill through the rotation chamber. Before the automated reagent replacement starts, you must carry out a clean cycle.

Drain the reagent

1. Place a suitable waste container in front of the instrument.

Note!
Automatic replacement: Make sure the waste container is large enough for the quantity being drained, and is suitable for the reagent.

2. Attach the drain hose to the gray connector socket marked 'Ext Tank' on the front of the equipment:

Figure 35. Outlet for draining the paraffin tank.

3. Place the end of the hose into the waste container.

4. Touch **Reagents**, then touch the container icon for the reagent you want to replace.

   - A black frame indicates the reagent you have selected, and color indicates that the station has reagent in it.

5. Press **Lock** in the top left corner of the screen to lock the chamber lid.

6. Select **Drain** at **Automatic** in the lower part of the screen.

7. Select **Yes** in response to “Do you want to empty the station?”.

8. Make sure the end of the hose is in a suitable container, then select **Yes** in response to “Is the hose connected to the device and its free end in the external tank?”.

9. The device pumps the reagent into the rotary chamber, empties it into the waste container; the basket holder rotates for a short time and the device emits an audible signal when the chamber is empty.

Note!
You can switch the signal off with the button Change. To do this press the settings and reagents on the standby screen.

DRAINING THE BOTTLE
Never remove the hose from the waste container while the emptying process is still active on the screen.

If the chamber lid is *not locked* properly:

a. A warning message appears. Select **OK** to confirm this.

b. Select **OK** again to confirm the drain error message.

c. Restart from step 5 above.

Refill the reagent bottle

1. When the device has finished emptying the chamber, you can prepare a new reagent bottle to use in the device

2. Make sure that the station that you want to fill is highlighted in gray on the screen (i.e. it is empty) and is still selected (i.e. highlighted in black).

   Note!
   If no hose is connected to the connector of the external tank, an error message appears immediately after starting the automatic filling.

3. Place the end of the hose into the external reagent container.

4. Make sure the station you want to refill is higlighted in gray (that is, empty) and is still selected (that is, framed in black).

5. Select **Fill** at **Automatic** in the lower part of the screen.

6. Select **Yes** in response to “Fill this station?”.

7. Select **Yes** in response to “Is this station really empty?”.
   The instrument pumps the new reagent through the rotary chamber into the selected station. It spins briefly, then sounds an audible signal that filling is complete. To prevent the spillage of reagent the tubes are removed after the filling is complete.

8. Run a cleaning cycle (see Section 3-6-1 Running a cleaning cycle).
   The device automatically resets the counter of the replaced reagent consumption to zero.

Removing the hose
Never remove the hose from the external storage container while the filling process is still active on the screen.

If the level of reagent in the external container is *too low*:

a. A warning sounds and an error message appears. Select **Yes** to confirm this.

b. Switch off the acoustic warning signal.

Note!
If there is not enough reagent in the external tank for the automatic filling, the operation is aborted and the reagent is pumped back into the external tank.

Note!
To avoid mixing incompatible reagents (see Section: 2-5-7 Working with the reagent) the last filled reagent is stored. If the next externally filled reagent is incompatible according to list of the defined Reagent Groups then the reagent above it is used. The chamber is filled with the cleaning alcohol, rinsed, and then the second Reagent stored.

If more reagents are to be filled, including the cleaning alcohol from an external tank, first change the cleaning alcohol.

3-7 Editing and Creating Protocols

Note!
Changing protocols: The minimum user level required to change protocols is 'Supervisor'. Routine users cannot change protocols. For these users, the 'Edit' button becomes a 'View' button only, and only viewing the protocol is possible.

3-7-1 Editing a protocol

1. On the Standby screen, choose the appropriate chamber by selecting either **Rotation** or **Biopsy**.

   If no protocol is currently running, a list of predefined protocols appears.

   If a protocol is already running in the selected chamber, select **List** to see a list of existing protocols.

   Depending on the situation, different function buttons appear at the bottom of the screen.

2. Choose a protocol from the list and select **Edit** in the lower part of the screen, to see a list of its protocol steps and options.

   The area above the list shows the protocol name, and the predefined fixed end time if the 'Fixed end time' box is checked.

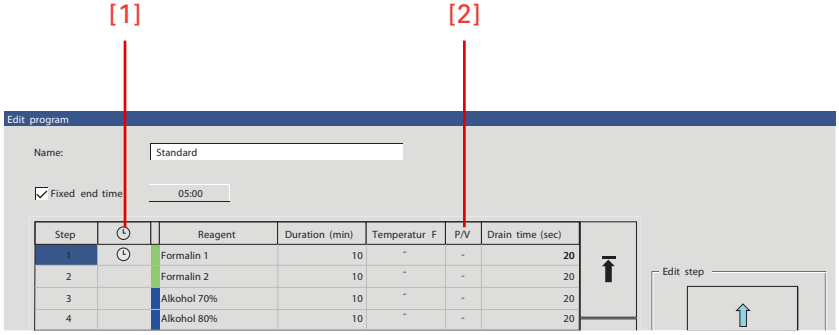


Figure 36. Detail of protocol screen with editing options.

[1] Waiting step
[2] Pressure/Vacuum

3. To **edit a value**, touch its text box and proceed as follows:

   - Reagent: Select the desired reagent from the available list and click **OK** to save the change. Pressing **OK** will save the log, or enter additional values.

   - Duration or Temperature: Select values from the predefined ranges using the virtual keyboard, touch **OK** to save the change. Pressing **OK** will save the log, or enter additional values.

- P/V or Drain time: Select a value from the list, touch **OK** to save the change. Pressing **OK** will save the log, or enter additional values.

- Fixed endtime: To set or remove an end time:
  i. Select the box next to Fixed endtime.
  ii. To edit the end time, select the time value box.
  iii. Enter the hour and minutes using the virtual keyboard, and the 24-hour clock.
  iv. Touch **OK** to save the change. Pressing **OK** will save the log, or enter additional values.

To choose a fixed end time you must set a protocol as a wait step.

- Wait step: To set a wait step, touch the text box next to the step number that you want to define as a wait step. A clock appears. Wait steps are protocol dependent and there can only be one wait step per protocol.

Typically, a wait step is defined as a formalin step.

4. To **insert a step**:

   a. Touch a number before a step to insert a new step.

   b. Touch **Insert Step** on the right side of the screen.

   c. Insert appropriate values, as described in step 3 above.

      Alternatively: To add a step at the end of the protocol touch an free space in the lower line of the protocol table and enter the appropriate values as described in step 3.

      Note!
      By moving the selected step with the Up and Down buttons you can change the order of protocol steps.

5. To **delete a step**:

   a. Select the number of the step you want to delete.

   b. Touch **Delete** on the right side of the screen. A message box appears.

   c. Select **Yes** to delete the step, or **No** to return to the Edit screen.

Note!
Copying a protocol: You can also select **Copy** *to copy an existing protocol, then use* **Edit** *to modify it.*

Note!
Deleting a protocol: You can delete a protocol by selecting **Delete**.

Note!
Changing protocol steps: If a protocol is running, you can modify parameters for steps that have not been processed yet. For example, you can change parameters for step 3 and the following steps while running step 2. However, you cannot insert or delete protocol steps, and you cannot change the current step.

Note!
Protocol changes: Changes made to a running protocol are not stored permanently. They are only valid for the current protocol run.

