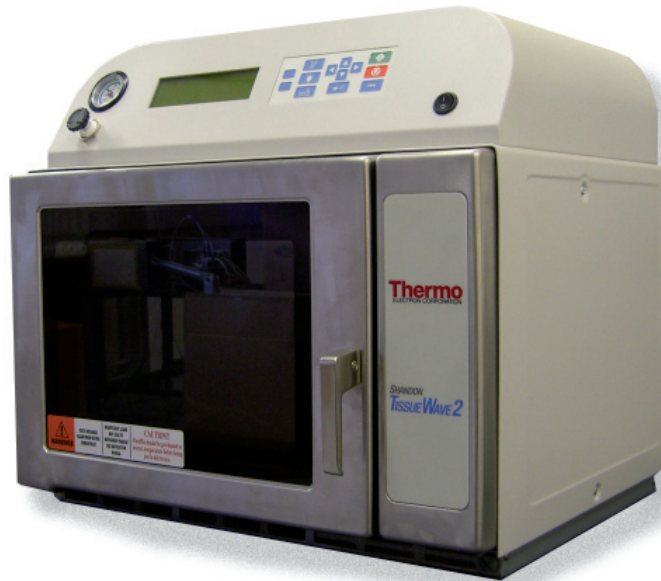


Shandon TissueWave 2 Microwave Specimen Processing System

Operator Guide - Issue 1
B35210021 English



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SCIENTIFIC

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The Shandon TissueWave 2 meets the following CE Mark requirements:

In Vitro Diagnostic Directive 98/79/EC

Low Voltage Directive 2006/95/EC.



Symbols

The following symbols and conventions are used throughout this manual and on the instrument.



THIS SYMBOL IS USED ON THE EQUIPMENT, OR IN A DOCUMENT, TO WARN THAT INSTRUCTIONS MUST BE FOLLOWED FOR SAFE AND CORRECT OPERATION. IF THIS SYMBOL APPEARS ON THE INSTRUMENT, ALWAYS REFER TO THIS OPERATOR GUIDE.



THIS SYMBOL IS USED ON THE EQUIPMENT, OR IN A DOCUMENT, TO WARN THAT THERE MAY BE A BIOHAZARD ASSOCIATED WITH THE INSTRUMENT. ALWAYS ACT WITH COMMON SENSE AND BE AWARE OF THE SAMPLES USED. TAKE SUITABLE PRECAUTIONS.



THIS SYMBOL WARNS YOU THAT SURFACES ARE HOT. IF THIS SYMBOL APPEARS ON THE INSTRUMENT, ALWAYS REFER TO THIS OPERATOR GUIDE.



THIS SYMBOL IS USED ON THE EQUIPMENT, OR IN A DOCUMENT, TO WARN THAT HARMFUL CHEMICALS ARE USED WITH THE INSTRUMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS FOR THE CHEMICALS USED. ALWAYS ACT WITH COMMON SENSE AND BE AWARE OF LOCAL LABORATORY PROCEDURES. TAKE SUITABLE PRECAUTIONS.

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

Note

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

Contents

How to Use This Guide

Safety Information

1 - Introducing the Shandon TissueWave 2

2 - Daily Operation

3 - Installation

4 - Programming

5 - Troubleshooting

6 - Maintenance and Cleaning

Appendix A - Approved Reagents List

Appendix B - List of Available Names

Appendix C - Graph of Power Output

Appendix D - Power Output Confidence Test

Appendix E - Accessories

Appendix F - Warranty and Declaration of Conformity

Appendix G - Technical Specifications

Index

How to Use This Guide

Introduction

The **Shandon TissueWave 2 Microwave** is intended for use in pathology laboratories by operators familiar with tissue processing and laboratory equipment.

Before operating the instrument, the section entitled **Safety Information** must be read and understood.

This Operator Guide is structured to let processing of tissues begin quickly and safely with the Shandon TissueWave 2.

Chapter Summary

Section 1 - Introducing the Shandon TissueWave 2 This chapter identifies the components of the Shandon TissueWave 2 Microwave and describes their functions.

Section 2 - Daily Operation This chapter explains the daily operation procedures required to run pre-defined protocols.

Section 3 - Installation This chapter describes the initial installation and setup of the unit.

Section 4 - Programming This chapter explains the initial programming of the microwave, as well as how to make changes to existing programs.

Section 5 - Troubleshooting This chapter explains the alarm messages and gives details on how to solve common processing problems.

Section 6 - Maintenance and Cleaning This chapter explains the daily, weekly and monthly cleaning and maintenance requirements for the unit.

Safety Information

The Shandon TissueWave 2 is designed and made with care.

The instrument is safe to use, simple to operate, and easy to maintain.

Many safety features have been built into the unit to ensure its safe operation.

However, incorrect actions by a user may damage the equipment, or cause a hazard to health.



All users must read and understand the following paragraphs before using this instrument.



Operate the unit from a properly grounded and appropriately rated receptacle.

- To minimize the risk of electrical shock and the possibility of interference with other electronic devices, the unit must always be powered from a grounded receptacle.
- Position the Shandon TissueWave 2 so that it is possible to interrupt the mains supply at the source by removing the plug from the socket.
- In addition, the unit should be operated on its own electrical power circuit with a current rating at least equal to the unit's fuse rating. Line voltage may fluctuate particularly if other devices are powered on the same line.
- The shortest possible distance between the service outlet and the main connection feeding the service will provide the best results in terms of consistent power output from the microwave.



Ensure proper operation of the vent system.

- The Shandon TissueWave 2 vent system interlock is designed to prevent use of the unit unless adequate air flow has been established through the microwave chamber.
- Keep the exhaust hose clean and unrestricted. This provides protection against the buildup of possibly toxic or explosive fumes inside the unit.
- Never attempt to operate the unit with a known deficiency in the venting unit.



Do not operate the unit when empty.

- Whenever operating the Shandon TissueWave 2 unit, be sure that the microwave chamber contains some type of microwave absorbent material. Use only microwavable containers in the Shandon TissueWave 2.
- Insufficient or improper loads or improper containers (metal) will cause the magnetron or parts of the microwave interior to overheat. When this happens, a thermal switch will eventually turn the unit off so the magnetron can cool. Several minutes will need to elapse before the switch resets and allows the unit to operate.
- Damage to the magnetron may occur with insufficient loads.
- Never heat food in a laboratory microwave.



Do not put excessive weight on the door.

- For example, the door is not designed to support the weight of someone leaning on it. Applying heavy loads to the door might cause it to become misaligned and result in improper operation of the unit.
- Do not attempt to operate the unit with something caught in the door or with the door open.

- There are two safety interlocks on the door to prevent open-door operation.
- Do not allow residue to build up on the door seals. Seals may be cleaned with a mild detergent and warm water using a soft sponge or cloth.
- Do not operate the unit if the door, hinges or door seals are damaged.



Use caution when heating volatile and / or flammable materials.

- Volatile material may evaporate quickly in the microwave chamber and should be closely monitored during processing.
- To prevent the build-up of an explosive mixture in the chamber, flammable materials should not be heated to their boiling point.
- Reagents containing metals (eg: Zinc Formalin or Mercuric Chloride) need to be completely cleaned off of all internal components. Build up of such metals may cause arcing to occur.
- Do not install the unit next to or near a source of heat.
- Do not install the unit at or above eye level. Make sure the microwave fits securely on a counter space.
- To avoid toxic fumes when handling heated solutions always work with heated solutions in a properly vented area.



Never use an additional thermometer in the unit.

- Only the supplied temperature probe should be used to monitor temperature inside of the Shandon TissueWave 2.



Use only qualified microwave service personnel for repairs.

- The unit should never be adjusted or repaired by anyone except qualified microwave service personnel. The outer case of the microwave should not be removed at any time, except by a qualified service person.



Use caution when the vacuum chamber is in use.

- The vacuum line (hose) is intended for pulling gases, not liquids. Care should be taken to not allow liquids to be sucked into the line.
- Always release the vacuum from the chamber with the vacuum release knob on the control panel.



Specimens must be completely covered with fluid during all processing and staining procedures.

- Processing and staining fluids will disperse the heat generated by the microwaves in an even manner throughout the tissue sample. This provides even processing and staining without undue heating of artifacts.
- Exposed plastic cassettes and processing racks may melt if left uncovered with fluid.
- Avoid using sponge biopsy pads as they may interfere with the exchange of heat and reagents for the specimen sample.
- Material such as metal suture staples may be processed in the unit safely as long as they are totally submersed in processing solution.



Never heat combustible fluids above their boiling points.

- There is a potential static discharge hazard when heating combustibles.

- Paraffin should be properly heated to the processing temperature before placing the paraffin into the Shandon TissueWave.



Never attempt to disengage the vacuum unit by disconnecting the tubing or lid.

- This will cause a backup of fluid into the tubing and possibly the vacuum pump.
- Always disengage the vacuum by releasing the vacuum knob located on the control panel.



If this equipment is used in a manner not specified by Thermo Fisher Scientific, the protection offered by the equipment may be impaired.

