Tissue-Tek® TEC™ 6

Embedding Module

Operating Manual

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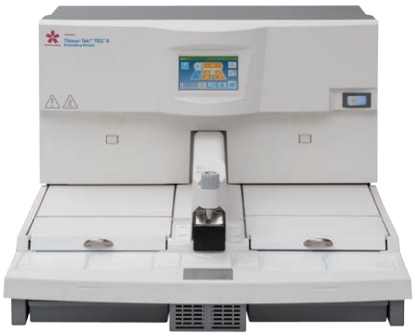

continuous innovation for pathology

SAKURA®

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1. Introduction

1. Introduction

1.1 Intended Use

The Tissue-Tek® TEC™ 6 Embedding Module (hereinafter referred to “the instrument”) is intended to embed processed human or animal tissue in paraffin by melting solid paraffin and dispensing molten paraffin. This instrument is used to facilitate as part of steps to produce tissue specimens for histological studies and tests conducted in the fields of pathology, anatomy, clinical pathology, etc.

This instrument can be used standalone and also designed for use with the Cryo Module connected by a control cable.

This document is the Operating Manual for the Embedding Module, but the procedures to handle the Tissue-Tek® TEC™ 6 Cryo Module are also provided.

Carefully read this Operating Manual and use the instrument correctly so that its performance can be utilized fully. Any other use of this instrument is considered improper operation.

1.2 Safety Precautions

Designate the "Instrument Control Manager."

- Operation of the instrument requires expert knowledge of the target application, method of use, and so on. Therefore, to use the instrument correctly and safely, designate an "Instrument Control Manager."
- When the instrument is delivered, the Instrument Control Manager should receive explanation on the handling of the instrument directly from the staff trained in the instrument or distributor.

Before using the instrument, read the "Safety Precautions" to ensure the correct use of the instrument.

The cautionary instructions provided herein are intended to ensure that the instrument will be used safely in a manner preventing operator from injury and property damage. These instructions provide important safety information that must be needed at all times.

In this manual, instructions pertaining to different levels of potential hazards are classified and indicated respectively as danger, warning, caution and note.

The definition of each hazard is defined below.

DANGER

DANGER pertains to a potential hazard where failure to observe the specified instruction may result in death or serious injury of the user or another person.

WARNING

WARNING pertains to a potential hazard where failure to observe the specified instruction may result in a serious injury of the user or another person.

CAUTION

CAUTION pertains to a potential hazard where failure to observe the specified instruction may result in damage to the instrument or other property, or affect the process results.

NOTE pertains to an item to pay attention to or other useful information.

1. Introduction

The symbols used on the labels attached to the instrument are explained.

The labels bearing one of the following symbols provide particularly important information you must know in order to ensure safety of the operator, improve work efficiency and protect the instrument from damage. Be sure to check these labels and understand the specified instructions before commencing your work

A label bearing this symbol specifies an action that must be taken. Always follow the instruction.

A label bearing this symbol specifies a prohibited item. Always follow the instruction.

A label bearing this symbol specifies a precaution. Wrong handling against the instruction may potentially expose the operator to danger or damage the instrument, so be sure to follow the instruction.

A label bearing this symbol is provided near a high-temperature area. Exercise caution against burns caused by high temperatures.

If any biologically hazardous substance is handled, follow applicable regulations or guidelines in your country or region to ensure safety.

WARNINGS:

- **Follow instructions in this operating manual.**

  If the instrument is not used properly, it may induce failure of the instrument, injury to operators, and/or damages to facilities.

- **Do not put flammable/explosive substances other than paraffin in the instrument.**

  When using the instrument, do not put flammable/explosive substances other than paraffin in the areas where paraffin is intended such as the paraffin chamber and warming chamber. Doing so may result in fire or explosion.

- **Do not move the instrument while molten paraffin is inside.**

  Do not move the instrument while molten paraffin is inside. Before moving the instrument, unplug the power cord and remove the paraffin inside the instrument or wait for it to cool and solidify. Failure to follow this instruction may result in the paraffin spilling over to cause burns or contacting with live electrical parts to cause fire.

- **The instrument, paraffin and paraffin container become hot.**

  The paraffin melting part, paraffin and paraffin container in the instrument become hot. Exercise caution to prevent burns.

- **Do not disassemble or modify the instrument.**

  Do not disassemble or modify the instrument except for the areas specified in this manual. The instrument may malfunction or cause accident, thus creating a dangerous situation.

- **Do not wet the instrument.**

  Do not wet the instrument except for the areas specified in this manual. If the instrument gets wet, electrical current leak may occur and cause fire or electric shock.

- **Do not operate the switches with a wet hand.**

  Failure to observe the instruction may result in electric shock.

- **Do not connect/remove the power plug with a wet hand.**

  Failure to observe the instruction may result in electric shock.

- **When connecting/removing the power plug, do so by holding the plug.**

  Connecting/removing the power plug by holding parts other than the plug may cause fire or electric shock.

- **Do not damage the power cord.**

  Do not forcibly bend, pull, twist or bundle the power cord. If the damaged power cord is used, fire or electric shock may occur. If the power cord or power plug has scratches or other abnormalities, contact the Sakura instrument distributor or representative.

- **Check the power cord and electrical outlet for damage and accumulated dust and/or paraffin periodically.**

  Failure to do so may cause fire depending on the condition.

- **Keep the instrument with the optional magnifying lens away from direct sunlight exposure.**

  The lens subjected to direct sunlight may cause fire and/or accident because of refraction of light.

CAUTIONS:

- **Connect the power plug to an electrical outlet with grounding terminals.**

  Connect the power plug to a dedicated electrical outlet with grounding bar. If the power plug is not grounded, electric shock may result.

- **Use the supplied power cord.**

  If the supplied power cord is not used, electric shock or failure may result. In particular, use of a power cord of lower capacity may cause fire or electric shock.

- **Turn off the power before cleaning the instrument.**

  Unless otherwise instructed in this document, turn off the power before cleaning the instrument. If the instrument is cleaned while the power is still on, an accident may occur.

- **Turn off the power if the instrument behaves abnormally.**

  Should you notice the instrument giving off a foul smell or abnormal noise, or otherwise behaving abnormally, remove the power plug and contact the Sakura instrument distributor or representative.

- **Do not remove the warning/caution labels.**

  Do not remove the warning/caution labels attached to the instrument. Without these labels, the operators cannot be reminded of the necessary warning/cautionary information in the day-to-day handling of the instrument, which may result in unexpected problems.

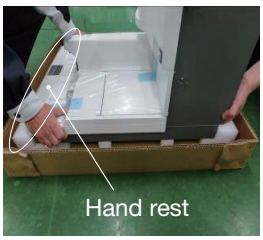
- **Perform periodic inspection of the instrument every 6 months.**

  Perform periodic inspection of the instrument every 6 months to ensure safe use of the instrument and maintain its performance. For details on periodic inspection, contact the Sakura instrument distributor or representative.

- **When moving the instrument, hold it on each side or the back side.**

  When moving the instrument, hold it on each side or the back side. Also, two persons should work together to carry the instrument, because the Embedding Module weighs approx. 25 kg.

  ***Do not hold the Embedding Module with your hands on the front side. Doing so may damage the hand rests and cause injury or the instrument to fall.**



1. Introduction

- **Precautions when installing the instrument (Installation)**

  Do not put down the instrument in an unstable place or on a floor or surface with insufficient strength.
- **Stay away from the instrument during earthquake.**

  The instrument may fall over and cause injury.
- **Disconnection from power source**

  Turn the power switch off before unplugging the power cord.

1.3 Precautions for Use

CAUTIONS:

- **Precautions when using the instrument (Keep fire away)**

  Do not bring fire sources close to the instrument. The paraffin in the instrument may ignite.

- **Precautions when moving the instrument**

  Do not move the instrument while molten paraffin is inside. Before moving the instrument, unplug the power cord and remove the paraffin inside the instrument or wait for it to cool and solidify. The paraffin may spill over to cause burns or contact with live parts to cause fire. Also, it is recommended that two persons work together to carry the instrument which weighs approx. 25 kg.