COPYING A PROTOCOL
If you have copied a protocol, rename it.

3-7-2 Protocol steps and options

When you create a protocol, you must define the following for each step:

- **Reagent:** This assigns a reagent to the selected step, and displays a color marking.

- **Duration (in minutes):** This defines how long this particular protocol step takes.

- **Temperature:** You can define the temperature inside the chamber for the given protocol step, and adjust it within preset limits. Be especially careful adjusting the temperature for paraffin, that it does not fall below the minimum paraffin temperature (see Section 2-5-6 Editing processing parameters). Also note that the highest reagent temperature you can use for a chamber is 65°C.

- **Pressure/vacuum:** Among the protocol steps, you have the possibility to choose pressure or vacuum, or a change between pressure and vacuum.

You can also define:

- **Fixed End Time:** This defines the duration of a wait step where specimens remain so that the protocol will finish at the programmed end time.

Note!
Wait Step: There can only be one wait step in any protocol. When determining a wait step, take into consideration individual tolerability of the sample with a longer retention period in the appropriate reagent.

- **Idle time (sec)**: Choose from the list the time when the air will be pumped after emptying the chamber. By entering longer idle periods reagent carry-over and the escape of vapors on opening of the chamber can be reduced.

Note!
Changing colors: See Section 2-5-7 Editing reagent groups*, to find out how to change the reagent colors.*

3-7-3 Creating a new protocol

1. On the Standby screen, choose the appropriate chamber by selecting either **Rotation** or **Biopsy**. When in the selected chamber no protocol appears, the list of saved records is displayed.

2. Select **New**. An new, empty row in the list.

3. Select **Edit**. The Edit program screen appears, showing a table of steps (empty when you start). The last line in the table of steps is always blank, so you can add a new step:

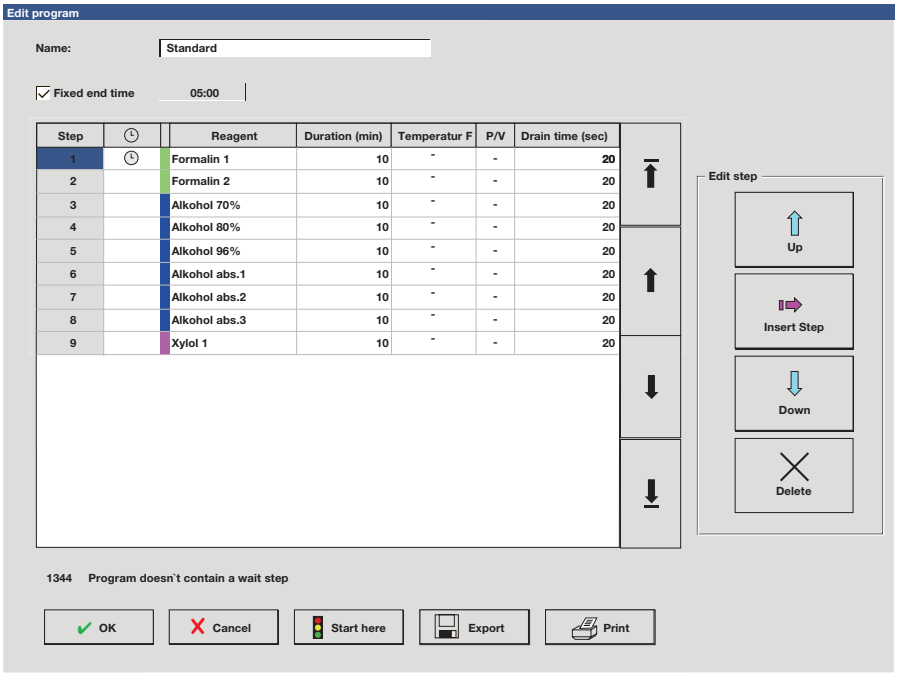


Figure 37. Edit program screen.

4. On the screen, touch the box to the right of 'Name', type a name using the virtual keyboard, and select **Enter**.

5. Check the box next to the fixed end time, if you want to assign a predefined end time.

6. Touch the time box that appears, and select the desired end time from the virtual keyboard.

7. On the screen, touch the white box under 'reagent', select the desired reagent from the list that appears, then select **OK**:

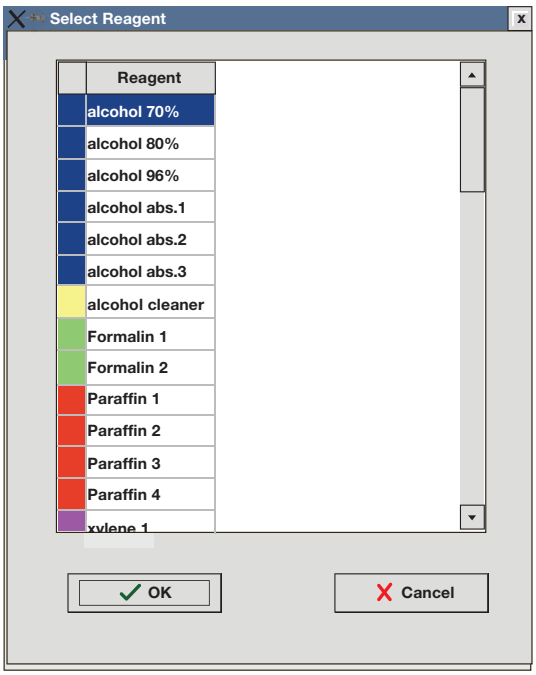


Figure 38. Selecting a reagent during a protocol setup.

Note!
Non-existent reagents: If a reagent is defined in the Reagent List, but no station is assigned to it, the reagent is not available.

Note!
Next step: As you select a reagent, a new empty line is created in the table, ready for entering the next step.

8. Touch the white box under 'duration', select the time you want, in minutes, from the virtual keyboard, then select **Enter**.

   The minimum time is 1 minute, the maximum is 99999 minutes (that is, unlimited for all practical purposes).

9. Touch the white box under 'Temperature', select the desired temperature in Celsius from the virtual keyboard, then select **Enter**.

   A zero here means that this step is not heated at all. For a paraffin step, bear in mind the preselected minimum and maximum paraffin temperatures (see Section 2-5-6 Editing processing parameters).

10. Select the white box under 'p/v', select pressure, vacuum, both or neither from the list, then select **OK**.

PRESSURE VALUES
The actual pressure values used are defined as system parameters and, for safety reasons, cannot be changed by **routine** users.

11. Touch the white box under ‘drain time’, select the time you want, in seconds, from the list, then select **OK**.

    During idle time when the chamber is empty, it is being filled with air. Extending the idle time will reduce the carryover of reagents and the escape of vapors when opening the chamber.

12. Repeat steps 4 through 11 until you have built the protocol you want.

Note!
Number of steps: In general, the number of steps you can enter is unlimited.

13. If you checked ‘Fixed end time’, you must define a wait step: touch the white box under the clock next to the step you want the protocol to wait in.

Adding a wait step

Add the wait step only in steps in which an extended retention period of the sample will not be impaired. These are usually fixed steps.