Chemical Safety

The Shandon TissueWave 2 as supplied, complies with EN 61010-1:2001.

However, chemicals introduce potential hazards and Thermo has adopted the following position with regard to the subject of heated surfaces and volatile chemicals used in medical laboratories:

- i Non-specified chemicals are used in the instrument at the customer's own risk.
- ii All the chemicals recommended by Thermo have auto-ignition temperatures considerably above any surface temperature that can be reached during a single fault failure of the heating system on the instrument.
- iii The instrument contains no source of ignition in any areas of the instrument where chemicals are stored or likely to leak in a single fault condition.

- iv The operator is fully aware of the contents of the specification documents detailing the properties of the chemicals they are using.
- v The operator has carried out any legally required assessment of chemicals used and is using good laboratory practice.



Some chemicals used during tissue processing are flammable - do not use sources of ignition in the vicinity of this instrument when it is loaded with reagents.

Environmental

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



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

Further information on Thermo Fisher's compliance with these Directives, the recyclers in your country, and information on Thermo Fisher products which may assist the detection of substances subject to the RoHS Directive are available at:

www.thermo.com/WEEERoHS.

1 - Introducing the Shandon TissueWave 2

Introduction

Welcome to the Shandon TissueWave 2 Specimen Processing Microwave System.

This unit may be used for:

- Tissue fixation and processing
- Decalcification of hard material
- Routine special stains where heat would accelerate the staining process
- Epitope enhancement during immunohistochemistry staining.

With a total capacity of 14 protocols consisting of a total of 63 steps, the Shandon TissueWave 2 is designed for greater flexibility to meet the growing laboratory workload demands.

This user friendly instrument will free-up technical time for more complex procedures.

The Shandon TissueWave 2 will deliver uniformly excellent results in a fraction of the time.

Laboratory safety is always an important consideration when purchasing equipment.

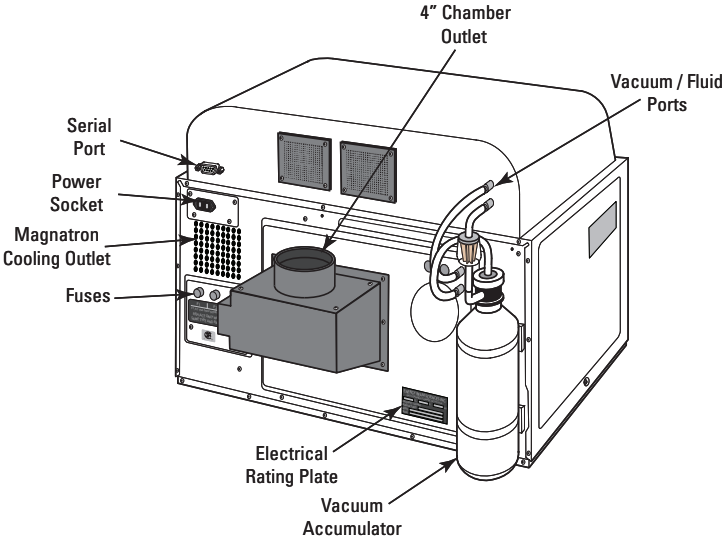
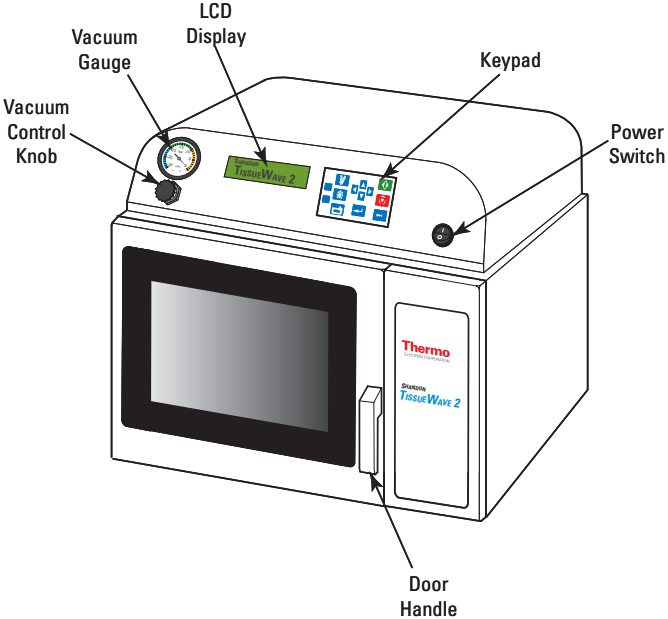
The Shandon TissueWave 2 has a ventilation system interlock that prevents the unit from operating if there is not adequate air flow established through the microwave chamber.

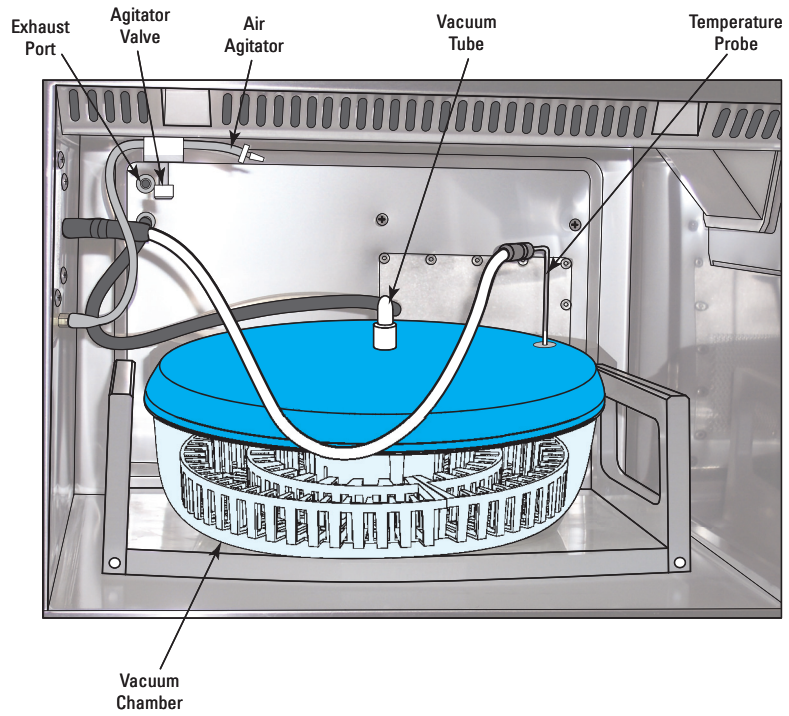
The Shandon TissueWave 2 has an interactive LCD screen that directs and informs the user throughout the operation of the unit.

A custom designed vacuum chamber is an added accessory that comes with the Shandon TissueWave 2.

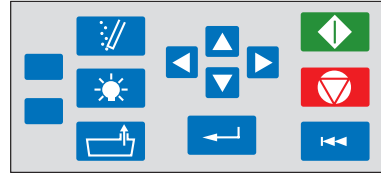
This unique chamber allows for a more rapid microwave fixation and consistent paraffin wax infiltration.

Identification of Parts





Keypad Functions



The Shandon TissueWave 2 has an interactive **LCD Display** which directs and informs the user throughout operation.

The **Keypad** is used to perform various actions and to interact with the **LCD Display**.

The **Keys** on the **Keypad** have the following functions:



Run



Stop



Quit



Enter



Cursor Left / Right



**Cursor Up / Down
Increase / Decrease Value**



Vacuum On / Off



Interior Light On / Off

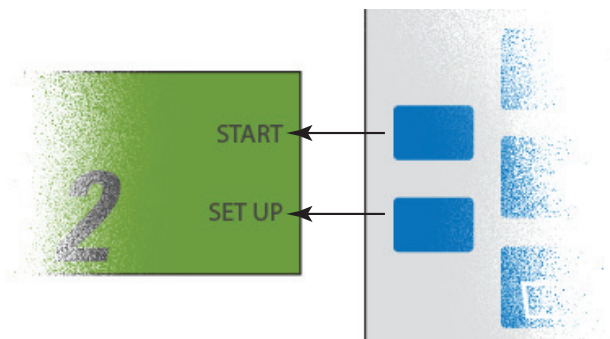


Agitation On / Off



Function Keys*

* The **Function Keys** will perform **Screen Specific Functions** which are noted on the **LCD Display** adjacent to the **Function Keys**.



Additional Symbols Used On the Instrument

In addition to those on the **Keypad**, there are a few other symbols used on this instrument.

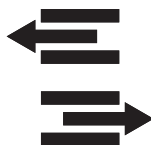
The meanings of these symbols are as follows:



Power On / Off Switch



Serial Port Connector



Vacuum Ports

Features of the Shandon TissueWave 2

The Shandon TissueWave 2 has several features designed to maximise the efficiency and quality of specimen processing.

These features are as follows:

- **Ventilation**
 - **Vacuum Accumulator**
 - **Temperature Probe**
 - **Vacuum Chamber**
 - **Air agitator**
 - **Interior Light**
-

Ventilation

The Shandon TissueWave 2 has a **Vent System Interlock** that prevents the unit from operating if there is an inadequate air flow established through the microwave chamber.