- **Precautions when installing the instrument (installation)**

  Do not put down the instrument in an unstable place or on a bench or surface with insufficient strength. The instrument may tilt, causing the paraffin to spill over and cause injury. Install the instrument in a location meeting the installation conditions. Dew condensation, etc. may cause malfunction. (See 2.1.2 Installation Environment)

- **Precautions when using the instrument (Caution for high temperature)**

  The hot plate, paraffin melting chamber, paraffin and paraffin container in the instrument become hot. Wear rubber gloves or other protective gears to prevent burns. Also, make sure the instrument is used only by those with appropriate knowledge and education.

- **Caution for high temperature**

  When using the instrument, do not directly touch the molten paraffin in the paraffin chamber, warming chamber, etc. You may get burned. Wear rubber gloves or other protective gear to prevent burns.

- **Precautions when adding paraffin**

  When adding paraffin into the paraffin chamber, tissue tray, etc., heed the maximum capacity and pay attention not to let the paraffin spill over. Failure to do so may cause paraffin to overflow, leading to instrument failure and accident. You may get burned. Wear rubber gloves or other protective gear to prevent burns.

- **Precautions on dispensing**

  When dispensing, be careful not to touch the paraffin with your hands. You may get burned by the hot paraffin. Wear rubber gloves or other protective gears to prevent burns.

- **Precautions on moving parts**

  When closing the lid of the paraffin chamber or warming chamber, be careful not to pinch your fingers. Injury may result. Also, be careful not to open and close the lid sharply. Failure to do so may cause the components to deform or damage.

- **Precautions when removing the wrist rests**

  An attempt to remove the wrist rest forcedly may result in injuring your fingertip. Use the scraper.

- **Precautions when cleaning (Caution for high temperature)**

  Unless otherwise instructed in this document, turn off the power before cleaning the heated areas. If they are cleaned while the power is still on, an accident may occur.

- **Burn hazard (Instrument failure)**

  Periodically clean the area where the filter is installed, and around the dispenser. The solenoid valve may fail and cause the paraffin to leak, resulting in burns or paraffin deposits on the instrument.

- **Precautions when cleaning (Caution for chemical agent)**

  When cleaning, do not use chemical agents other than those specified. Unauthorized chemical agents may damage the instrument or cause health issues. Also, wear protective gears and ventilate the work area when cleaning.

- **Items to check when cleaning paraffin drain trays**

  Discard the paraffin in the paraffin drain trays every time after using the instrument. Paraffin may overflow inside the instrument and dirty the surrounding areas if not discarded.

- **Precautions for infections**

  When using the instrument in a hospital, be careful not to cause secondary infections.

- **Caution on electromagnetic environment**

  The instrument is designed to operate in normal electromagnetic environment. In other electromagnetic environments, use the instrument under the responsibility of the user.

Precautions for Prevention of Failures

- **When cleaning the instrument, do not use any organic solvents (xylene).**

  If any organic solvents flow into the paraffin line between the paraffin chamber and the dispenser, the internal parts may degrade or deform, resulting in failure. Also, the coatings and materials on/of the exterior panels, control panel display, etc., may deteriorate.

- **Do not turn the paraffin flow rate adjustment dial unless the paraffin is in molten state.**

  If the dial is forcibly turned when the paraffin is solid, failure may result.

Paraffin flow rate adjustment dial

- **Do not close the paraffin flow rate adjustment dial after work.**

  If the paraffin cools down and solidifies when the flow rate adjustment dial is fully closed, the paraffin may expand the next time it is melted, and leak out from the flow rate adjustment dial.

- **Do not put anything on top of the instrument.**

  Failure or unexpected problems may occur.

- **Do not put hot paraffin whose temperature exceeds 80°C in the instrument.**

  Do not put paraffin, etc., whose temperature exceeds 80°C in the paraffin chamber or warming chamber. It may lead to instrument failure.

- **Do not block the intake port.**

  Cold spot failure may occur.

- **Do not extend the power cord using a different cord, etc.**

  Connect the instrument power cord directly to an electrical outlet instead of extending it using a different cord, etc. If the power cord is extended and connected, the supply voltage may drop and the compressor may stop working. This is especially true with the Cryo Module.

- **Do not use things with a sharp point such as a sharp pen tip to operate the control panel display.**

  Doing so will cause instrument failure.

Precautions for Proper Embedding

- **Make sure the tissues, paraffin, cassettes and base molds are of the same temperature.**

  During embedding, set the instrument temperature so that the tissues, paraffin, cassettes and base molds can be kept at the same, appropriate temperature as much as possible. To minimize any temperature drop experienced by the cassettes and base molds, do not keep them away from the heated areas of the instrument for long periods. A large temperature difference prevents the paraffin block from remaining in a uniform state.

- **Place two small trays in one warming chamber when the optional tray is used.**

  Placing only the one small tray may cause thermal conduction to slow.

- **Clean the inside of the used base mold.**

  After the work is over and the paraffin block is removed, clean the inside of the base mold. If the inside of the base mold is not clean, the paraffin block may not be removed easily in the next session.

- **Clean the instrument or equipment properly when it gets dirty during the embedding.**

  Continuing the embedding work with dirty instrument or equipment may cause contamination.

- **Paraffin attached on the hot plate may cause a base mold to move.**

  Clean paraffin residues off the surface of the hot plate frequently. Do not release your hand from the base mold on the hot plate during the dispensing.

- **Precaution for temperature settings**

  Considering the melting point of the paraffin and environment (e.g. ambient temp, air conditioning), set temperatures of the paraffin chamber, hot plate, and warming chambers by adjusting from the default setting (62°C). Operating the instrument with unmelted paraffin may cause a failure on valves in the dispensing system or difficulty of embedding work due to solidified paraffin.

1.4 Overview of the Instrument

1.4.1 Instrument Configuration

The instrument comprises:

A storage area where the paraffin-infiltrated tissues (specimens), base molds and molten paraffin used for embedding are kept at appropriate temperatures;

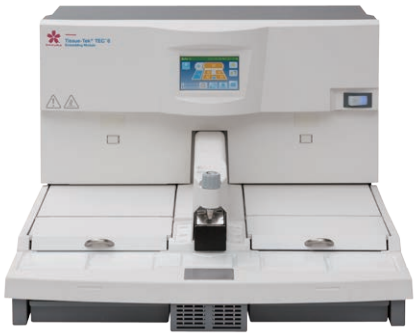
A hot plate that performs a key part of embedding:

A cold spot used for positioning and orienting the tissue;

A dispenser that dispenses paraffin for embedding;

A cooling plate that cools/solidifies the embedded paraffin block; and

Electronic controls, control panel display and other parts for temperature-controlling, monitoring or otherwise manipulating the aforementioned components.



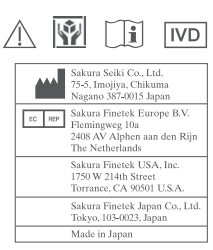
Embedding Module

CAUTION

- **The instrument is designed for use with the Cryo Module connected with the control cable. Do not connect any other instruments.**