14. You can see all the protocol steps listed in the table. Use the buttons on the right to scroll through the steps, and insert or delete steps, if necessary:

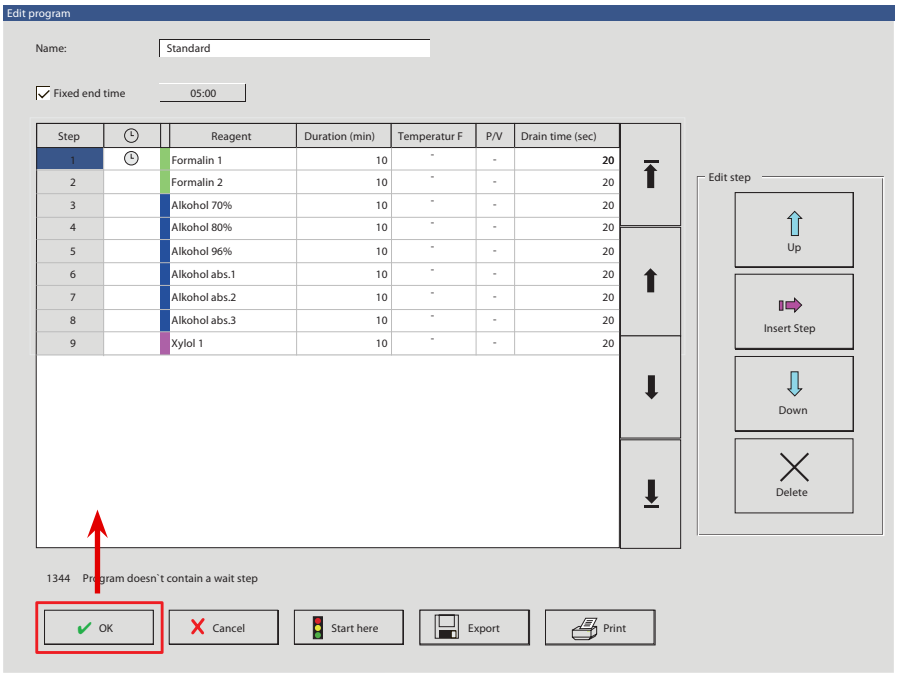


Figure 39. Confirming a protocol setup.

Note!
Inserting steps: 'Insert step' puts the new step above the highlighted step.

15. Select **OK** to save the protocol.

    The system checks the validity of the protocol (for example, if the parameters are within the preset limits, whether successive reagents are compatible, etc.). If there are any problems, the screen displays an appropriate error message. **OK** will not be an option if there are issues with the protocol.

16. Select the option "Open User" with the appropriate button that is located next to the log list if you want to open the chamber during an active protocol only at the "User" Level

Note!
The "Open User" or "Open supervisor" applies to all protocols in each chamber.

Note!
The device can not detect whether the defined protocol is suitable for the selected samples.

You must therefore always consult the General Procedures for Tissue processing and check the compatibility of the individual samples with the reagents.

3-8 Exporting and Importing Protocols

3-8-1 Exporting a protocol

1. On the Standby screen, choose the appropriate chamber by selecting either **Rotation** or **Biopsy**.
2. Select the protocol you want to export.
3. Insert the supplied USB data stick.
4. Select **Edit**.
5. Select **Export**.
6. Type the protocol name, using the virtual keyboard.
7. Select **OK**.

For backups and to transfer protocols from one instrument to another, you can export protocols onto floppy disks, or onto the USB data stick provided. Before you do so, make sure you have selected 'USB for IO' as the peripheral (see Section 2-5-6 Editing processing parameters):

- **Floppy disk:** Use a 3.5-inch standard floppy disk. Make sure the disk is formatted with MS-DOS before you use it, then insert it into the integrated floppy disk drive and select **Export**.

  Note!
  Devices with the monitor interfaces for peripherals do not have a floppy drive.

- **USB data stick:** Plug the included USB data stick into one USB port on the left side of the device or the left side of the screen and select **Export**.

Protocols are stored on the disk or data stick as .csv files with the protocol name as the file name, and can then be read or evaluated using a spreadsheet program, such as Microsoft© Excel©.

Exporting a protocol enables you to change the file name on the floppy disk or data stick, for archiving, without losing the protocol name in the system.

3-8-2 Importing a protocol

You can import a defined protocol from a disk or USB data stick:

1. Insert the USB data stick into the USB port, or insert the disk.

   Note!
   Devices with the monitor interfaces for peripherals do not have a floppy drive.

2. Choose the appropriate chamber by selecting either **Rotation** or **Biopsy**.

3. Select **New** and highlight the empty box.

4. Select **Import**.

5. Select **Yes** to overwrite the new, empty protocol.

6. Select the protocol from the list and select **Open**.

Note!
Invalid file: If the file you want to import is corrupt, importing is cancelled automatically.

3-9 Paraffin Regeneration Program

The regeneration function for the paraffin was developed for the use of isopropyl alcohol (not ethanol or Xylene) for the dehydration and regeneration.

As the paraffin infiltrates the specimens during reagent exchange, it accumulates solvents. To extend the useful life of the paraffin, the STP420 includes an integrated process, the paraffin regeneration program, that removes solvents from the paraffin by evaporation.

Paraffin regeneration takes place according to preset default regeneration parameters:

- Duration (of the regeneration step): 10 minutes
- Temperature: 65°C
- Drain time: 33 seconds

You can change these parameters if you have 'Supervisor' user access (see Section 2-5-6 Editing processing parameters).

To regenerate paraffin

1. On the Standby screen, press **Reagents**. The Reagents management screen appears.
2. On the touch screen, select the paraffin container you want by pressing the appropriate container icon.

   The functions available appear in the lower part of the screen.
3. Press **Regenerate** and confirm it with the button **Yes**.

   The instrument pumps paraffin from the selected container into the rotary chamber, where the solvent contamination is removed using vacuum and heat.
4. When the regeneration process is finished, the instrument pumps the regenerated paraffin back into its correct paraffin container, and automatically resets the regeneration counter.
5. After running the paraffin regeneration program, you must clean the instrument. See Section 3-6-1 Running a cleaning cycle.

Note!
You must also run a cleaning cycle after each protocol run that includes paraffin steps, to remove the paraffin waste from the rotary and biopsy chambers.

3-10 Creating and Changing Quick Start Buttons

Quick start buttons are numbered buttons that let you start frequently-used programs with one button press, instead of having to navigate down through screens and menus. Some quick start buttons are predefined, and you can create others of your own.

Quick start buttons appear in the lower part of the Standby screen.

To create or change a quick start button:

1. On the Standby screen, select **Setup** to access the setup menu.

2. Select **Quick Start**. A list of assigned and vacant buttons appears:

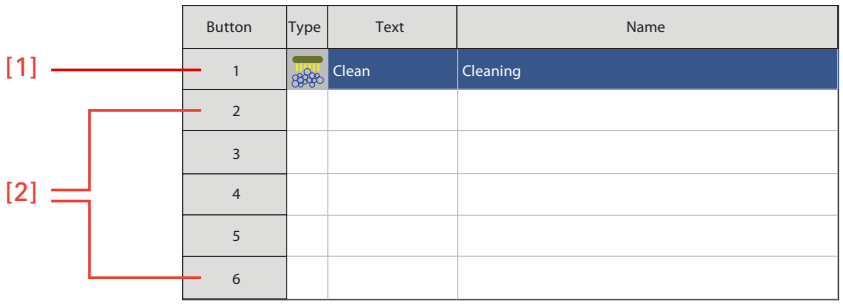


Figure 40. Editing Quick Start Buttons.