This prevents the accumulation of dangerous and toxic fumes.

The vent system on the Shandon TissueWave 2 is designed to be fed to a **Powered Exhaust System**.

A **4" (100 mm) Chamber Outlet** is attached to the back of the unit for easy exhaust hook-up.

An **Aluminium 4" (100 mm) Diameter Hose** is included with the unit for ventilation.

Note:

It is recommended that aluminium hosing be used since plastic hoses have a tendency to collapse at bends.

Vacuum Accumulator

The Shandon TissueWave 2 **Vacuum Accumulator** is designed to prevent the accidental ingestion of liquid paraffin or other contaminants by the system's **Vacuum Pump**.

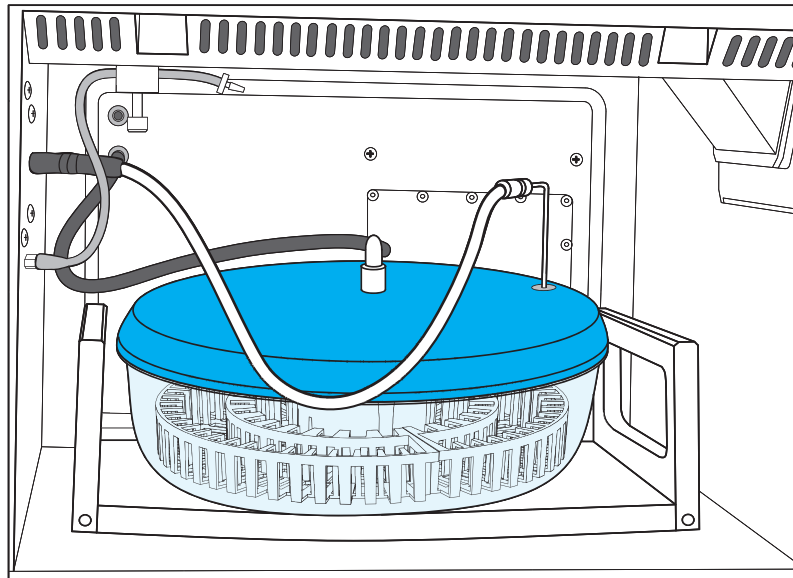
Should liquids enter the **Vacuum System** via the **Vacuum Inlet Connection** inside the **Processor Cavity**, they will be discharged into the **Accumulator Canister** and collected at the bottom.

Paraffin will solidify and remain there until re-heated for removal.

The accumulator's collection capacity before vacuum operation is affected is approximately **15 fl oz (450 ml)**.

The flow rate of the **Vacuum Pump** is **2200 in³/min (0.036 m³/min)**.

Temperature Probe



The **Flexible Temperature Probe** may be used in conjunction with the **Air Agitator** or threaded through the **Vacuum Chamber** during **Paraffin Infiltration**.

The probe guarantees accurate temperature measurement to $\pm 1^{\circ}\text{C}$ in most aqueous solutions.

The **Temperature Sensor** is located at the tip of the probe, although at least 1" (25 mm) of the probe must be covered by fluid.

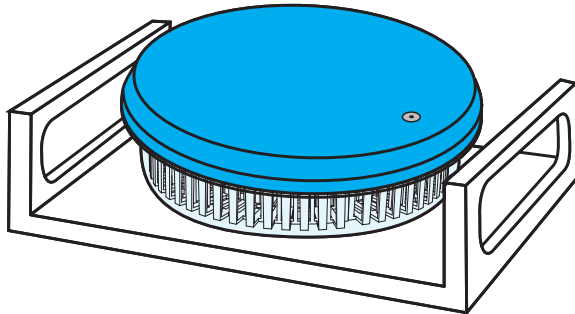
When placing the **Temperature Probe** into a **Container**, the tip should be located **as closely as possible to centre of the processing fluid** within the container, and **at mid-depth** in the fluid.

This will produce the most reliable and stable reading of the fluid temperature.

The **Temperature Probe** is made from stainless steel and is quite flexible, allowing it to be bent and formed as required for placement within various shaped containers.

Vacuum Chamber

The **Vacuum Chamber** is designed for use with the Shandon TissueWave 2 during **Paraffin Infiltration**.



Never use vacuum when microwaving alcoholic solutions, as this can cause rapid boiling and evaporation of the fluids.

Air Agitator

Air agitation during processing helps in eliminating cold and hot spots.

The constant air flow causes the air to circulate and prevents hot and cold spots from affecting any one particular area.

The total **Air Agitator** flow rate is **1 l/min Nominal**.

The **Air Agitator Pump** may be controlled by the **Air Agitator Key** located on the **Keypad**.

The **Pump** is usually controlled by a command in the **Protocol Edit** screen.

However, the operator may override this setting with the **Air Agitator Key**.

The **Air Agitator Outlet Tube** may be removed from the bushing and placed separately in the container for agitation.

The volume of the air stream producing the agitation is controlled manually with the **Flow Control Valve Knob** located at the connection of the tubing to the unit.

The airflow is **Decreased** as the knob is turned **Clockwise**.

Interior Light

The **Interior Light** can be turned on and off using the **Interior Light Key** on the **Keypad**.

This function can be used at any time while the instrument is switched **On** at the Mains.

2 - Daily Operation

Introduction

This chapter explains the routine operating procedures for processing with the Shandon TissueWave 2.

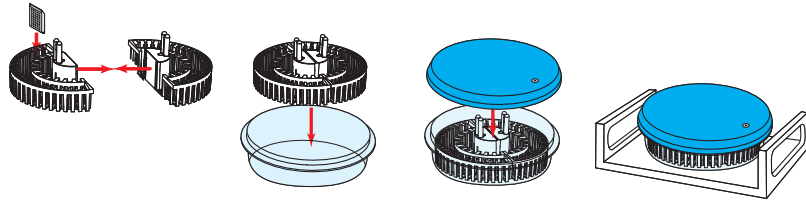
The procedures explained are:

- Loading the Shandon TissueWave 2
 - Internal Connections
 - Running a Protocol
 - Running a Manual Process
 - Running a Power Process
-

Loading the Shandon TissueWave 2 Vacuum Chamber

The **Shandon TissueWave 2 Vacuum Chamber** is designed to accept **Shandon Excelsior™ Processing Baskets**, which allow up to **74 Tissue Cassettes** to be processed at once.

The **Processing Basket** comprises of two sections, each capable of containing **37 Tissue Cassettes** in an ordered manner.



The procedure for filling and loading the **Processing Baskets** is as follows:

- Arrange the **Tissue Cassettes** as required in the **Processing Basket** halves.
- Place the two halves together as shown, and insert into the **Vacuum Chamber Base**.
- Fill to the required level with **Processing Fluid**.



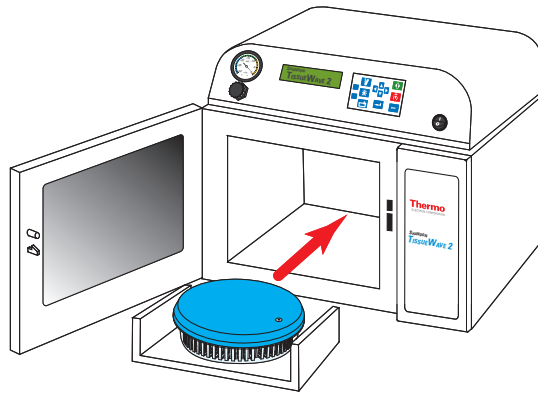
Insufficient fluid levels may cause the probe to overheat and prevent the unit from operating.

- If vacuum is required, place the **Vacuum Chamber Lid** on the Vacuum Chamber Base.



Ensure the lid forms a tight seal around the rim of the base, as poor sealing will negate the vacuum effects.

- It is recommended that the **Vacuum Chamber** be placed onto a **Microwavable Plastic Tray** to facilitate safe removal after processing.



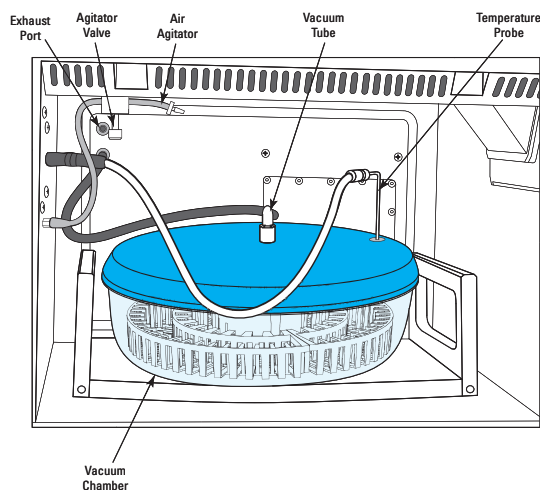
- Insert the **Vacuum Chamber** into the Shandon TissueWave 2 .
-

Internal Connections

Once the **Vacuum Chamber** is inside the Shandon TissueWave 2 the various **Internal Connections** need to be established.