1.4.2 Specifications

Brand name		Tissue-Tek® TEC™ 6 Embedding Module				
Model		TEC 6-EM-J0	TEC 6-EM-A1	TEC 6-EM-E2	TEC 6-EM-JC2	TEC 6-EM-J2
Product code		5104	5108	5112	5116	5128
Manufacturing license number		20B2X00014000035	-	-	-	-
Dimensions		575 (W) × 642 (D) × 377 (H) mm				
Weight		Approximately 25kg				
Rated power supply		AC100V 50/60Hz 8.5A	AC115V 60Hz 9.0A	AC230V 50Hz 4.0A	AC230V 50Hz 4.0A	AC230V 50Hz 4.0A
Temperature control	Heated area & Program-mable Settable range	Paraffin chamber: 50 to 75°C Left and right warming chambers: 50 to 75°C Hot plate: 50 to 75°C				
	Cold spot temperature	15°C or below (room temperature of 25°C, no wind, no load (nothing on the cold spot))				
Safety device		Overcurrent protection: Circuit protector Heater overheat protection: Self-holding over temperature protector, temperature fuse)				
Location of the instrument		Indoor use				
Required facilities	Voltage	100 VAC±10%	115 VAC±10%	230 VAC±10%	230 VAC±10%	230 VAC±10%
	Frequency	50/60 Hz	60 Hz	50 Hz	50 Hz	50 Hz
	Capacity	15 A or higher	15 A or higher	10 A or higher	10 A or higher	10 A or higher
Operating environment	Ambient temperature	10 to 35°C				
	Relative humidity	30 to 85% (non-condensing)				
	Altitude	2,000m or lower				
Storage environment	Ambient temperature	-10°C to 60°C				
	Relative humidity	30 to 85% (non-condensing)				
Overvoltage category		II (2)				
Transient overvoltage up to the level		1500V				
Electromagnetic environment		Normal electromagnetic environment				
Pollution degree*		2 (*per IEC61010)				
Noise*		60 dB or less (A-weighted level) (*per JIS Z8737-2:2000)				
Vibration/Drop		Vibration test per JIS Z 0200, JIS Z 0232 Drop test per JIS Z 0200, JIS Z 0202				
Regulatory and applicable standards	Law	Pharmaceutical Affairs Law	FDA Class1 IVD	CE Marking EMC/LVD/ RoHS Directive	CFDA	IVD
	Electrical safety evaluation	JIS C 1010-1:2014 JIS C 1010-2-101:2013	UL61010-1; 3rd ed: 2012 CSA-C22.2 No.61010-1-2012 IEC61010-2-010:2014 IEC61010-2-101:2015	EN 61010-1-2010	GB 4793.1-2007 (IEC61010-1:2001) GB 4793.6-2006 (IEC61010-2-010:2005) YY 0648-2008 (IEC61010-2-101:2002)	IEC61010-2-101:2015 IEC61010-2-010:2014
	Risk management	JIS T 14971:2012 IEC 62366:2007	-	-	-	ISO14971:2007
	Medical equipment software	JIS T 2304:2017	-	-	-	-
	Quality management	ISO13485:2016	-	-	-	ISO13485:2016
	Electro-magnetic compatibility	JIS C 1806-2-6:2012	-	EN 61326-1:2013	GB/T 18268.1-2010 (IEC61326-1:2005) GB/T 18268.26-2010 (IEC61326-2-6:2005)	IEC61326-2-6:2012
	Others	-	-	EN 50581:2012(RoHS)	China RoHS 2	-



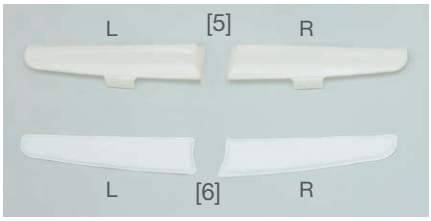
(TEC 6-EM-A1)

(TEC 6-EM-E2)

(TEC 6-EM-J2)

1.5 Accessories

1.5.1 Standard Accessories (Embedding Module)



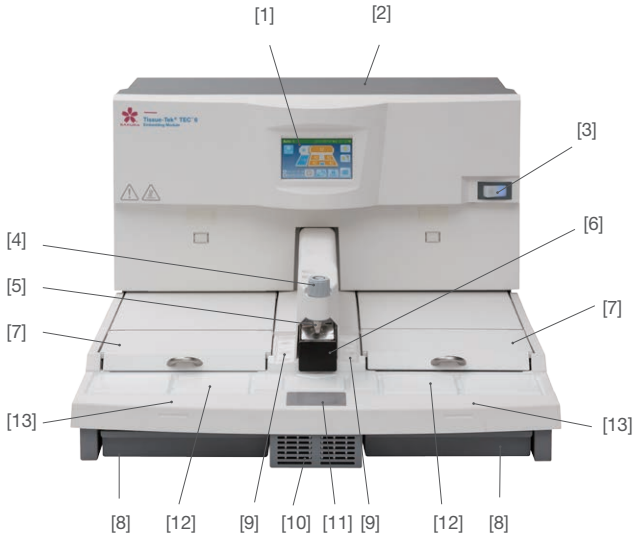
	Item name	Product code	Quantity				
			TEC 6-EM-J0	TEC 6-EM-A1	TEC 6-EM-E2	TEC 6-EM-JC2	TEC 6-EM-J2
[1]	Warming chamber tray (large)	5120	2	1	1	1	1
[2]	Scraper	1550	1	1	1	1	1
[3]	Tamper (large)	1551	1 each	1 each	1 each	1 each	1 each
	Tamper (small)	1552					
[4]	Power cord	A4010541	1	-	-	-	-
		A4010537	-	1	-	-	-
		A4010534	-	-	1	1	1
[5]	Wrist rest R	5121	1 each	1 each	1 each	1 each	1 each
	Wrist rest L	5122					
[6]	Wrist rest cushion R	5123	1 each	1 each	1 each	1 each	1 each
	Wrist rest cushion L	5124					
	Operating manual		1	1	1	1	1

1.5.2 Optional Accessories (Embedding Module)

	Item name	Product code	Quantity				
			TEC 6-EM-J0	TEC 6-EM-A1	TEC 6-EM-E2	TEC 6-EM-JC2	TEC 6-EM-J2
[1]	Foot pedal	5785	1	1	1	1	1
[2]	Tray (small)	5782	1	1	1	1	1
[3]	Base mold dividers	5783	1	1	1	1	1
[4]	Magnifying lens assembly with wrench and dust cover	5127	1	1	1	1	1

1.6 Description of Instrument Parts

1.6.1 Instrument (Front Side)



[1] Control panel display

Used for running/stopping the instrument and setting various parameters and conditions. It also serves as a monitor that displays the operating status of the system.

[2] Paraffin chamber

A container that stores molten paraffin used for embedding. The capacity is 4 liters of paraffin in molten state. Graduations are provided on the interior of the chamber for reading the remaining level.

[3] Power switch

A switch for the main power supply. The lamp is turned on while power is supplied.

[4] Paraffin flow rate adjustment dial

A dial for adjusting the amount of paraffin to be dispensed.

[5] Dispenser

A dispenser that dispenses paraffin.

[6] Finger plate

A switch for dispensing paraffin used for embedding.

Pressing the switch starts dispensing, and releasing it stops dispensing. Dispensing will stop after the switch is held for 1 minute.

[7] Warming chamber

One warming chamber is provided on the left and another on the right of the dispenser. These chambers are used to warm the tissue or base mold depending on the dominant hand of the operator/direction of work flow.

[8] Paraffin drain tray

A tray for collecting the excess paraffin generated by embedding. Each tray has a capacity of 500mL.

[9] Forceps holder

A forceps holder for keeping the various types of forceps warm which are used for embedding.

One holder is provided on either side of the dispenser, to accept a total of six forceps. The forceps holders can also accommodate tampers.

[10] Intake port

This port is used to take in air to raise the cooling efficiency of the cold spot.

[11] Cold spot

A cooling plate used to quickly cool paraffin at the bottom of a base mold during embedding, to help correctly position the tissue sample.

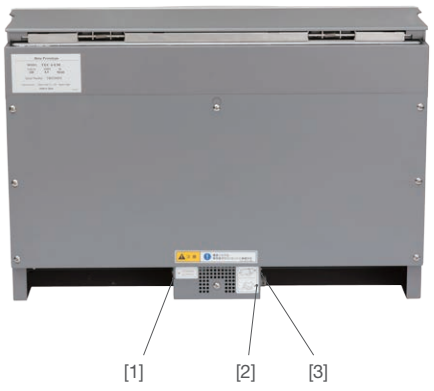
[12] Hot plate

A work surface on which embedding is performed.

[13] Hand rest

A resin part that prevents accidental contact with the hot plate during embedding.

1.6.2 Instrument (Rear Side)



[1] Power inlet

Connect the power cord here.

[2] Foot pedal connector

Used to connect the foot pedal.

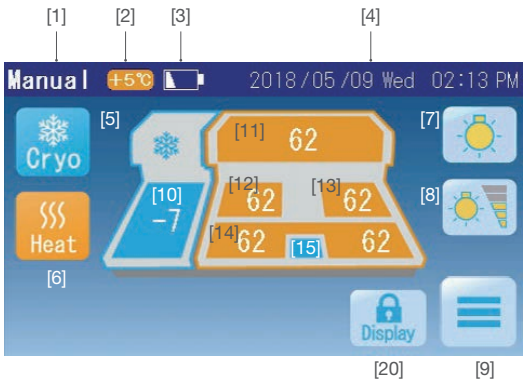
[3] Control cable connector

Used to connect to the Cryo Module.