[1] Assigned
[2] Vacant

Note!
Quick start Button 1: The first quick start button (Button 1) has already been assigned as a default cleaning program. Do not delete it. Cleaning cycles can only be started by selecting the quick start button.

3. To create a new button, touch a vacant line in the list. A selection list appears.

4. Press **Edit**. A selection list appears.

5. Under Type, in the upper part of the window, select a program type:

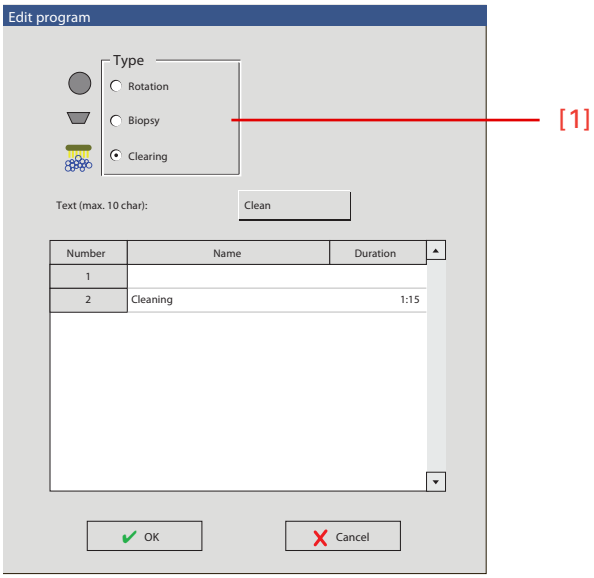


Figure 41. Selecting a program type.

[1] Select program group

Programs in the group are listed on the screen (for example, cleaning programs), and you can choose the one you want to assign the new quick start button to.

The icon for the program type is automatically assigned to the button.

6. Touch the field to the right of 'Text' in the middle of the screen, and enter a program description, of not more than 10 characters. Confirm with **Enter**.

7. Select **OK**. The quick start button is created and becomes available on the Standby screen.

Chapter 4
Troubleshooting and Errors

The STP420 is equipped with a state-of-the art troubleshooting system. It constantly monitors all the important parameters and functions during processing, and gives you information about the instrument's status.

If an error is detected, detailed error messages and appropriate user instructions are displayed on the touch screen.

Details of all events are recorded in the 'logfile'. You can access the logfile by touching **Diagnosis** on the Standby screen.

4-1 Screen Display Messages

- **Status messages:** These give you information on system readiness (for example, the temperature of the paraffin reservoir) and the progress and status of the protocols currently in use.
- **Maintenance messages:** These provide information about routine maintenance (for example, station cleaning, chamber cleaning, reagent expiration, and so on).
- **Error messages:** These alert you to various types of system malfunctions (for example, rotation errors, block of the reagent system, leaks, pressure and vacuum errors, power outage, and so on).

If, during operation, an error message appears on the screen you must immediately confirm it and respond with appropriate measures.

MALFUNCTIONS
You *must* make sure you resolve *all* error messages *before* you start a program.

ERROR REMOVAL
If you have any doubts about the resolution of any error messages, contact your technical support provider.

4-2 Fill or Drain Problems

A number of conditions can cause fill and drain problems:

- There is insufficient reagent: Verify that the reagent bottles and the paraffin tanks both have sufficient reagent.
- Inadequate reagent from the external tank: When a message about inadequate reagent coming from the external tank into the rotation chamber appears, the reagent is already being pumped back into the external tank.
- There is insufficient pressure or vacuum: The STP420 cannot create sufficient vacuum (for a fill) or pressure (for a drain) in the chamber:
  - Verify that all reagent bottles are fully inserted in their correct locations.
  - Ensure that the caps of the reagent bottles are tight.
  - Check if the lid of the chamber is properly closed.
- There is a blockage in the air or reagent lines. Appropriate error messages indicate the specific station that must be cleaned to remove the blockage, for example:

  "Cleaning Station X: Station X filling time (emptying time) is too long, a station cleaning is recommended".

4-2-1 Station cleaning

Station cleaning takes approximately 20 minutes:

1. Touch **OK** to confirm the error message.
2. Select **Setup** from the screen menu.
3. Select **Cleaning** from the submenu.
4. Select **Station cleaning**.
5. Select **Start**. A dialog box appears with the prompt: *"Position X contaminated. Please remove bottle X, check for paraffin residue and clean if necessary"*.
6. Touch **OK** to acknowledge the prompt. A dialog box with a command prompt: *"Please insert the Xylolreinger bottle in position X and put the bottle from the position X into a vacant position."*
7. Follow the instructions on the screen and then click OK.

8. Touch **OK** again to confirm that the Xylene cleaner bottle is in position X.

9. Press **OK** again to continue the station cleaning program.

Station cleaning proceeds with a series of messages:

- After the first step of the protocol*:*
  "Please put the Alcohol cleaning bottle in position X, the Xylene cleaning bottle in position 11 and the cleaned bottle in position 12."
  Follow the instructions.

  Note!
  Position 11 is the second from the right in the bottom row, right next to position 12.

- *"Please confirm that alcohol cleaner bottle is in position X".*
  Touch **OK** to confirm this. The cleaning program will resume. No further input required before the program is finished.

- *"Emptying: cleaning program is finished, do you want to open the lid?"*
  Click **OK** to accept

- *"Rotation program: Lid is unlocked and can be opened"*.
  Touch **OK** to acknowledge this.

- *"Station cleaning: cleaning for station X is deleted.".*
  Touch **OK** to acknowledge this.

- *"Please put the cleaned bottle and the Alcohol cleaning bottle X back in their original positions."*
  Touch **OK** to confirm you have done this.

The station cleaning display appears on the screen, then the Standby screen returns.

Note!
If you want to perform a station cleaning session without getting an error message, you can run the cleaning session as long as no protocol is running. To do this press the following keys:

"Settings", "Cleaning", "Station Cleaning" and choose the station and the desired chamber.

Note!
When performing the cleaning of must a station 17 External Tank, the external tank must be used instead of the Xylene cleaning bottle. In this case the external tank must hold at least 6 liters of Xylene.

Note!
Both a station cleaning and a regular chamber cleaning cycles are required after paraffin is used. The device must be cleaned first, however the protocol steps of the "Short Cleaning" ycle can be used. The request to put the Alcohol cleaning bottle in position X in step 9 is performed in about 20 minutes.

4-3 Leak Tight Error

The system displays the error message:

"X Please check that the bottles are secured in their positions, bottle caps or plugs, for leakage and whether level of the substance in the wash bottle is too low".

1. Touch **OK** to acknowledge the error message.
2. Check the lids of all the reagent stations and make sure they are properly closed.
3. Check that all reagent stations are engaged correctly in their respective positions.
4. Check the water level in the wash bottle.

4-4 Rotation Error

The level sensors in the rotary chamber help to detect rotation errors by checking whether the reagent in the chamber are in motion or not. If the basket holder is not rotating, an error message appears: *"Rotation program: Basket rotation error at step x"*.