These connections will vary, depending on whether or not vacuum is required for the protocol.

Connections for Processing With Vacuum:



- Slide the **Temperature Probe** through the **Bushing** in the **Vacuum Chamber Lid**.
- The tip of the **Temperature Probe** should be at about the **Half-Way Point** of the Depth of Fluid and not in contact with any solid material.
- Securely fit the **Vacuum Tube** to the **Central Connector** on the **Vacuum Chamber Lid**.
- If the **Air Agitator** is not used, it can be disconnected from the coupling adjacent to the **Agitator Valve** on the chamber roof.
- The **Exhaust Port** should be left **Open**.

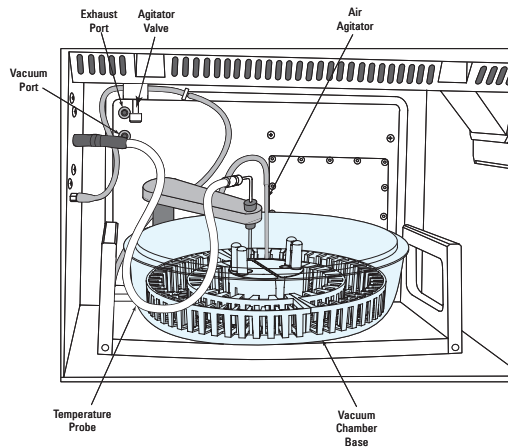
Note:

It is possible to engage the vacuum prior to the protocol step beginning, using the Vacuum Control Key on the Keypad.

This will ensure that the lid is properly seated and that a vacuum has been established before the protocol step begins.

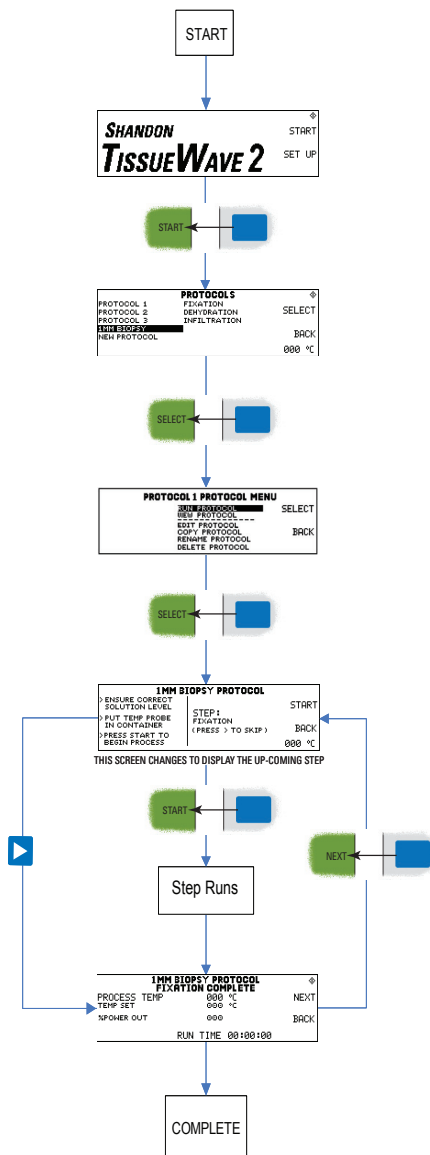
- When fully engaged, the **Vacuum Gauge** should read approximately **-15 inHg**, although this may be affected by load and run volume.

Connections for Processing Without Vacuum:



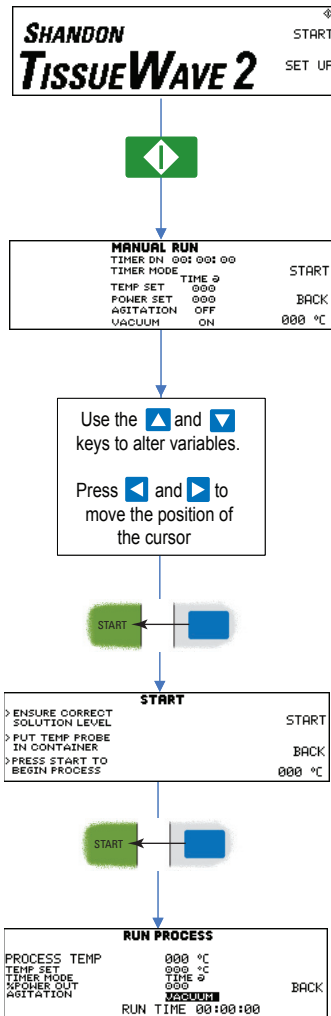
- Mount **Temperature Probe** so that the tip is at about the **Half-Way Point** of the Depth of Fluid, and as close to the centre as possible and not in contact with any solid material.
- Connect the **Air Agitator Tube** to the coupling adjacent to the **Agitator Valve** on the **Microwave Chamber** roof.
- Immerse the open end of the **Air Agitator Tube** in the **Processing Fluid**.
- The **Vacuum** and **Exhaust Ports** should be left **Open**.

Running a Protocol



- After turning on the TissueWave 2 the **Welcome** screen will appear.
- Press the **'Start'** Function Key.
- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight the protocol to be used.
- Press the **'Select'** Function Key.
- The **Protocol Options** screen will appear with **Run Protocol** highlighted.
- Press the **'Select'** Function Key.
- The **Run** screen will appear with the first step displayed alongside a list of checks to perform. Steps can be skipped using the **'Right'** Arrow Key.
- Press the **'Start'** Function Key to begin the step.
- The step will run for the required time.
- The **Step Complete** screen will appear, giving the option to proceed to the **Next Step**.
- Once all steps are complete the **Welcome** screen will appear.

Running a Manual Process



- Press the **Run Key**.
- The **Manual Run** screen displays a list of variables and their current values.
- Use the **Arrow Keys** to navigate between variables and to alter their values.
- Press the **'Start' Function Key**.
- Perform the on-screen checks.
- Press the **'Start' Function Key**.
- The **Run** screen will appear and the process will begin

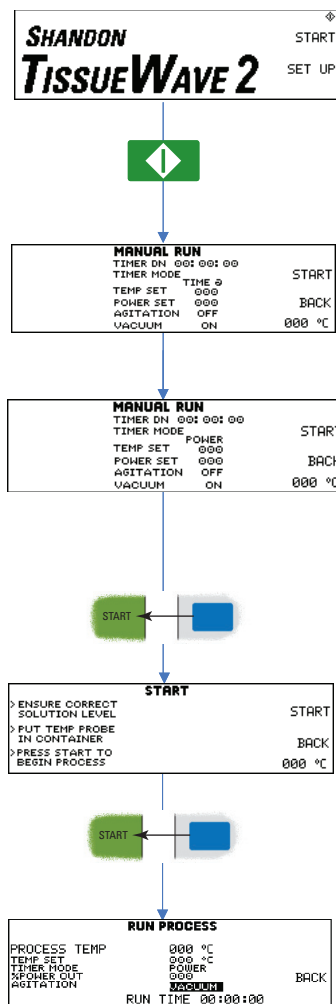
Running a Power Process

The Shandon TissueWave 2 has two possible **Power Processes**.

These are:

- Manual Power Process
- Protocol Power Process

Manual Power Process



• Press the **Run Key**.

• The **Manual Run** screen displays a list of variables and their current values.

• Use the **Arrow Keys** to navigate to **Timer Mode** and to scroll through the available settings until the word **Power** appears.

• Press the **'Start' Function Key**.

• Perform the on-screen checks.

• Press the **'Start' Function Key**.

• The **Run** screen will appear and the process will begin.

Protocol Power Process

RUN PA SCHIFF'S PROTOCOL			
PROCESS TEMP	PERIODIC ACID	000 °C	
TIMER MODE	POWER		BACK
%POWER OUT	000		
AGITATION	VACUUM		
	RUN TIME	00:00:00	

- Using the method described in **Chapter 4 'Editing Steps'**, set the **Timer Mode to Power** for all the steps in a Protocol.
 - Run the Protocol as described in **'Running a Protocol'**.
-

3 - Installation

System Specification

System Dimensions:	19"H x 21.5"W x 24.5"D (48.2 x 54.6 x 62.2 cm)
Microwave Chamber Dimensions:	9.5"H x 13.5"W x 15.5"D (24.1 x 34.3 x 39.4 cm)
System Mass:	78 lbs. (35.5 kg)
Input Current:	14A at 120V Nominal / 7.3A at 230V Nominal
Microwave Output Power:	825W Nominal (as measured by the 2 minute test method)
System Fusing:	2 x 15A Slow-Blow
Temperature Readout Refresh Rate:	Once per second
Temperature Readout Accuracy:	Temperature Error < 0.5°C
Power Control Accuracy:	Power Control Error < 1%
Air Agitation:	Flow Rate = 61 in ³ /min (0.001 m ³ /min) Nominal
Vacuum Pump Capacity:	Flow Rate = 2200 in ³ /min (0.036 m ³ /min)
Internal Lighting:	40W Incandescent Light Bulb
Fluid Ports:	Port size will accept up to 3/16" (5 mm) hose.