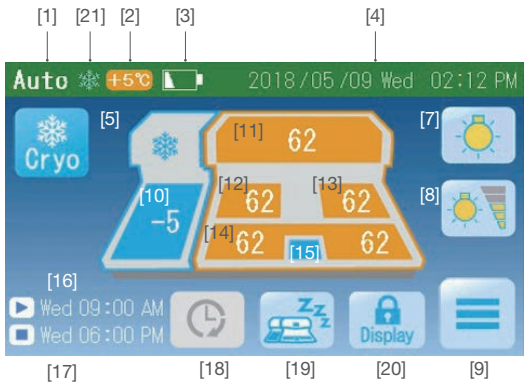
1.6.3 Control Panel Display

The control panel display is located on the Embedding Module. You can use this display to set various parameters and conditions such as temperatures and times. The control panel also operates and displays the status of the Cryo Module.

•Operation Screen (Manual Operation)



•Operation Screen (Auto Operation)



[1] Operation method display area

Whether “Manual” or “Auto” is displayed depending on the operation mode.

[2] Quick heating mode display icon

This icon comes on when quick heating is started.

[3] Low battery alarm icon

This icon comes on when the voltage in the battery of the display becomes low. When this icon comes on, the battery must be replaced. Refer to **5.1.4 What to Do When the Low Battery Alarm Icon is Indicated.**

[4] Date, day-of-the-week and time area

The current date, day of the week, and time, are displayed.

[5] Cryo button

An operation switch for the Cryo Module. Touching this button when the icon is gray changes the icon color to blue, and the cooling operation will start. Touching it again changes the icon color to gray and the cooling operation will stop.

: Operating 

: Stopping

This button is not displayed if the Cryo Module is not connected or while the Cryo Module is paused during auto operation.

[6] Heat button

An operation switch for the heated working areas on the Embedding Module. Touching this button when the icon is gray changes the icon color to orange, and the heating operation will start. Touching it again changes the icon color to gray and the heating operation will stop.

: Operating 

: Stopping

This button is not displayed during auto operation.

[7] Light button

An operation switch for the work light. Touch this button to turn on the LED light. Touch it again to turn off the light.

Refer to **3.2.4 Turning On/Off the Work Light** for details.

 : Turning On  : Turning Off

[8] Brightness settings button

This button is displayed when the work light is turned on. You can touch the button to change the brightness up to five levels. Once the highest level is reached, the next touch of the button adjusts the brightness to the lowest level. Refer to **3.2.4 Turning On/Off the Work Light** for details.

 > Touch  > Touch  > Touch  > Touch  > Touch  >

Level1 Level2 Level3 Level4 Level5 Level1

[9] Main Menu button

Touch this button to move to the Main Menu screen. On the Main Menu screen, you can switch between auto operation and manual operation, perform quick heating, activate the cleaning mode, and move to the Maintenance Menu.

[10] Cooling plate temperature area

The current temperature of the cooling plate is displayed. Touch this area to move to the temperature setting screen. Refer to **2.2.1 Temperature Setting for Each Part of the Instrument** for details.

[11] Paraffin chamber temperature area

The current temperature of the paraffin chamber is displayed. Touch this area to move to the temperature setting screen. Refer to **2.2.1 Temperature Setting for Each Part of the Instrument** for details.

[12] Left warming chamber temperature area

The current temperature of the left warming chamber is displayed. Touch this area to move to the temperature setting screen. Refer to **2.2.1 Temperature Setting for Each Part of the Instrument** for details.

[13] Right warming chamber temperature area

The current temperature of the right warming chamber is displayed. Touch this area to move to the temperature setting screen. Refer to **2.2.1 Temperature Setting for Each Part of the Instrument** for details.

[14] Hot plate temperature area

The current temperature of the hot plate is displayed. Touch this area to move to the temperature setting screen. Refer to **2.2.1 Temperature Setting for Each Part of the Instrument** for details.

A temperature is displayed separately for the left and right, but the temperature setting is the same.

[15] Cold spot

A cooling spot*. The cold spot temperature cannot be set. (* 15°C or below)

[16] Start time display area

Auto operation (preparing/operating): The day of the week and time at which the current operation was started, are displayed.

Auto operation (paused): The day of the week and time at which the next operation will be started are displayed.

Refer to **2.2.3 Setting the Schedule of the Auto Operation (with the Auto Cryo Mode)** for details. This area is not displayed during manual operation.

[17] End time display area

Auto operation (preparing/operating): The day of the week and time at which the current operation will end are displayed.

Auto operation (paused): The day of the week and time at which the next operation will end are displayed.

Refer to **2.2.3 “Setting the Schedule of the Auto Operation (with the Auto Cryo Mode)”** for details. This area is not displayed during manual operation.

[18] Extend button

If you want to continue working in the auto operation mode after the end time, touching this button before the end time arrives lets you extend the operation until the end time set for the next operation. When the button is touched again and the end time has already passed, the instrument turns off automatically. Refer to **2.2.3 Setting the Schedule of the Auto Operation (with the Auto Cryo Mode)** for details.

 : Extended  : Not extended

This button is not displayed in the manual operation mode.

[19] End button

Touch this button to pause the instrument before the end time arrives in auto operation.

Refer to **3.2.5 Continuing Embedding after the End Time of Auto Operation** for details. This area is not displayed during manual operation.

[20] Lock Display button

Hold down this button to lock the operation of the display. Holding down it for at least 3 seconds locks the display. To unlock the display, hold down the button again for at least 3 seconds.

: Hold this button to lock
(When display is unlocked)

: Hold this button to unlock
(When display is locked)

[21] Auto Cryo icon

This icon indicates that the Cryo Module is automatically turned on and off in conjunction with the Embedding Module in the auto operation mode.

Refer to **3.2.6 Ending the Auto Operation before the End Time** for how to set the auto operation for the Cryo Module.

•Main Menu Screen (Manual Operation)

•Main Menu Screen (Auto Operation)

[1] Auto button

When you want to perform the auto operation, touch this button to set the start time and end time for the auto operation and select the Auto Cryo mode for the Cryo Module. Refer to **2.2.3 Setting the Schedule of the Auto Operation (with the Auto Cryo Mode)** for the setting methods and **2.3.1 Operation Method** for the operation mode.

[2] Manual button

Touch this button to perform manual operation. Refer to **2.3.1 Operation Method** for the operation mode.

[3] Quick Heating button

Touching this button raises the set temperatures for the paraffin chamber and warming chambers by 5°C. Touching the button again during quick heating cancels quick heating. Refer to **3.2.2 Melting Paraffin Quickly** for details.

This button is not displayed while the instrument is paused.

[4] Cleaning mode button

Use this button to lower the temperatures of the forceps holder and hot plate.

This button is not displayed while the instrument is paused.

Refer to **2.2.5 Setting the Auto Panel Display Off Timer** for information on cleaning the forceps holder.

[5] Maintenance button

Use this button to move to the Maintenance Menu screen. On the Maintenance Menu screen, you can set the date/time, date format, language and auto panel display off time and check the error log.

[6] Close button

Use this button to return to the Operation screen.

•Maintenance Menu screen (common)

[1] Date & Time Settings button

This button can be used to set the date and time. Refer to **2.2.2 Setting the Date and Time** for details.

[2] Language Settings button

This button can be used to select the display language. Refer to **2.2.4 Setting the Display Language** for details.

[3] Date Format Settings button

This button can be used to set the order of year, month and day and the 24-hour display or 12-hour display mode. Refer to **3.2.1 Various Settings** for details.

[4] Auto Panel Display Off Settings button

This button can be used to set the time until the panel display turns off. The panel display can also be set to never turn off. Refer to **2.2.5 Setting the Auto Panel Display Off Timer** for details.

[5] Error Log button

Use this button to display the error log. Refer to **4.1.1 Viewing the Error Log** for details.

[6] Close button

Use this button to return to the Operation screen.

1. Introduction

2. Installation

2.1 Installation

2.1.1 General Information on Installing the Instrument

This section provides information on determining a location for, and installing the instrument.

Installation should be performed by staff trained in the instrument. This instrument must be installed correctly to ensure proper operation and service.

Read this Operating Manual carefully before operating the instrument. Follow all instructions provided in this document carefully.

CAUTION

This instrument is a precision instrument and must be handled with care. If the instrument is handled in a rough manner or dropped, its internal components may malfunction or get damaged. Always exercise due care when handling the instrument.