1. Touch **OK** to acknowledge this.

2. Check that the rotation chamber works correctly, by visually inspecting the rotation of the basket holder and observing it through the glass window of the chamber lid:

   - If the basket holder is rotating, press **Yes**. The chamber unlocks. Open the lid, clean the level sensors (see Section 5-1), then reclose the lid.
     Press **Continue** to continue the program.

   - If the basket holder is not rotating, press **No**.
     If you can see the cause of the blockage (for example, an open or misaligned basket, or loose screen), press **Yes** to open the chamber, fix the problem and press **Continue**.
     If you cannot see the cause of the blockage press **No** to stop the current protocol. In such a case, please contact Customer Service.

4-5 Power Failures

If there is a power outage during the operation of the device, the battery maintains all internal functions for 5 more minutes.

If the power failure exceeds 5 minutes:

- If the changing of reagents has already started so that the samples remain in the reagent.
- The heaters are not operating and the internal PC is shut down even if the main switch remains in the ON position.
- If the outage does not happen during the paraffin step of the current protocol, the rotational movement receives an emergency control to keep samples moist.
- If the current protocol in a paraffin step receives an emergency signal, the system maintains the rotation for additional 5 minutes.
- When the supply is being emptied back into the tank, the protocol in an interrupted manner. It is, however, started a timer to ensure that melting already solidified paraffin has melted completely. Paraffin steps in the protocol are executed only when this timer expires.
- If the device was in the paraffin step at the time of the power outage, the teo is extended until paraffin melting point timer works. In this case, there is no rotation until the timer sets off. After a power outage of 30 minutes during a paraffin stage the paraffin on the chamber might not have melted until the melting point timer sets off. It may happen that the paraffin present in the chamber is emptied in the last paraffin tank at the end of the protocol even though the tank is already full.

4-6 Opening Chambers During Power Failures

If there is a power failure, you can remove the specimens to continue with a manual infiltration process.

HAZARD

When you interrupt the process, there might be an overpressure or vacuum in the chamber. If there is a vacuum, you will not be able to open the chamber. However, if there is an overpressure, opening the chamber could be hazardous. Make sure you activate the emergency ventilation, as described in Section 4-6-1 Emergency ventilating the biopsy chamber, and Section 4-6-2 Emergency ventilating the rotary chamber, before you open the chambers.

4-6-1 Emergency ventilating the biopsy chamber

To ventilate the biopsy chamber in the event of a power failure:

1. Insert the supplied hexagonal key with a T-handle into the lower hole on the left side of the instrument and press so that the vent valve is located there:

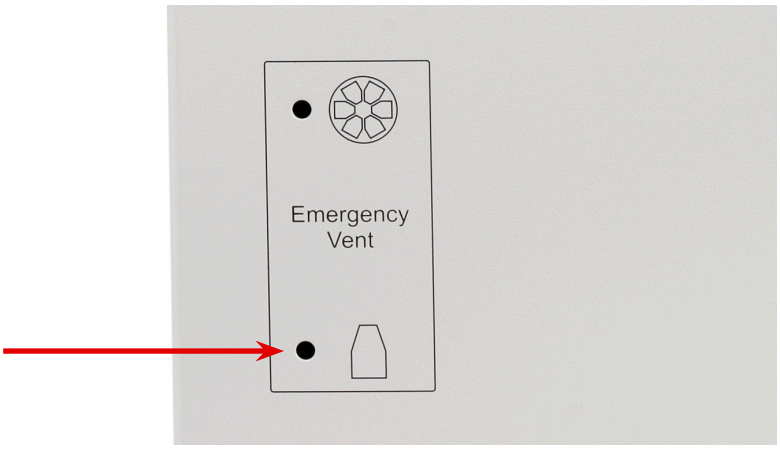


Figure 42. Placing the heaxgon key for ventilating the biopsy chamber.

2. Keep the key pressed for approximately 10 seconds, until the ventilation sound is no longer audible.

3. If the vent is no longer audible, the biopsy chamber is opened.

To open the chamber manually, lift the handle of the locking: mechanism:

Figure 43. Opening the biopsy chamber.

4-6-2 Emergency ventilating the rotary chamber

To ventilate the rotary chamber in the event of a power failure:

1. Insert the supplied hexagonal key with a T-handle into the upper hole on the left side of the instrument and press so that the vent valve is located there:

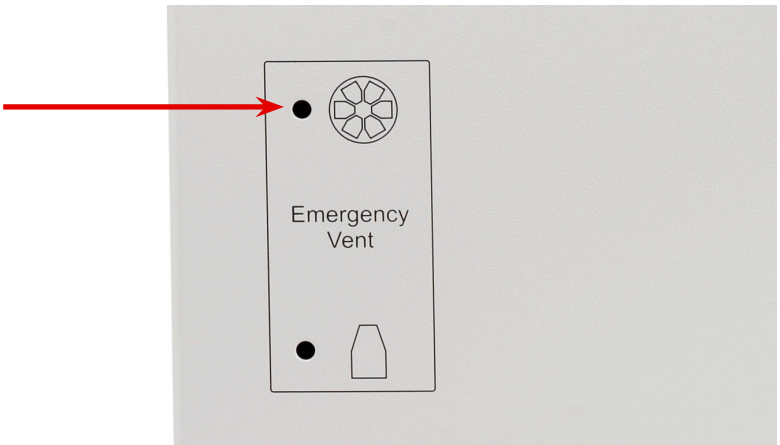


Figure 44. Placing the heaxgon key for ventilating the rotary chamber.

2. Keep the key pressed for approximately 10 seconds, until the ventilation sound is no longer audible.

3. Insert the hexagonal key into the hole below the lid of the rotary chamber, from the left side:

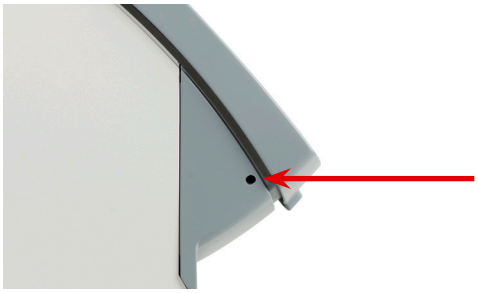


Figure 45a. Placing the hexagon key for an emergency release of the rotary chamber lid.

4. 'Emergency release' the rotary chamber lid:

   a. A guiding plate and an external emergency release screw. A key must be inserted through the guiding plate and into the head of the screw. The key must fit the screw in order to turn it around. Once the key is inserted into the screw head, the screw can be unscrewed. A slight resistance and a whirring sound indicate that the key is moving the screw.

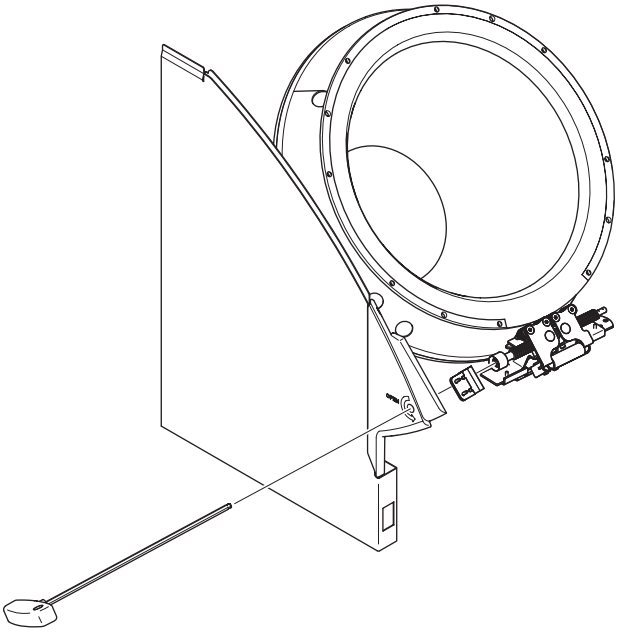


Figure 45b. Placing the hexagon key for an emergency release of the rotary chamber lid.

   b. Turn the key to the left until you can open the lid.