Locating the Shandon TissueWave 2

The Shandon TissueWave 2 should be located on a **non-flammable level bench or tabletop** with close proximity to **electrical power** and a **facility ventilation system**.

Consideration should be given to the surrounding work space to ensure that easy access to the material and equipment to be used with the Shandon TissueWave is provided as well as an adequate work surface area.

Power Requirements

It is highly recommended that the Shandon TissueWave be connected to a service outlet that is not used by any other device.

It should also be noted that the shortest possible distance between the service outlet and mains connection feeding the service will produce the best results in terms of consistent power output from the Shandon TissueWave.

The specific service requirements are as follows:

- 120V Model - 15A Service Minimum (20A Recommended)
 - 230V Model - 10A Service Minimum (15A Recommended)
-

Ventilation Requirements

The Shandon TissueWave **Vent System** is designed to connect to a **positively vented (powered) laboratory hood** or **building vent stack**.

A **4" (100 mm) Diameter Vent Hose** is included with the unit for this purpose.

Caution should be used regarding the length and number of bends in this piece of ducting.

In general, right angle bends should be avoided and the total length of the hose should be kept to **less than 8 feet (2.4 m)**.

Cooling Requirements

The Shandon TissueWave draws cooling air through a **Filter** located on the right-hand, front, bottom surface of the unit and exhausts it through a port on the back wall.

Care should be taken to keep these air vents from being obstructed.

The protrusion of the **Vent System Housing** on the back will usually provide adequate clearance for the exhaust outlet.

Periodic cleaning of the **Inlet Screen** will also help ensure sufficient cooling for the **Magnetron** and other heat sensitive devices in the unit.



If airflow is restricted, the unit will not operate properly and the life of the electrical parts will be shortened.

4 - Programming

There are some concepts about the Shandon TissueWave 2 unit which should be understood prior to beginning programming.

Control Parameters

The Shandon TissueWave 2 has two **Control Modes** which can be used:

- **Temperature Control**
- **Power Control**

Use the **Function Keys** to select **Temperature (T)** or **Power (P)** when prompted.

In **Temperature Control Mode**, the **Output Power** is continually adjusted to maintain a particular **Temperature Profile**.

The **Temperature Profile** can be further defined using the **Timer Mode** field.

The **Timer Mode** options are:

- **Time @** - Used to define the **Procedure Time** from the time when the **Solution** reaches the required temperature.
- **Time T** - Used to define the **Total Procedure Time** including the **Ramp Time** required to achieve the correct temperature.

In **Power Control Mode**, the **Output Power** is held at a **User-Defined Preset Value**.

Solution Temperature is ignored as a control factor.

When using most **Published Procedures**, the user will need to use the **Temperature Control Mode**.

In cases where a **Specific Wattage** is required, use the **Conversion Table** in **Appendix D** to determine the correct **Power Setting**.

Proportional Band

The **Proportional Band** is a **Pre-Defined Temperature Range** used to control the **Solution Temperature**.

Essentially it provides a **Feedback Loop** which the Shandon TissueWave 2 uses to determine whether **More** or **Less Power** is required at any given time.

Power Delivery

The Shandon TissueWave 2 uses **Pulsating Power** to control **Temperature** and **Output Power**.

This allows the Shandon TissueWave 2 to provide accurate temperature control and a smooth 'Temperature Curve'.

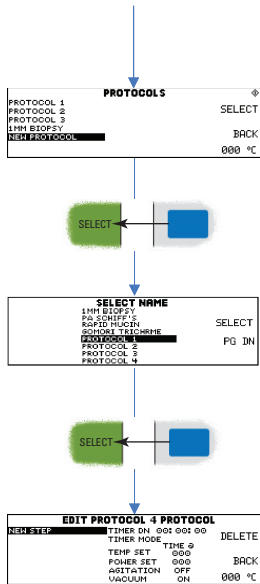
Programming Features

The Shandon TissueWave 2 has a number of programming options available to allow it to be customized as required by the user.

The Features available are:

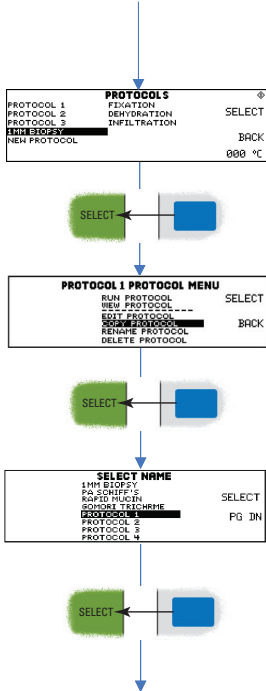
- **Add Protocol**
 - **Copy Protocol**
 - **Add Step**
 - **Edit Step**
 - **Delete Step**
 - **Delete Protocol**
 - **Rename Protocol**
-

Add Protocol



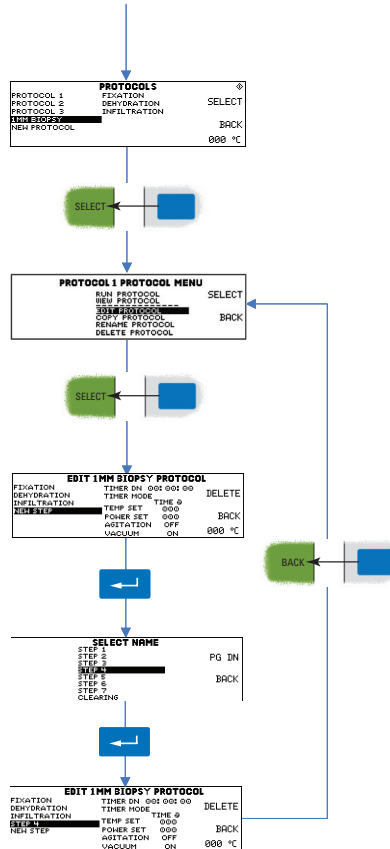
- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight **New Protocol**.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to select a **Protocol Name** from the available options.
- Press the **'Select'** Function Key.
- Insert the required steps and edit them as required (see **Add Step** and **Edit Step Flow Charts**).

Copy Protocol



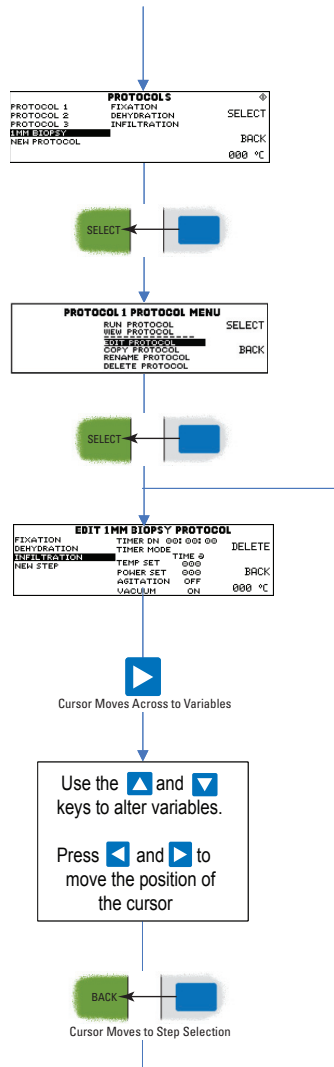
- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight the protocol to be copied.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to highlight **Copy Protocol** from the available options.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to highlight the **Protocol Name** required from the available options.
- Press the **'Select'** Function Key to complete.

Add Step



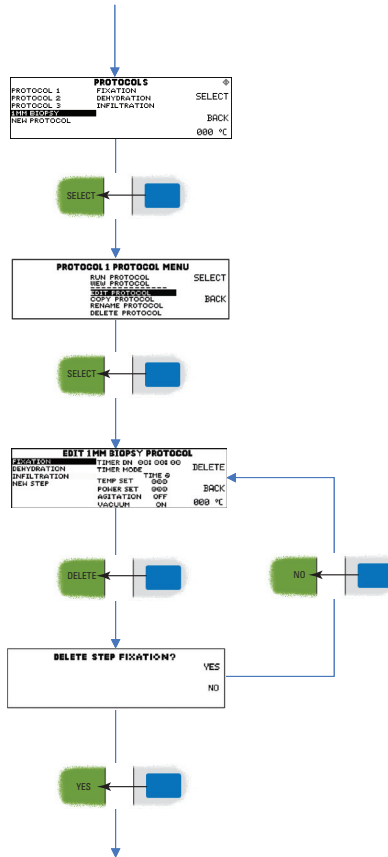
- From the **Protocol List**, use the **'Up'** and **'Down' Arrow Keys** to highlight the Protocol to be edited.
- Press the **'Select' Function Key**.
- Use the **'Up'** and **'Down' Arrow Keys** to highlight **Edit Protocol** from the list of options.
- Press the **'Select' Function Key**.
- Use the **'Up'** and **'Down' Arrow Keys** to highlight **New Step**.
- Press **Enter** to proceed.
- Use the **'Up'** and **'Down' Arrow Keys** to highlight the required step name.
- Press **Enter** to confirm.
- The step can then be edited as required (see **Edit Step Flow Chart**).