2.1.2 Installation Environment

Install the instrument in a location meeting the following conditions:

- Free from fire or ignition sources nearby
- Not exposed to direct sunlight
- A horizontal level and stable surface area
- Subject to minimum vibration
- Protected from water splashes
- Away from volatile substances or flammable materials
- Away from corrosive chemicals (acids, alkalis, etc.)
- Free from equipment that consumes high voltage or large current Example) Large refrigerator, ultrasonic cleaner, cooling centrifuge, etc.
- The ambient temperature and humidity meet the following use environment values:

  Ambient temperature: 10 to 35°C

  Relative humidity: 30 to 85% (non-condensing)

2.1.3 Unpacking Method of the Embedding Module

How to remove the instrument from the packing box that has been carried in, and remove the protective materials, is explained in this document. To perform each work safely and correctly, be sure to follow the procedure specified herein.

CAUTION

CAUTIONS:

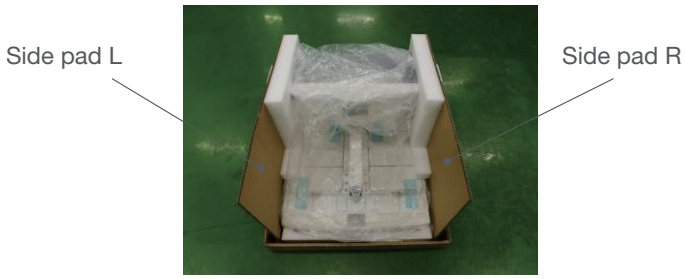
- **Confirm before unpacking the instrument, that the packing materials have not been damaged due to external forces applied during transport.**
- **Unpacking of the instrument should be performed by staff trained in the instrument.**
- **The instrument itself weighs approx. 25 kg. At least two people should work together when lifting or moving the instrument.**
- **When lifting the instrument, bend your knees fully or otherwise assume a natural posture.**
- **Do not put down the instrument in an unstable place or on a floor with insufficient strength.**

Unpacking the Instrument

1. Cut the two bands with a cutting knife, etc. and remove the cap.

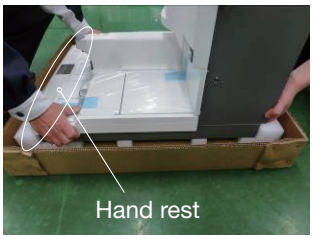
2. Take out the Operating Manual and remove the sleeve.

3. Remove the side pads.



4. Remove the plastic sheets covering the instrument.

5. Take out the instrument.



CAUTIONS:

CAUTION

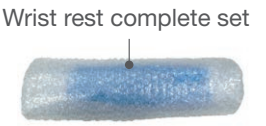
- **Exercise caution when lifting the instrument, because the center of gravity is located on the rear side of the instrument.**
- **Do not hold the instrument with your hands on the front side (hand rest).**
- **Exercise caution that lifting the instrument with your fingers hooked underneath may result in pinched fingers when the instrument is set down.**

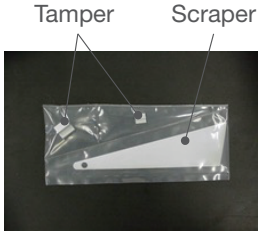
Unpacking Inside the Instrument

Paraffin chamber

1. Open the paraff in chamber and remove the cushioned packing materials.
2. Remove the following parts stored inside the cushioned packing materials:

   •Power cord
   •Scraper
   •Tamper (large)
   •Tamper (small)
   •Wrist rest complete set

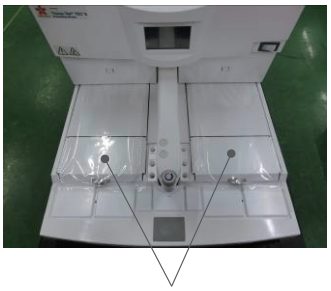




Warming chamber lid and tray (large)

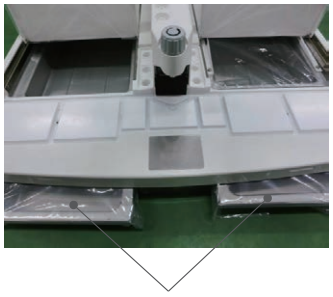
1. Remove the blue tapes attached on the lid of the warming chamber.
2. Take the left and right warming chamber lids out of the plastic bags.
3. The tray (large)* is found inside the right warming chamber. Remove it from Warming Chamber and take it out of the plastic bag.

   (*TEC 6-EM-J0: There is another warming chamber tray(large) in the left warming chamber)



Paraffin drain tray

Take the paraffin drain tray out of the plastic bag.



2. Installation

Checking after Unpacking

Confirm that all of the accessories and removable parts are present (refer to the table below) and the instrument and accessories are free from damage.

If the instrument is damaged or any of the accessories are missing or damaged, contact the Sakura instrument distributor or representative.

Name of part	Quantity					Remarks
	TEC 6-EM-J0	TEC 6-EM-A1	TEC 6-EM-E2	TEC 6-EM-JC2	TEC 6-EM-J2	
Power cord	1	1	1	1	1	Housed in the instrument
Warming chamber lid	2	2	2	2	2	
Tray (large)	2	1	1	1	1	
Scraper	1	1	1	1	1	
Tamper (large)	1	1	1	1	1	
Tamper (small)	1	1	1	1	1	
Paraffin drain tray	2	2	2	2	2	
Wrist rest R	1 each	1 each	1 each	1 each	1 each	
Wrist rest L						
Wrist rest cushion R	1 each	1 each	1 each	1 each	1 each	
Wrist rest cushion L						
Operating manual	1	1	1	1	1	Inside the box

2.1.4 Installation Method

If you have any questions on how to install the instrument, contact the Sakura instrument distributor or representative.

Before moving the instrument, if it has been previously installed, confirm that no molten paraffin is left inside the Embedding Module or any paraffin left in the module is cool and solid.

CAUTION

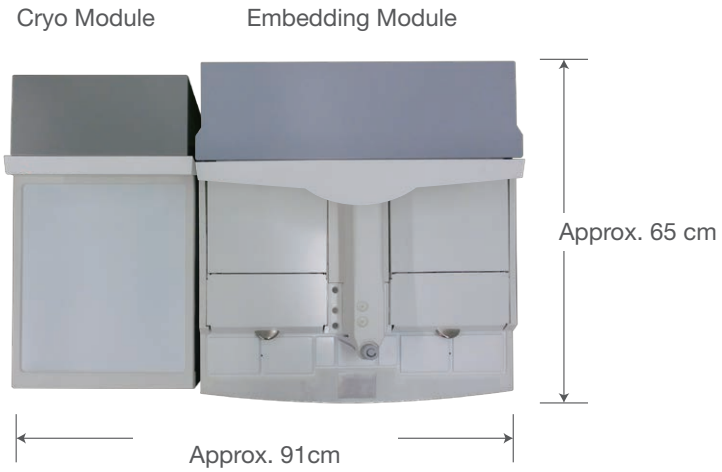
CAUTION:

Do not move the instrument while molten paraffin is inside. Before moving the instrument, remove the power plug and confirm no molten paraffin inside the instrument or wait for it to cool and solidify.

Installing the Instrument

1. Select a work bench that has enough space to allow the Embedding Module and Cryo Module to be placed on, and enough strength to withstand the mass of the instrument containing paraffin (approx. 55 kg).

   The left, right and rear side of the instrument can be in contact with walls, etc. On top of the work bench, at least 80 cm of space is required so that paraffin can be added.



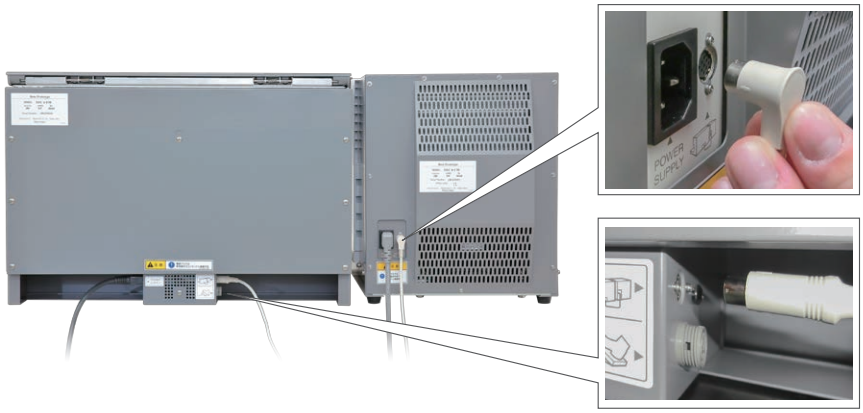
NOTE:

The instrument can be placed on a work bench with a depth of 60 cm or more.