Note!
Turn the key counter-clockwise only.: Try to open the chamber after each rotation of the key.

WHEN THE LID OPENS
Do *not* continue turning the key when the lid has unlocked.

4-7 System Self-test at Start of a Protocol

When any rotary or biopsy chamber protocol is started, the instrument automatically carries out a tightness test on the pressure and vacuum. If the test indicates a system error, the screen displays the following message:

- *"Please check that reagent bottle is leak-tight: Bottle cap is loose or bottle not inserted correctly, or water level in wash bottle is too low".* Make sure that all reagent bottles are tightly closed and fully inserted in position. Check whether the cover of the chamber is closed.

- *"X Biopsy program: The flow resistance in the air line or the water level in the wash bottle is too high".* Check the level of the wash bottle. Reduce the level of the wash bottle to the minimum mark (See section 3-3-2).

- *"X over-/under-pressure error", "X A pressure change of 10 mbar was not reached in 15 sec."* The system has encountered an error that can be resolved only by a technician. Contact Customer Service at ThermoFisher without delay.

4-8 Export of Log Files

For a quick and accurate analysis of errors the log files can be exported and sent to the customer.

Proceed as follows:

1. Plug the included USB stick into the USB ports (see Chapter: 1-3 interfaces)

2. Press the **“Diagnosis”**

3. Press **“Logs / Param.”**

4. Press **“Log File”**

5. Use the **Up** and **Down** buttons at the top of the log table to choose the day on which the event needs to be analyzed.

6. Press **“Export”** There are two files **“DataLog ...”** and **“STPLog ....”** Stored on the USB stick.

7. Two files, STPLog and DataLog, are stored on the USB. Wait for the **“Export”** button to appear.

8. Now you can remove the USB stick and plug it into your PC to send the data via email

Note!
You can export the log files only if no protocol is running.

Chapter 5
Cleaning and Maintenance

5-1 Daily Maintenance

For the optimal functioning of the device minimum daily maintenance is required.

Clean the surfaces and the level sensors in rotational and biopsy chamber. Use clean cotton swab and alcohol to clean the sensors, applying as little pressure as possible on the sensors to prevent damage.

- Clean the housing surfaces (see Chapters 5-4)
- Make sure that the fluid level is in the wash bottle between Min and Max (see section 2-4-4)
- Check the fluid levels in all containers and fill them in if necessary. (See section 3-6-2)
- Check the fluid levels in the paraffin container and fill if necessary. (See section 2-4-3).
- Check for any prompts from the reagent management system and refresh reagents if indicated. (See Chapter 3-6)

5-2 Routine Maintenance

- Replace the reagent chamber filter in the rotation chamber once or twice a week.

  Loosen the screw which is fixed to the Outlet with a screwdriver or a coin.

  Carefully remove the used filter and replace it with a fresh filter reagents.

  Replace the Outlet again and tighten the screw.

  Do not to clean a used filter, or try to reuse

  After 5 processing cycles a reminder will appear to change the Reagent filter.

  You can defer change by selecting the “Remind Later” button. The prompt will appear again before the next protocol is started and can be deferred or acknowledged with “OK”.

Note!
You can reset the counter only when you have “Supervisor” access.

- When used paraffin is to be changed empty the first paraffin container then remove the center bar from the tank and clean it, paying particular attention to the lower end and filter. Also clean the bottom of the wax container and replace the center rod before adding fresh paraffin.

5-3 Rotary and Biopsy Chamber Cleaning Cycle

After each protocol run that includes paraffin steps, the paraffin waste must be removed from the rotary and biopsy chambers by running a cleaning cycle.

Note!
New starts: After a protocol run, you cannot start a new protocol until a cleaning cycle has been carried out.

During a predefined cleaning cycle, paraffin waste dissolves and remains in the cleaning liquids. Cleaning liquids must be replaced frequently. There are two cleaning programs: a short ("Short Cleaning") and a long ("Standard Cleaning"). By default, the short program starts, the "Standard Cleaning" must be used after 50 short cleaning programs. The device will notify you when 50 short cleaning cycles were performed.

Note!
Cleaning liquids: Thermo Fisher Scientific recommends that you use pure Xylene and alcohol for cleaning purposes.

XYLENE
You must use only Xylene, or the substitute type Clear-Rite3, as the cleaning reagent. Other Xylene substitutes (such as Toluol and so on) might lead to paraffin blockages. Any damage caused by using any cleaning reagent other than Xylene is excluded from warranty, and any resulting repair and/or service call will be charged.

PARAMETER VALUES
Do not reduce the parameter values for the predefined steps (that is, time, temperature, and number of steps) of the pre-installed cleaning program. Reducing these values might cause paraffin blockages. Any damage caused by reducing these predefined values is excluded from warranty, and any resulting repair and/or service call will be charged.

5-4 Cleaning the Surfaces of the Instrument

To clean the surfaces of the instrument:

1. Turn the instrument off, as described in Section 3-1-2 Turning the instrument off.

2. Remove coarse paraffin waste with the plastic scraper, supplied with the STP420 as part of the standard equipment.

3. Clean all the surfaces of the instrument using commercially available cleaning agents and a smooth cloth. Use the cleaning agent sparingly so that it does not drip into the instrument or onto the screen.

Note!
Cleaning the surfaces: For cleaning the outer surfaces of the instrument, and its accessories, use mild domestic cleaners. Do not use aggressive cleaning agents or solvents, such as abrasive agents, as the paint and plastic parts might be damaged.

Note!
Cleaning the wax drain rail: Use gauze to wipe residual paraffin from the wax drain rail, while the paraffin and rail are still warm. Remove any paraffin solidified on the rail the next time you use the wax drain rail.

5-5 Routine Maintenance

Thermo Fisher Scientific strongly recommends that only trained and certified service technicians carry out maintenance on your STP420.

Certified service technicians are trained by Thermo Fisher Scientific and are equipped with the necessary tools and the latest software updates.

To make sure the instrument continues to process safely, you are advised to have a routine maintenance carried out by a trained service technician *twice a year*.

Thermo Fisher Scientific, or a local service provider authorized by Thermo Fisher Scientific, offers a service contract which guarantees that the routine maintenance takes place on time, and that your instrument is always in perfect condition. A notification will appear on the screen during these intervals. ThermoFisher service should be called as soon as possible. The prompt can be closed and the unit used normally until the maintenance is performed.

5-6 Service Contract

For more information, contact your nearest Thermo Fisher Scientific sales and service office.

You are strongly advised not to carry out repairs yourself. To do so would render all the warranties and guarantees null and void. Repair work must only be carried out by an authorized service technician.

Parts must only be checked or replaced by Thermo Fisher Scientific or its authorized representatives.