Edit Step



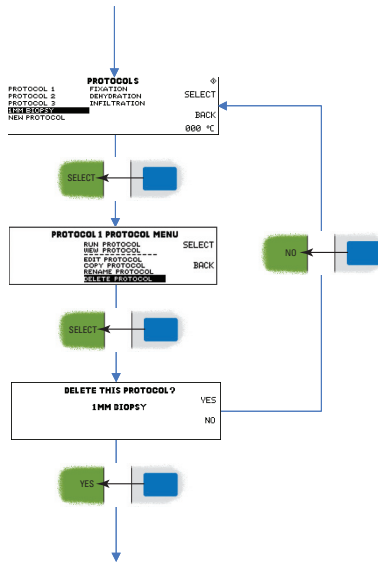
- From the **Protocol List**, use the **'Up'** and **'Down' Arrow Keys** to highlight the Protocol to be edited.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to highlight **Edit Protocol** from the list of options.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to highlight the step to be edited.
- Press the **'Right'** Arrow to move the cursor to the first variable position of the step options.
- Use the **Arrow Keys** to navigate between variables and to alter their values.
- Press the **'Back'** Function Key to move the cursor back to the **Step Selection** position.

Delete Step



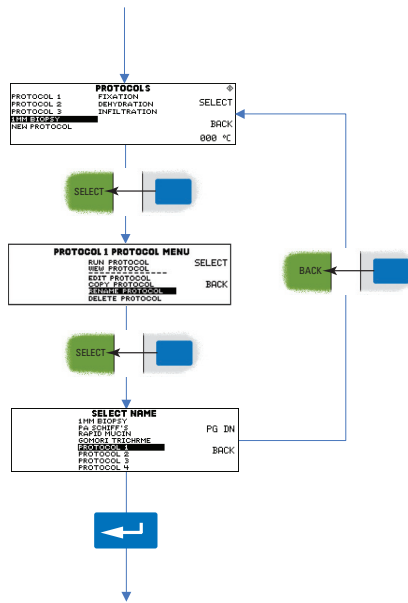
- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight the Protocol to be modified.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to select **Edit Protocol** from the available options.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to highlight the step to be deleted.
- Press the **'Delete'** Function Key.
- Ensure the correct **Step** has been selected.
- Press the **'Yes'** Function Key.

Delete Protocol



- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight the Protocol to be deleted.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to select **Delete Protocol** from the available options.
- Press the **'Select'** Function Key.
- Check that the correct **Protocol** has been selected.
- Press the **'Yes'** Function Key.

Rename Protocol



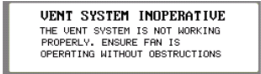
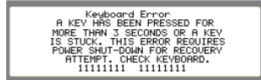
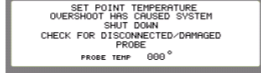
- From the **Protocol List**, use the **'Up'** and **'Down'** Arrow Keys to highlight the Protocol to be renamed.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to select **Rename Protocol** from the available options.
- Press the **'Select'** Function Key.
- Use the **'Up'** and **'Down'** Arrow Keys to select the **New Name** from the list shown.
- Press **Enter** to confirm.

5 - Troubleshooting

Warning Screens

The Shandon TissueWave 2 provides informative **Warning Screens** and an **Audible Alert** when certain conditions or problems occur.

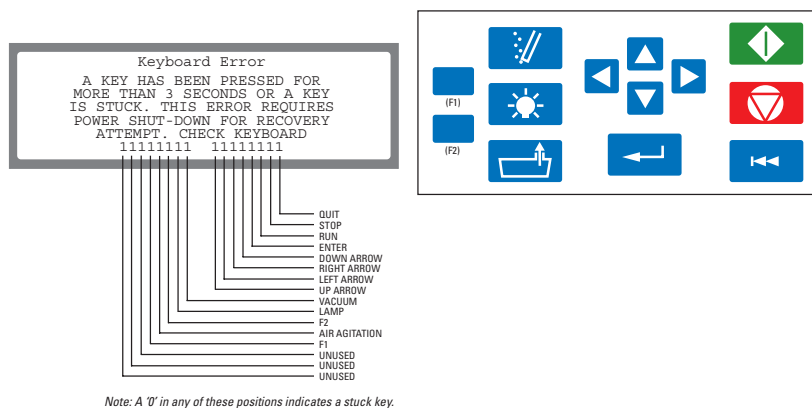
The following table lists the **Warning Screens**, their cause(s) and possible remedies for the appropriate faults.

Error Message	Cause	Remedy
	Instrument is in the process of powering up	<ul style="list-style-type: none"> • None - This is normal
	Airflow has been significantly reduced	<ul style="list-style-type: none"> • Check for obstructions in the air-flow circuit • Check for correct venting system • Check that the hose is properly attached • Turn power off and then back on • If problems persist call ThermoFisher Scientific Technical Support
	A key has been pressed for more than 3 seconds (See Stuck Key Identification)	<ul style="list-style-type: none"> • This is a fatal error • Turn power off and then back on • If problems persist call ThermoFisher Scientific Technical Support
	Measured temperature has exceeded the set-point temperature by 6°C	<ul style="list-style-type: none"> • Check fluid level is appropriate • Check power settings • Check temperature probe placement and connections • Check probe for damage • If problems persist call ThermoFisher Scientific Technical Support

<p>SYSTEM OVERTEMPERATURE ! THE CHAMBER IS OVERTEMPERATURE USE CAUTION!! CHECK CHAMBER CONTENTS.</p>	<p>Microwave chamber temperature too high</p>	<ul style="list-style-type: none"> • Turn power off and allow chamber to cool • If problems persist call ThermoFisher Scientific Technical Support
<p>HIGH PROBE TEMPERATURE HAS CAUSED SYSTEM SHUTDOWN CHECK FOR DISCONNECTED/DAMAGED PROBE 000 °C PROBE TEMP</p>	<p>Measured temperature exceeds 120°C</p>	<ul style="list-style-type: none"> • Check fluid level is appropriate • Check power settings • Check temperature probe placement and connections • Turn power off and then back on • Check probe for damage • If problems persist call ThermoFisher Scientific Technical Support
<p>LOW PROBE TEMPERATURE HAS CAUSED SYSTEM SHUTDOWN CHECK FOR DISCONNECTED/DAMAGED PROBE 000 °C PROBE TEMP</p>	<p>Measured temperature is less than 5°C</p>	<ul style="list-style-type: none"> • Check probe for damage • If problems persist call ThermoFisher Scientific Technical Support

Stuck Key Identification

If a **Keyboard Error** occurs, the key which is causing the problem can be identified using the following diagram:



Other Faults

There are also some faults which may occur, for which no **Warning Screen** is provided.

The following table lists those most commonly encountered:

Problem	Remedy
Unable to draw a vacuum on the vacuum chamber	<ul style="list-style-type: none"> • Check that the Tubing is properly connected to the Chamber Lid
	<ul style="list-style-type: none"> • Check that the Chamber Lid is securely fitted and makes a good contact at all points
	<ul style="list-style-type: none"> • Check the Chamber Lid mating surfaces for damage
	<ul style="list-style-type: none"> • Check the Bushing around the Temperature Probe
	<ul style="list-style-type: none"> • Check that the Vacuum Control Knob is set correctly
	<ul style="list-style-type: none"> • Check that the Vacuum Gauge is working correctly
	<ul style="list-style-type: none"> • Check that the seal between the Vacuum Chamber and its Lid is clear of debris.
	<ul style="list-style-type: none"> • If problems persist call ThermoFisher Scientific Technical Support
Unable to achieve set temperature	<ul style="list-style-type: none"> • Check that the Temperature probe is correctly positioned
	<ul style="list-style-type: none"> • Check the Power Settings
	<ul style="list-style-type: none"> • Check that the Load is correct for the Power Setting
	<ul style="list-style-type: none"> • Check that the Preset Temperature has not been changed
	<ul style="list-style-type: none"> • Use marble chips if necessary
	<ul style="list-style-type: none"> • If using paraffin (wax), ensure the temperature of the molten paraffin is close to the Preset Temperature before processing
	<ul style="list-style-type: none"> • If problems persist call ThermoFisher Scientific Technical Support

Watchdog Timer

When the Shandon TissueWave 2 is set to **Time at Temperature (Time @) Mode**, the process is only terminated when the **Countdown Timer** reaches zero.

If the **Timer** should fail to start it can cause indefinite heating of the process materials and possible loss of reagents and / or specimens.

This situation can arise if:

- The **Temperature Probe** is not placed in the reagent being heated.
- The reagent does not absorb the microwave energy sufficiently to reach the **Set Point Temperature**.

The **Watchdog Timer** is designed to prevent such an occurrence by automatically terminating the process if the **Process Timer** has not started within a fixed time period.