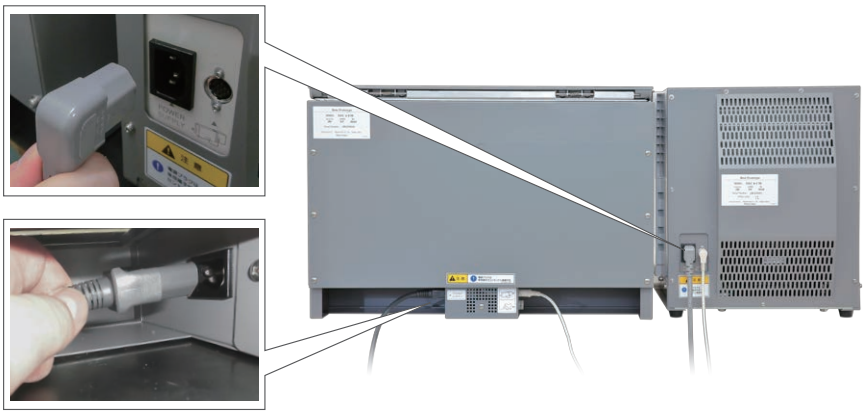
2. Select on which side of the Embedding Module the Cryo Module is placed, according to your desired work flow. (The cables will be connected to the rear of the instrument, so do not place the instrument close to the walls yet.)

Connecting the Cables

1. Confirm that the respective power switch of the Embedding Module and Cryo Module has been turned OFF.
2. Connect the control cable while paying attention to the insertion direction.



3. Insert the power cord of each module into an applicable power inlet.



4. Insert the power plug of each module into an electrical outlet with grounding terminals.

   Power supply system meeting the following conditions is needed to connect the power plugs:

Voltage:		100VAC	115VAC	230VAC
Capacity:	EM	15 A or higher	15 A or higher	10 A or higher
	CM	15 A or higher	15 A or higher	10 A or higher

CAUTION

CAUTIONS:

- **Connect the instrument power cord directly to an electrical outlet instead of extending it using a different cord, etc. If the power cord is extended and connected, the supply voltage may drop and each module may stop working. This is especially true with the Cryo Module.**
- **Do not connect/remove the power plug with a wet hand. Failure to observe the instruction may result in electric shock.**

  When connecting/removing the power plug, do so by holding the plug. Connecting/removing the power plug by holding parts other than the plug may cause fire or electric shock.
- **Connect the power plug to a dedicated power outlet with grounding terminals. If the power plug is not grounded through proper grounding terminals, electric shock may result.**

5. Determine the position of the instrument. (The rear and sides of the instrument may be in contact with walls, etc.)

NOTE:

Connect the optional foot pedal, if available. (Refer to **3.3.3 Foot Pedal**)

6. By trainned staff, an offset value for temperature compensation, which is labeled on the backside of the Cryo Module, is entered in the Embbeding Module.

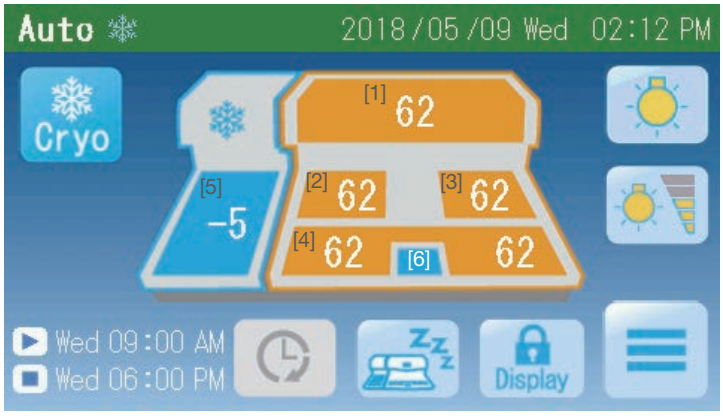
2.2 Setting Up the Instrument

Set the control temperature for each part of the instrument, auto operation and current time.

Perform these settings on the control panel display of the Embedding Module.

2.2.1 Temperature Setting for Each Part of the Instrument

The heating and cooling parts of the instrument are temperature-controlled at their respective set values. Refer to **Setting the Temperature** in this paragraph for information on how to change the set temperatures.



NOTE:

Shown above is an example of the Auto screen.

The factory temperature settings of the instrument are as follows:

Temperature setting location	Setting range	Temperature display range	Factory setting of the instrument	Remarks
[1] Paraffin chamber	50 to 75°C	-99 to 99°C	62°C	
[2] Left warming chamber	50 to 75°C	-99 to 99°C	62°C	
[3] Right warming chamber	50 to 75°C	-99 to 99°C	62°C	
[4] Hot plate	50 to 75°C	-99 to 99°C	62°C	A temperature is displayed separately for the left and right, but the set temperatures are the same.
[5] Cooling plate	-10 to 0°C	-99 to 99°C	-5°C or 0°C	Only J0 is 0°C
[6] Cold spot	Cannot be set.	Not displayed.		

NOTES:

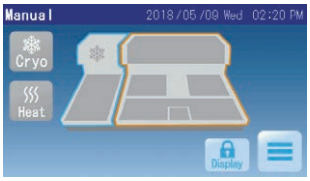
- The forceps holder temperature is set to 8°C above the set temperature of the hot plate. Note, however, the upper limit is 80°C
- At a room temperature of 25°C, no wind and under no load (nothing on the cold spot), the cold spot temperature should be between 0 and 15°C when each temperature is set to 62°C.

Status of the Temperature Display Area

The temperature control status of the paraffin heating part is indicated by the display color of the temperature display area.

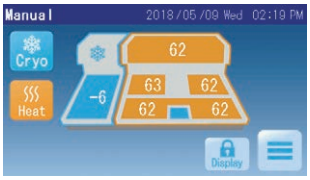
•Temperature control is inactive (paused)

> Gray



•Temperature control is active (preparing, operating)

> Orange

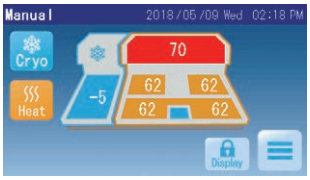


NOTE:

Each temperature indication is blinking during preparation.

•An error is present

> Red



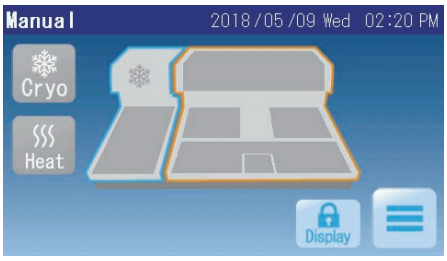
Setting the Temperature

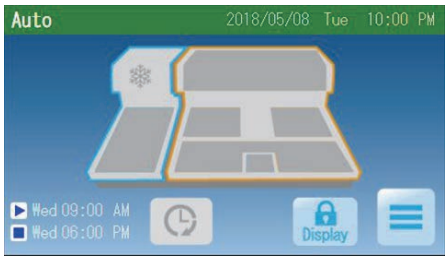
1. Turn the Embedding Module power switch on.

NOTE:

The power switch of the Cryo Module may be off. Also note that Cryo Module temperatures can be set even when the control cable is not connected.

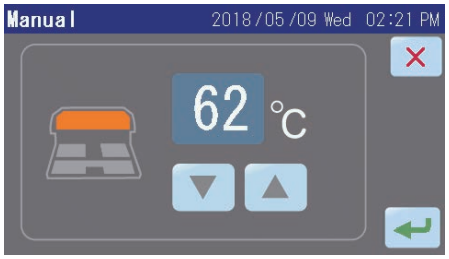
2. Touch the location corresponding to the temperature you want to set.

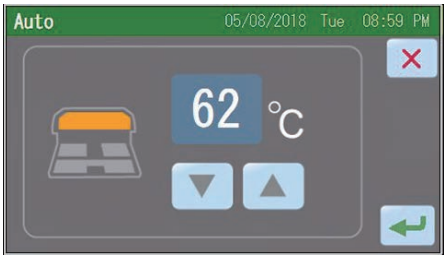




3. Touch the "▼"/"▲" buttons to change the set temperature. Touching the "↵" button saves the setting, after which the display returns to the Operation screen.

   Touch the "×" button, and the display will return to the Operation screen without the setting being saved.





NOTE:

The current temperature displayed on the Operation screen will blink until it falls within +3/-1˚C of the set temperature.