Chapter 6
Transportation and Final Shutdown

In some circumstances, you might want to ship or transfer the STP420 to another place. Eventually, you might not need to use the instrument any further. There are specific instructions for transporting and disposing of the STP420 safely.

6-1 Transportation: Preparing for Shipment

You must familiarise yourself with the instructions here, before you ship the instrument.

Packaging

You must ship the instrument in packaging materials that are the same as the original packaging. Any damage caused by shipping with any other, nonconforming, packaging is not covered by the manufacturer's warranty.

Any repairs required as a result of using nonconforming packaging will be fully charged to the sending party. Thermo Fisher Scientific reserves the right *not* to carry out a repair, depending on the seriousness of the damage.

To order original packaging materials, contact Thermo Fisher Scientific or a local dealer authorized by Thermo Fisher Scientific.

Biohazard

Make sure you follow the precautions for biological hazards. These are in the Safety Precautions section of this manual.

To prepare for shipment and to make sure the instrument functions perfectly again after transportation:

1. Observe all the conditions for storage and transportation given in:
    - Section 2-1 Unpacking the STP420
    - Section 2-2 Selecting a Site for the STP420
    - Section 2-3 Transporting the STP420 to Its Site
2. Remove all tissue cassettes.
3. Carry out a cleaning cycle with empty baskets.

4. Empty the reagents.

5. Empty the paraffin.

6. Empty the wash bottle (see Section 3-3-2 Emptying water from the wash bottle).

7. Turn the instrument off, as described in Section 3-1-2 Turning the instrument off.

8. Unplug the unit.

9. Dispose of all liquids appropriately, according to the safety data sheets and any applicable laboratory regulations.

10. Install transport handles as described in Section 2-3 Transporting the STP420 to Its Site.

11. Pack the instrument *in the original packaging*, as this gives you the best chance of transporting the instrument without damage.

Note!
Original packaging: If the original packaging is no longer available, contact your local Thermo Fisher Scientific representative.

RETURNING THE INSTRUMENT
If you return the unit, make sure it is clean and safe.

6-2 Final Shutdown

After the final shutdown of the instrument, you are advised to dispose of the instrument in accordance with the information given under Environment, in How to Use This User Guide, at the start of the manual.

All debris, waste, and infectious material from operating the instrument must be disposed of in accordance with the appropriate laboratory regulations.

Disinfectants, cleaning liquids, and section waste must be disposed of in accordance with the appropriate regulations governing special waste.

Reagents must be disposed of in accordance with the General Laboratory Guidelines.

The labeling on the instrument and its literature indicates that, after the final shutdown, the instrument must not be disposed of with ordinary domestic waste.

Dispose of your instrument separately from other waste, to avoid the harm caused to the environment and human health by uncontrolled waste disposal.

Recycling your instrument helps support the sustainable recycling of material resources.

DISPOSAL
You must not dispose of this instrument with other commercial waste.

Appendix A
Standard Equipment

The STP420 is delivered with the following standard equipment. Check all delivered parts against the delivery note and your order. If any parts are missing, please contact your local Thermo Scientific sales office immediately. Use the catalogue numbers listed below to reorder standard equipment.

Quantity	Description	Cat. No.
7	Basket for organized or bulk fill, complete with lid	526520
3	Insert for baskets	434910
1	Basket loading stand	434930
13	Reagent container	264130
1	Xylene cleaning bottle	264550
1 Set	Reagent tags	526540
1	Power cord	314990
1	User Guide *	
	Gernan	387790
	English	387791
	French	387792
	Spanish	387793
	Italian	387893
1	Hexagon key with T-grip	362470
1	angled Allen key	362120
1	Funnel	362770
1	Plastic paraffin scraper	334020
1	USB data stick, 256 Mbytes	612000
1 Set	Hose, 1 set of tubes includes two tubes with connections	526860
1	Active coal filter cpl	526420
25	Reagent filter (standard equipment on delivery)	
1 Pack.	Reagent filter (100 pieces), to reorder	435020
1	Quick Reference Guide “Understanding the screen displays” *	
	Gernan	388096
	English	388097
	French	388099
	Spanish	388098
	Italian	388100
1	Quick Reference Guide “System Icons” *	
	Gernan	388101
	English	388102
	French	388104
	Spanish	388103
	Italian	388105

* Delivered in English or local language

Appendix B
User and Supervisor Permissions

B-1 Users

Users can:

- Run protocols:
  - View
  - Start
  - Interrupt (If the option is enabled, see Section 3-7-3 Creating a New Protocol)
  - Cancel
  - Terminate
  - Step start
- Start a cleaning cycle
- Manage expired reagents
- Change language settings, date format in temperature and pressure
- Turn on and off the acoustic signal at the end of logs and at the end of the automatic filling or emptying operation.
- Access to the log files of error lists
- Export log files and send troubleshooting e-mail to the Thermo Fisher Scientific Service
- Change password for supervisor

B-2 Supervisors

Supervisors can perform all the normal operations associated with users, and:

- Run protocols:
  - Write
  - Delete
  - Edit
  - Export
  - Import
- Manage reagent list:
  - Create
  - Delete
  - Edit
  - Export
- Manage reagents:
  - Define reagent parameters
  - Assign defined reagents to specific stations
- General settings:
  - Access logfiles and data loggers for troubleshooting
  - Export logfiles and data loggers for Service experts analysis
  - Receive advice and service help from Service experts

Appendix C
Factory Default Settings

Feature	Setting
Date	DD/MM/YY
Language	English
Paraffin temperature	60°C
Protocols:	
Draining time	20 seconds
Pressure/vacuum	OFF
Passwords:	
User (routine user)	No password necessary
Supervisor	Supi
Demo	STP420
Technician (service technician)	No password necessary, however this mode does require a service dongle

CAUTION – NO RESET
Think very carefully before you edit these values and settings. It is not possible to reset them to the factory defaults automatically.

Appendix D
Approved Reagents

The following reagents are recommended for the STP420:

Reagent type	Approved variety
Fix	Buffered and non-buffered formalins (for example, Glyoxal-based fixative Zink Formalin, buffered and non-buffered)
	Fast Flex fixative (solution 1)
Drain	Ethanol
	Isopropanol
	Fast Flex dehydrant (solution 2)
	Flex dehydrant
Wax	Paraffin
	Paraplast
	Fast Flex paraffin
	Paraffins with melting points between 55°C and 58°C
Clarify	Xylene
	Clear-Rite3
	Fast Flex Xylene (solution 3)
	Fast Flex Xylene substitute (solution 3)
Clear	Xylene
	Ethanol
	Thermo Scientific reagent alcohol
	Thermo Scientific Xylene substitute *Note!* *Use the "Standard Cleaning" function for cleaning the chambers when Xylol substitutes (see Chapters 5-3)*

Unlisted Reagents

Reagents which are not listed here can cause damage to the instrument. Do not use acetone, benzene or trichlorethane.