The default **Watchdog Timer** value is **10 minutes**.

In the event that the **Watchdog Timer** terminates the process the following screen will be displayed.



WATCHDOG TIMER EXPIRED!
THE SYSTEM TIMER HAS FAILED TO START.
CHECK PROCESS CONTENTS. ENSURE TEMPERATURE PROBE
IS IN PLACE. POSSIBLE TEMPERATURE MEASUREMENT
SYSTEM HALFFUNCTION. CHECK PROBE SYSTEM.

6 - Maintenance and Cleaning



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



To avoid danger of electric shock, never remove the Outer Case of this instrument!

The **Outer Case** should only be removed by an **Authorized Service Engineer**.

Removal of the **Outer Case** by **Non-Authorized Personnel** will **Invalidate** the **Warranty**.



Keep the Air Filter clean.

The **Air Filter** is located under the instrument directly below the **Control Panel**.

Wash the **Air Filter** with **Detergent** and **Water**, and **Dry** thoroughly before replacing.



Keep the Microwave Chamber and Door clear from debris and ensure any spilt reagent is cleaned up before use.

Clean surfaces using a **Soft Cloth** or **Sponge** and a **Mild Detergent**.

Do not use excessive amounts of water.

Do not use **Abrasive Cleaners** or cleaners which contain **Ammonia**.

Never pour water into the **Microwave Chamber**.

A **Cup of Water** can be boiled in the **Microwave Chamber** to soften debris before cleaning.

Dry thoroughly before use.

PRODUCT RETURN SAFETY DECLARATION

Part 1 Decontamination Certificate

Any instrument or part of any instrument must be clean before being returned, and where necessary accompanied by a completed Decontamination Certificate. Should the instrument or any part of it be received in an unclean condition, or Thermo Fisher Scientific consider it to be a hazard, the instrument or part will be returned unrepaired at the expense of the customer.

It is important that the certificate is forwarded by post or fax, and a copy attached to the exterior of the container. Containers will not be opened until the company is in possession of the required certificate.

This form **MUST** be completed by the customer and **NOT** by a Thermo Fisher or distributor employee.

If an instrument or part is to be returned to Thermo Fisher Scientific, please note the following:

- 1 If the instrument or any part of it has been exposed to, or been in contact with potential pathogenic or radioactive material, it is essential that it is decontaminated.
- 2 Set procedures are laid down in the European Health and Safety Directives for decontamination. To avoid any misunderstanding, we request that all instruments or parts returned to us must be accompanied by a certificate stating the following:

We certify that this (Model)..... Serial No.....

- has not been exposed to pathogenic, radioactive or other hazardous material and has been cleaned

OR

- has been decontaminated and cleaned (if exposed to the above) according to approved procedures following exposure to:

- Has the instrument been used for work with human or animal Transmissible Spongiform Encephalopathies, e.g. Creutzfeld-Jacob disease, Scrapie or BSE?
YES / NO
If yes, please contact Thermo Fisher Service before taking any further action.

Signed Position

Name (Block Capitals)

Company or Organisation

Full Address

Part 2 Guidelines for Returning Instruments

Please use the checklist below to ensure that the instrument being returned is ready for collection.

- All reagents / wax removed from instrument, including vapour traps (if applicable).....
- Accessories are secured / itemised
- Instrument has had transit clamps fitted as per Operator Guide (if applicable).....
- Instrument is packed in original packaging..... YES / NO

RMA NUMBER

CARRIER

FOR ATTENTION OF

Thermo Fisher Scientific, Anatomical Pathology, 4481 Campus Drive, Kalamazoo, MI 49008, USA
 Tel: 1-800-522-7270, Fax: +1 269-372-2674, www.thermo.com/shandon

Appendix A - Approved Reagents

Introduction

Thermo Fisher Scientific have approved the use of the following reagents with the TissueWave 2.

If the use of a reagent not on this list is required, contact your Thermo Fisher agent for advice.



The Shandon TissueWave 2 should not be used to heat any of the following:

- **Potentially explosive substances.**
- **Solvents**
- **Concentrated Strong Acids / Alkalis**
- **Reagents containing Calcium Chloride**



Refer to Material Safety Data-Sheets when handling reagents.

Reagent List

Dehydrants	Isopropanol	
	Ethanol	
	Industrial Methylated Spirits (IMS)	<i>Up to 5% Methanol in Ethanol</i>
	Reagent Alcohol	
Clearants	Presolve™ Clearant	
	Isopropanol	
Infiltrants	Paraffin Wax	
Fixatives	Formalin 10%	<i>Ensure proper ventilation when using Formalin based reagents</i>
	Zinc Formalin	
	Glyo-Fixx™	
Epitope Retrieval	Sodium Citrate Buffer	<i>0.1 mol/l</i>
	PBS (Phosphate-Buffered Saline)	
Cleaning Agents	Water	
	Dilute Detergent	
Also ...	Standard Decalcification Solutions	<i>Wipe chamber with a damp paper towel and dry thoroughly after use to prevent corrosion</i>
	Staining Solutions	<i>See Protocol Booklet</i>

Appendix B - List of Available Names

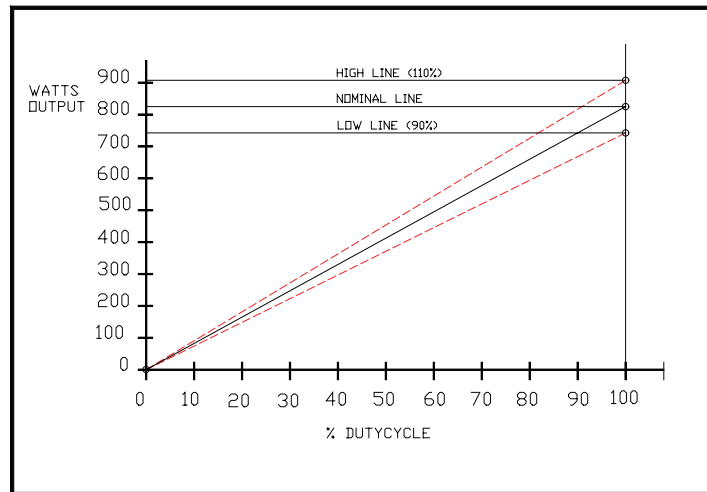
The following table contains the pre-programmed names available for identifying **Protocols** and **Steps**.

POSITION	NAME	POSITION	NAME	POSITION	NAME
1	1MM BIOPSY	41	FIXATION 2	81	PLAQUE
2	"PA SCHIFF S"	42	HIER 1	82	P53
3	RAPID MUCIN	43	HIER 2	83	RETICULIN
4	GOMORI TRICHROME	44	IHC 1	84	ACID FAST
5	PROTOCOL 1	45	IHC 2	85	ALCIAN BLUE
6	PROTOCOL 2	46	STAT RUN	86	DIFF QUICK
7	PROTOCOL 3	47	SHORT RUN	87	GIEMSA
8	PROTOCOL 4	48	LONG RUN	88	GMS
9	FIXATION	49	THICK	89	GORDON SWEET
10	DEHYDRATION	50	THIN	90	GRAM
11	INFILTRATION	51	FISH	91	GROCOTT
12	PERIODIC ACID	52	CISH	92	MALLORY
13	"SCHIFF S"	53	CYTO	93	MASSONS
14	FAST GREEN	54	GLYOXAL	94	MORDANT
15	FUCHSIN	55	FORMALIN	95	MUCICARMINE
16	"BOUIN S"	56	UNMASK	96	PERIODIC SCHIFF
17	FE HEMATOXYLIN	57	BLOOD	97	SAFRANIN
18	STEP 1	58	BLOODY	98	SILVER
19	STEP 2	59	BONE 1	99	SPORE
20	STEP 3	60	BONE 2	100	STEINER
21	STEP 4	61	BRAIN	101	TRICHROME
22	STEP 5	62	BREAST	102	WARTHIN STARRY
23	STEP 6	63	CALCIFIED	103	ASSAY
24	STEP 7	64	COLON	104	BEEM
25	CLEARING	65	FATTY	105	BROWN & BREM
26	STAINING 1	66	GI	106	COLLOIDAL
27	STAINING 2	67	LIVER	107	CUVETTE
28	STAINING 3	68	LUNG	108	INCUBATION
29	STAINING 4	69	LYMPHATIC	109	KINYON
30	PROCESSING 1	70	MUSCLE	110	MYCO
31	PROCESSING 2	71	NAIL	111	OSO2
32	USER 1	72	NEURON	112	PETRI
33	USER 2	73	PLACENTA	113	POC
34	USER 3	74	SKIN	114	POLYMERIZE
35	USER 4	75	ELASTIN	115	SLIDE DRY
36	DECAL 1	76	FIBRIN	116	SUSPENSION
37	DECAL 2	77	KERATIN	117	VERHOEFF
38	BIOPSY 1	78	MELANIN	118	VIRUS
39	BIOPSY 2	79	COLLAGEN	119	ZINC
40	FIXATION 1	80	FUNGUS	120	ASTROCYTE

Appendix C - Graph of Power Output

If a procedure uses a **Power Setting (in Watts)** as opposed to a **Temperature Reading**, the **Power Process Operation Method** should be used.