CAUTION:

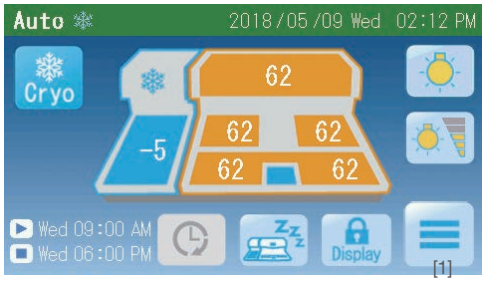
CAUTION

Set the temperatures of the heating parts of the instrument so that the tissues, paraffin, cassettes and base molds can be kept at the same, appropriate temperature as much as possible. A large temperature difference prevents the paraffin block from remaining in a uniform state, and the block may crack.

2.2.2 Setting the Date and Time

Set the built-in clock of the instrument to the current date/time.

1. Touch the "Main Menu" button [1] on the Operation screen.



2. Touch the "Maintenance" button [2] on the Main Menu screen.

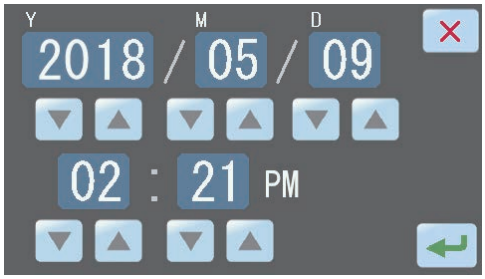
3. Touch the "Date & Time Settings" button [3] on the Maintenance Menu screen.

4. On the Date & Time Settings screen, touch the "▼"/"▲" buttons to set the current date/time.

   At the top, the Y field indicates “year,” M field indicates “month, and D field indicates “day.”

   At the bottom, “hours” and “minutes” are displayed.

   If the 12-hour display mode is set, AM or PM is displayed.



   Touching the "↵" button saves the setting, after which the display returns to the Maintenance Menu screen.

   Touch the "×" button, and the display will return to the Maintenance Menu screen without the setting being saved.

NOTE:

Refer to **3.2.1 Various Settings** for information on how to change the display order of YMD or the 12/24-hour display format.

2.2.3 Setting the Schedule of the Auto Operation (with the Auto Cryo Mode)

This instrument is operated in the auto mode and manual mode.

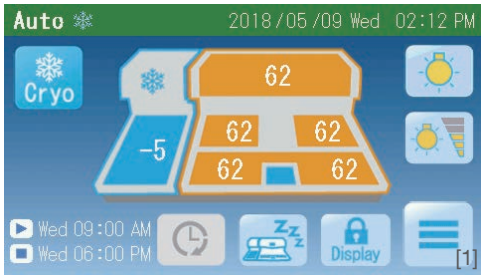
In the auto mode, the instrument is automatically activated so that paraffin has melted sufficiently when the start time arrives. When the end time arrives, the instrument automatically pauses.

The following explains how to set the days of the week when auto operation is performed, and the start and end times of auto operation.

NOTE:

Set the current date/time correctly before auto operation can be performed.

1. Touch the “Main Menu” button [1] on the 2.Operation screen.



2. Touch the “Auto” button [2] on the Main Menu screen.

3. The Auto Operation Display screen is displayed.

   The start and end times of operation on Sunday through Saturday are displayed.

   Touch "▽"/"△" on the screen to switch between the display of the first half of the week and the second half of the week.

4. Auto operation can be set separately for each day of the week.

   A “●” on the left side of the day-of-the-week field indicates that auto operation is turned on for that day of the week.

* The page showing the first half of the week displays Sunday through Wednesday, while the page showing the second half of the week displays Thursday through Saturday.

   A “●” indicates that auto operation is turned off.

   Touch the left side of the day-of-the-week field to switch the auto operation setting between on and off.

5. To set times separately for each day of the week, touch the time corresponding to a desired day of the week.

   The Auto Operation Settings screen is displayed.

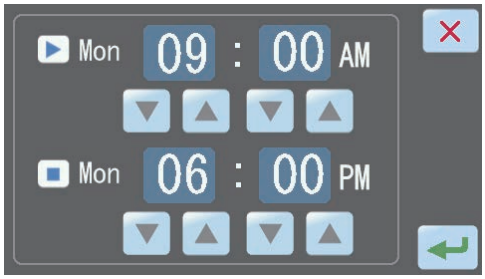
   The "▶" field at the top indicates the start time.

   The "■" field at the bottom indicates the end time.

   Touch "▼"/"▲" corresponding to the time you want to change, to set a desired time.

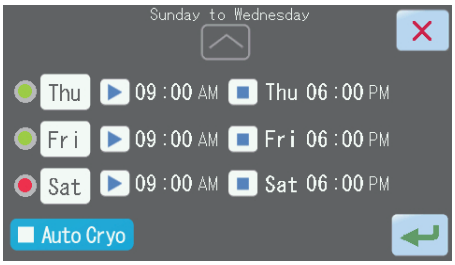
   Touching the "↵" button saves the setting, after which the display returns to the Auto Operation Display screen.

   Touch the "×" button, and the display will return to the Operation screen without the setting being saved.



* "Hours" changes by 1 at a time. "Minutes" changes by 5 at a time.

6. To set another day of the week, repeat the steps from 3.
7. To turn on and off the Cryo Module automatically in conjunction with the Embedding Module in the auto operation mode, touch the "Auto Cryo" button to check the Auto Cryo check box.



8. When all days of the week and corresponding times have been set, touch the "↵" button on the Auto Operation Display screen to start auto operation.

   Touching the "×" button returns the display to the screen corresponding to the current operation method without saving the changes made to the auto operation settings.

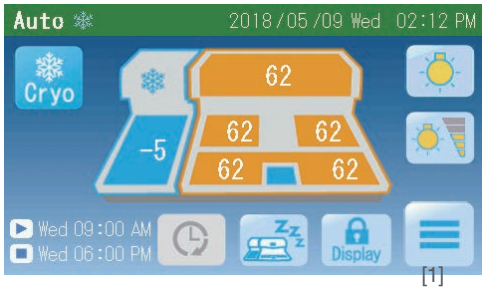
NOTE:

If a time earlier than the start time is set as the end time, auto operation will continue until the end time on the following day.

2.2.4 Setting the Display Language

Select the language you want to use for the information displayed on the instrument.

1. Touch the “Main Menu” button [1] on the Operation screen.



2. Touch the “Maintenance” button [2] on the Main Menu screen.

3. Touch the “Language Settings” button [3] on the Maintenance Menu screen.

4. Touch and select the language to be displayed on the Language Settings screen.

   When a language is selected, “O“ changes to “●”.

   Touching the "↵" button saves the setting, after which the display returns to the Maintenance Menu screen.

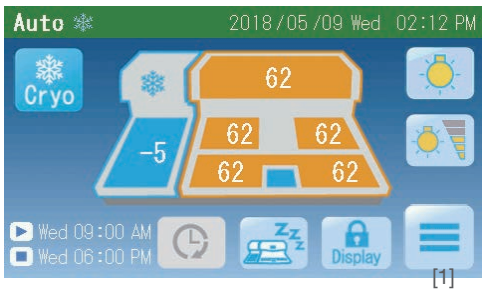
   Touch the "×" button, and the display will return to the Maintenance Menu screen without the setting being saved.

2.2.5 Setting the Auto Panel Display Off Timer

Set the desired time to elapse from the last screen touch before automatically turning off the backlight on the control panel display.

The panel display turns off only while the operation is paused after elapsing the scheduled end time in the Auto mode or when not operating by "Heat" or "Cryo" button in the Manual mode.

1. Touch the “Main Menu” button [1] on the Operation screen.



2. Touch the “Maintenance” button [2] on the Main Menu screen.

3. Touch the “Auto Panel Display Off” button [3] on the Maintenance Menu screen.

4. If you do not want the panel display to turn off automatically, select “Not In Use.”

   If you want the panel display to turn off automatically, you can preset the panel display switch off timer.

   The timer can be set to one of the following:

   1 minute
   10 minutes
   30 minutes
   1 hour
   2 hours

When a timer setting is selected, “O“ changes to “●”.

After the selection, touching the "↵" button saves the setting, after which the display returns to the Maintenance Menu screen.

Touch the "×" button, and the display will return to the Maintenance Menu screen without the setting being saved.