Appendix E
Technical Data

Software	**integrated PC and LINUX operating system**		
Filling volume rotary chamber	3.0 liters		
Filling volume biopsy chamber	1.0 liters		
Volume rotary chamber for automatic change of reagents	5.0 liters		
Filling or infiltration during vacuum	minimum -0.4bar		
Draining or infiltration during over pressure	maximum +0.35bar		
Maximum pressure	0.43bar = 43kPa < 50kPa		
Chamber temperature during infiltration	ambient temp. up to 65°C		
Chamber temperature during cleaning and paraffin steps	50°C up to 65°C		
Paraffin containers:			
Paraffin temperature	55°C up to 65°C		
Volume per container	4.5 liters		
Transportation and storage conditions:			
Storage temperature range	0°C up to 50°C		
Operating conditions:			
Temperature	+15°C to +35°C (at max relative humidity of 60%)		
Altitude	up to 1.500m NN		
Floor loading requirements	350kg/m²		
Power requirements	100 - 115V, 10A, 50 - 60Hz, +/-10% 220 - 240V, 5A, 50 - 60Hz, +/-10%		
Internal protection:			
Primary circuits	Main switch fuse unit Q1 T15AH		
Secondary circuits:			
Supply boards A2:			
Transformer T1 secondary		F1	T20A
Main circuit for heating	P24.1	F2	16 A
		F3	16 A
Pump P1	P24.3	F4	5 A
Valve and lock for lid – supply	P24.2	F5	6.3 A
Controller	P24.8	F6	1 A
Turning valve V1	P24.5	F7	6.3 A
Turning valve V2	P24.6	F8	6.3 A

Software	**integrated PC and LINUX operating system**		
Rotary motor R7	P24.7	F9	6.3 A
Power board A3:			
Instrument fan	M1/M2	F1	0.2 AT
Rotary chamber fill/Heating of the medium pipe	R21	F2	1.6 A
Outlet paraffin heater	O12	F3	1.6 A
Rotary chamber heater, lower front	R12	F4	4 A
Rotary chamber heater, lower	R15	F5	12.5 A
Rotary chamber heater, upper	R28.1	F6	10 AT
Biopsy chamber heater	B12/B13	F7	12.5 A
Paraffin container heater 1	O6.1	F8	6.3 A
Paraffin container heater 2	O6.2	F9	6.3 A
Paraffin container heater 3	O6.3	F10	6.3 A
Paraffin container heater 4	O6.4	F11	6.3 A
Valve unit	V5/V6	F12	6.3 A
Reserve		F13	1 AT
Reserve		F14	1 AT
Magnetic valve biopsy chamber	B24	F14	1 AT
Magnetic valve pressure	P31	F15	1 AT
Magnetic valve rotary chamber / biopsy chamber	P32	F16	1 AT
Magnetic valve vacuum	P30	F17	1 AT
Locking magnet biopsy chamber	B24	F18	1 AT
Reserve 1		F19	1 AT
Reserve 2		F20	1 AT
Pollution degree	2		
Overvoltage category	II		
Sound pressure	50 dB(A)		
Dimensions (mm)	wide 639mm × high 1503mm × deep 635mm		
Dimensions (inches)	wide 25.16in × high 59.17in × deep 25.0in		
Working height	848mm / 33.39in		
Level paraffin containers	1079mm / 42.48in		
Overall height, including monitor	1503mm / 59.17in		
Weight, empty	190kg		
Weight, with operating media	250kg		

Note!
Temperatures: All temperatures assume an ambient room temperature of +20°C.

Appendix F
Preferred Protocols and Best Practices

F-1 Protocols

Note!
The protocols listed here are examples of common procedures. Depending on the task and type of samples to be treated, it may be necessary to adapt the protocols.

Program step		Time (mins)	Pressure/ vacuum (P/V)	Temp (0°C)	Drain time (secs)	Time to fill and empty (mins)
Overnight						
1	Formalin 1	30	P/V	0	20	4
2	Formalin 2	60	P/V	0	40	4
3	70% alcohol	30	P/V	0	20	4
4	80% alcohol	30	P/V	0	20	4
5	95% alcohol	60	P/V	0	20	4
6	100% alcohol	60	P/V	0	20	4
7	100% alcohol	60	P/V	0	40	4
8	Xylene 1	30	P/V	0	20	4
9	Xylene 2	60	P/V	0	20	4
10	Xylene 3	60	P/V	0	40	4
11	Paraffin 1	30	P/V	62	20	4
12	Paraffin 2	30	P/V	62	20	4
13	Paraffin 3	30	P/V	62	20	4
14	Paraffin 4	60	P/V	62	40	4
	Total time including time to fill and empty (hr:min)	11:32				
Biopsy						
1	Formalin	30	P/V	0	60	4
2	Alc 80%	15	P/V	0	60	4
3	Alc 95%	15	P/V	0	20	4
4	Alc 100%	15	P/V	0	20	4
5	Alc 100%	30	P/V	0	60	4
6	Xylene	15	P/V	0	20	4
7	Xylene	30	P/V	0	60	4
8	Paraffin	15	P/V	62	20	4
9	Paraffin	15	P/V	62	20	4
10	Paraffin	30	P/V	62	20	4
	Total time including time to fill and empty (hr:min)	04:16				

Program step		Time (mins)	Pressure/ vacuum (P/V)	Temp (0°C)	Drain time (secs)	Time to fill and empty (mins)
Standard day:						
1	Formalin	30	P/V	0	60	4
2	Formalin	30	P/V	0	60	4
3	Alc 80%	40	P/V	0	20	4
4	Alc 95%	20	P/V	0	20	4
5	Alc 95%	20	P/V	0	20	4
6	Alc 100%	40	P/V	0	20	4
7	Alc 100%	65	P/V	0	60	4
8	Xylene	30	P/V	0	20	4
9	Xylene	45	P/V	0	60	4
10	Paraffin	30	P/V	62	20	4
11	Paraffin	30	P/V	62	20	4
	Total time including time to fill and empty (hr:min)	08:19				

Cleaning cycle "Short Cleaning" (both chambers)

Reagent	Time (Minutes)
Xylene cleaner	10
Xylene cleaner	10
Alcohol cleaner	5

Cleaning cycle "Standard Cleaning" (both chambers)

Reagent	Time (Minutes)
Xylene cleaner	10
Xylene cleaner	10
Xylene cleaner	10
Alcohol cleaner	5

Cleaning cycle "Cleaning reagent station" (station cleaning, both chambers)

Reagent	Time (Minutes)
Xylene cleaner	1
Alcohol cleaner	1

F-2 Tissue Grossing and Fixation

The following practises are recommended:

- Make sure that the tissue is completely secured before continuing.
- To achieve a good infiltration rate, do not cut tissue slices thicker than 4mm.
- Avoid squeezing the tissues in the cassettes.
- Close the cassettes properly.

F-3 Wrapping Ultra-Thin Tissue

For small, vascular, ultra-thin tissue (such as friable material or fine-needle biopsies), the following practise is recommended:

1. Use Turboflow II cassettes, with 7×7cm gauze and 2×3cm pieces of filter material (that is, the maximum size of the cassette).
2. Place the histological material on the filter piece (arrange and it as necessary).
3. Cover the material with a second filter piece.
4. Wrap the double layer in the gauze.
5. Place the wrapped material in the cassette, and close the cassette firmly.
6. Keep the wrapped material in fixation solvent (such as formalin).
7. Process it as required.

F-4 Cassettes

The following cassettes are recommended:

- TurboflowII, with attached cover: Catalogue number 170000
- Cassette IV, TissueLok, standard cassette: Catalogue number 35837
- Biopsy cassettes: Catalogue number 35838
- Histoscreen: Catalogue number 35840

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