The following graph can be used to identify the **Power (Watts) Output** for a given **Duty Cycle (%)**.



Notes:

The Power Output shown in the graph is a theoretical value based on a nominal line voltage input into the microwave unit.

The Actual Power Output will vary depending on the available line voltage.

Appendix D - Power Output Confidence Test

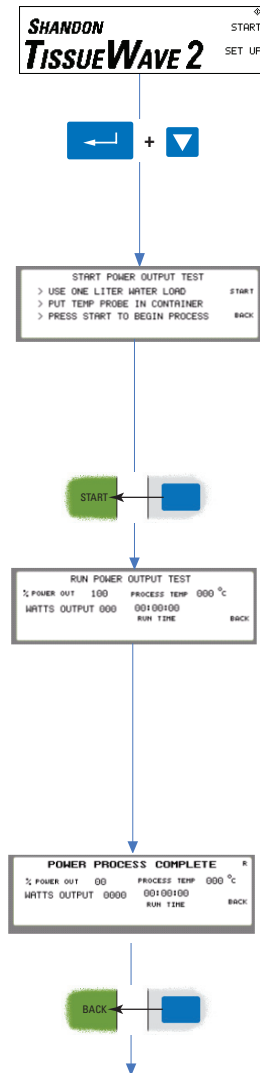
The **Power Output Confidence Test** provides an approximate qualitative measure of **Microwave Output Performance**.

During this two minute test, the unit will monitor the percentage of power output and the wattage output.

Influences on the **Wattage Output** include:

- Input Line Voltage
- Line Inductance
- Magnetron Temperature
- Age of the Instrument.

The Power Output Confidence Test is performed using the following method:



- After turning on the TissueWave 2 the **Welcome** screen will appear.
- Hold down the **Enter Key** and the **'Down' Arrow Key** simultaneously.
- The **Start Power Output Test** screen will appear.
- Fill a the **Processing Bowl** with **1 litre** of water and place it in the centre of the **Microwave Chamber**.
- Place the **Temperature Probe** centrally in the water
- Press the **Start Function Key**.
- The TissueWave 2 will run for 2 minutes, at **100% Power Output**.
- The **Wattage Output** and **Temperature** will be monitored by the system and the results displayed on the screen.
- Correct operating power should be between the **High and Low Lines** on the **Power Output Graph** shown in **Appendix C**.
- After completing the test the **Power Process Complete** screen will appear with the final **Temperature** and **Power Output** shown.
- To return to the **Welcome** screen press the **Back Function Key**.

Appendix E - Accessories

Description	Part No.
Air Agitator Tubing	B35240039
Excelsior Organized Basket	A78410025
Air Adjustment Screw	B35240005
Fuse, 15A	B35240014
AC Input Fuse Holder	B35240013
Interior Lamp	B35240015
Microwavable Specimen Container	B1002517
Operator Guide	B35210021
Temperature Probe	B35240003
Vacuum Chamber	B35210001
Microwavable Plastic Coplin Staining Jar	194
Microwavable Plastic Spill-Free Slide Jar - each	1001362
Microwavable Plastic Spill-Free Slide Jar - 12/Pk.	1001363
Microwavable Plastic Spill-Free Slide Jar - 48/Cs.	1001361
Microwave Tissue Processing Starter Kit	B35210002
Microwave Staining Starter Kit	B35210003
Plastic Staining Dish and Cover	195
Plastic Staining Rack - 25 Slide Capacity	196

Appendix F - Warranty and Declaration of Conformity

We at Thermo Fisher Scientific are proud of our quality, reliability and of our after-sales service. We continuously strive to improve our service to our customers.

Please ask your distributor or Thermo Fisher representative about Service Contracts which can keep your purchase in peak condition for many years to come.

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

Please note that your warranty may be invalidated if:

- This instrument is modified in any way.
- Accessories and reagents which have not been approved by Thermo Fisher Scientific are used
- This instrument is not operated or maintained in accordance with the instructions in this Operator Guide.

Declaration of Conformity

This Declaration of Conformity is only valid when the instrument is used in accordance with the Operator Guide

Manufacturer's Name: Thermo Shandon Limited (Trading as Thermo Fisher Scientific)
Manufacturer's Address: Chadwick Road, Astmoor, Runcorn,
Cheshire, WA7 1PR
ENGLAND
Product Description: Laboratory Microwave Tissue Processor
Product Designation: **Shandon TissueWave® 2**
Part numbers: B 35600001, B 35600002
including accessories supplied as standard
Year of Marking (CE): 2005

This product conforms with the essential requirements of the following directives:

In Vitro Diagnostics Directive 98/79/EC

Low Voltage Directive 2006/95/EC

This product complies with the following International Standards:

EMC: EN/IEC 61326:1997
Inc A 1:1998 + A 2:2001 + A 3:2003

Safety: EN 61010-1:2001
CAN/CSA C22.2 No. 61010-1-04
UL 61010-1, 1st edition

Issued by: K. Waldron
Quality Manager
Thermo Fisher Scientific
Anatomical Pathology, Diagnostics Division



Date: 27th February, 2007

Optional accessories considered subject to the In Vitro Diagnostics Directive (IVDD) are specifically identified on this Declaration of Conformity. Further supplies of standard accessories are treated as spares. Convenience aids offered as accessories are not subject to the IVDD.

Appendix G - Technical Specifications

Physical	Overall Width	21.5"	(54.6 cm)
	Overall Depth	24.5"	(62.2 cm)
	Overall Height	19"	(48.2 cm)
	Chamber Width	13.5"	(34.3 cm)
	Chamber Depth	15.5"	(39.4 cm)
	Chamber Height	9.5"	(24.1 cm)
	Mass	78 lbs	(35.5 kg)

Electrical	Voltage	120 V / 240 V	
	Current	14 A (120 V)	
		7.3 A (240 V)	
	Frequency	50/60 Hz	
	Maximum supply voltage fluctuations not to exceed $\pm 10\%$ of the nominal supply voltage.		
Fuses	(120 V Unit)	15 A / 250 V Slow Blow	
	(230 V Unit)	10 A / 250 V Slow Blow	

Switch Convention	Power On	I
	Power Off	O

Environment

General	Indoor Use Only
Operating Temperature	5°C to 40°C
Storage Temperature	-25°C to 55°C (+70°C for short exposure)
Humidity	Maximum 80% RH to 31°C decreasing linearly to 50% RH at 40°C
Altitude	Up to 2000 m
Pollution Degree	2
Over Voltage Category	II

Index

A

Add	
Protocol	35
Step	37
Agitator Valve	14, 21, 26
Air Agitator	14, 18, 21, 25, 26, 31
Air Agitator Key	16, 21
Air Filter	46
Aluminium Outlet Hose	13, 18, 32
Audible Alert	42

C

Chamber Dimensions	31
Combustible Fluids	9
Copy Protocol	36

D

Daily Operations	22
Delete	
Protocol	40
Step	39
Dimensions	31
Duty Cycle	51

E

Edit Step	36
Electrical Rating Plate	13
Exhaust Port	14
Exhaust Vent Hose	7

F

Fluid Ports	13, 31
Function Keys	16, 27
Fuses	13, 31

I

Improper Load	7
Input Current	31
Interior Light	18, 21, 31

K

Keyboard Error	43
Keypad	13, 15, 17, 21

L

LCD Display	13, 15, 16
-------------	------------

M		S	
Magnetron	32	Safety	6
Cooling Outlet	13	Chemical	10
Manual Run	28, 29	Environmental	11
Mercuric Chloride	8	Interlock	8
Microwave		Serial Port	13, 17
Containers	7, 20	Specific Wattage	34
Output Performance	51	Sponge Biopsy Pads	9
Output Power	31	Step Complete	27
P		T	
Paraffin Wax	10	Temperature	
Power		Control	33
Control	33, 51	Probe	8, 14, 18, 20, 25, 45
Control Accuracy	31	Profile	33
Output Test	52	Readout Accuracy	31
Process	29	Refresh Rate	31
Socket	13	Sensor	20
Switch	13	Switch	7
Proportional Band	34	Time @	33, 45
Protocol		Time T	33, 45
List	27	Timer Mode	29, 33
Options	27	Toxic Fumes	8
R			
Rename Protocol	41		
Run Screen	27, 29		

V

Vacuum

Accumulator *13, 18, 19*

Chamber *9, 18, 23*

Gauge *13, 26*

Line *9, 14*

Ports *17, 19, 25*

Pump *19, 31*

Release Knob *10, 13*

Ventilation System *12, 18, 26, 31*

Interlock *18*

Volatile Materials *8, 10*

W

Warning Screen *42, 44*

Watchdog Timer *45*

Wattage *51, 52*

WEEE Directive *11*

Weight *31*

Z

Zinc Formalin *8*