2.3 Operational Overview

2.3.1 Operation Method

Select one of two operation methods of the instrument: manual or auto.

Instrument State

The Embedding Module has one of the states shown in the table below.

State		Description	Remarks
Paused		Temperature control is stopped.	
Active	Preparing	Preparation temperature control is active. (The temperature of the paraffin storage part is deviated from the set value.)	Preparation starts 4 hours before the auto operation start time.
	Operating	Temperature control is active. (The temperature of the paraffin warming part has virtually reached the set value.)	When the paraffin heating part starts operating, paraffin dispensing is enabled and the work light can be turned on. (Except in the cleaning mode)

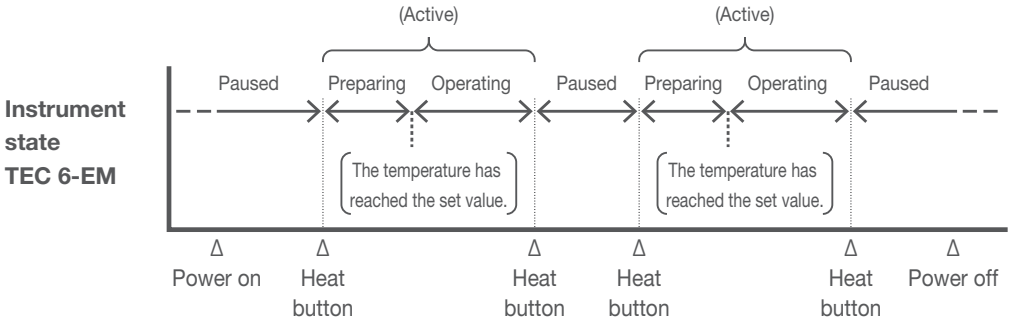
NOTE:

Each temperature indication is blinking during preparation even when it has reached the set temperature.

Details of the Manual Operation Mode

- Embedding Module

  The user touches the “Heat” button on the screen to switch the Embedding Module state between active and paused.

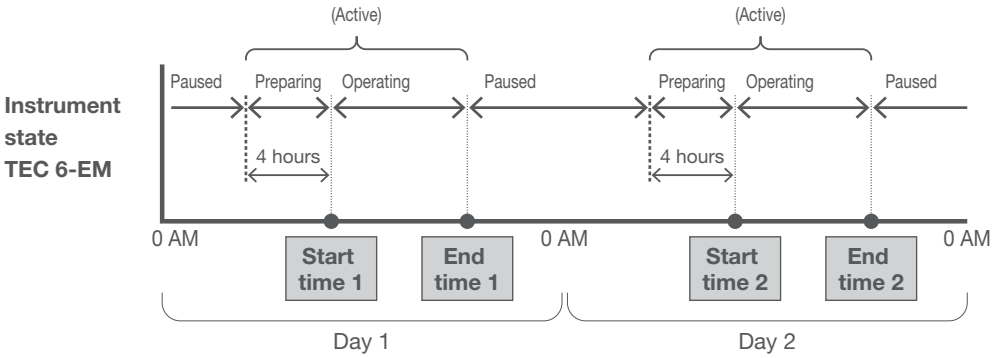


Details of the Auto Operation Mode

- Embedding Module

  When the start time arrives, the instrument is automatically activated to make sure paraffin melts sufficiently.

  When the end time arrives, the instrument automatically pauses.

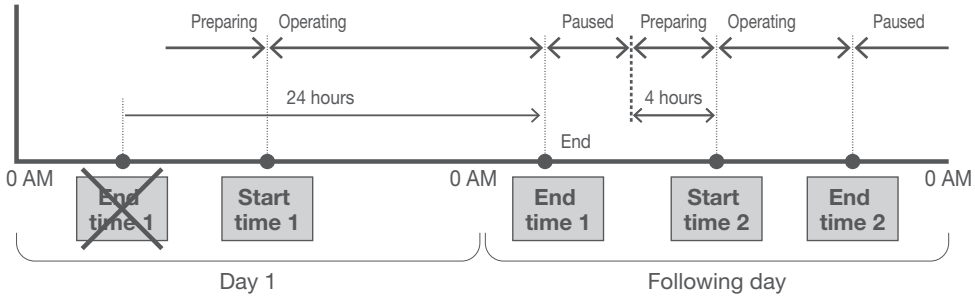


(*) [Start time 1] and [End time 1] represent the start time and end time on day 1.
[Start time 2] and [End time 2] represent the start time and end time on day 2.

- Example of special operation in auto operation

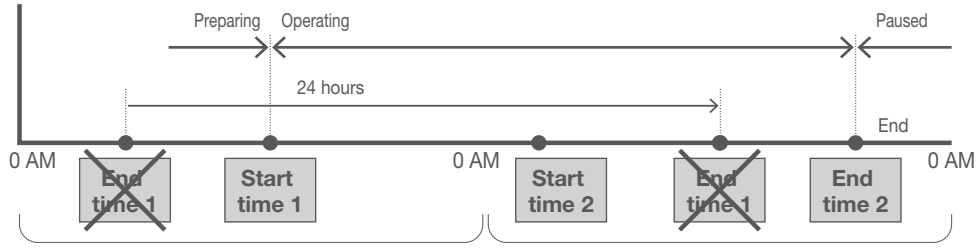
  * If a time earlier than start time 1 is set to end time 1, operation will continue after the 24:00 hour (0 hour) and end at end time 1 on the following day. Depending on the combination of the start time and the end time on the following day, operation may continue after end time 1.

Example 1 [End time 1] is at least 4 hours earlier than the start time on the following day ([Start time 2]):
> Operation will end at [End time 1].

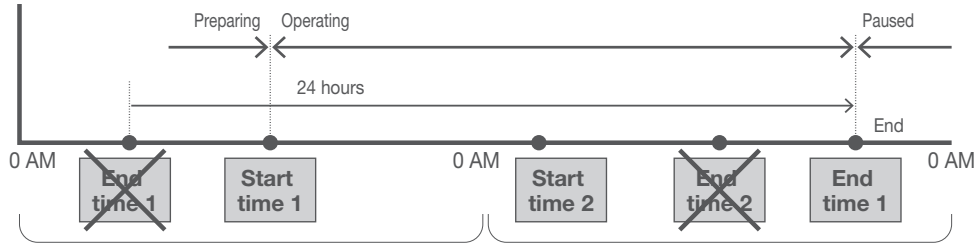


Example 2 [End time 1] is less than 4 hours earlier than [Start time 2]:
> Operation will end at [End time 1] or [End time 2], whichever is later.

Example 2-a In the case of the figure below, operation will end at [End time 2].



Example 2-b In the case of the figure below, operation will end at [End time 1].



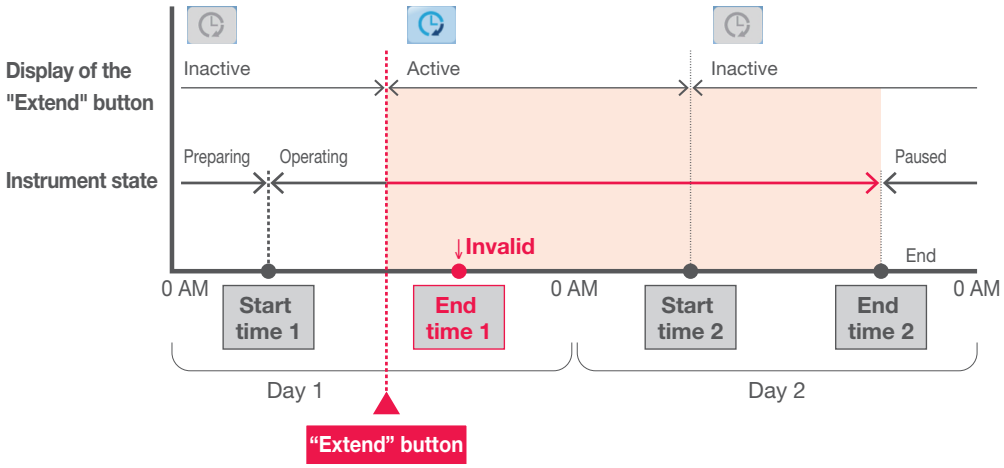
Auto Extension Operation in Auto Operation

Touching the “Extend” button during auto operation turns the extension mode ON and the “Extend” button active.

Note that the operation mode differs depending when the button is touched.

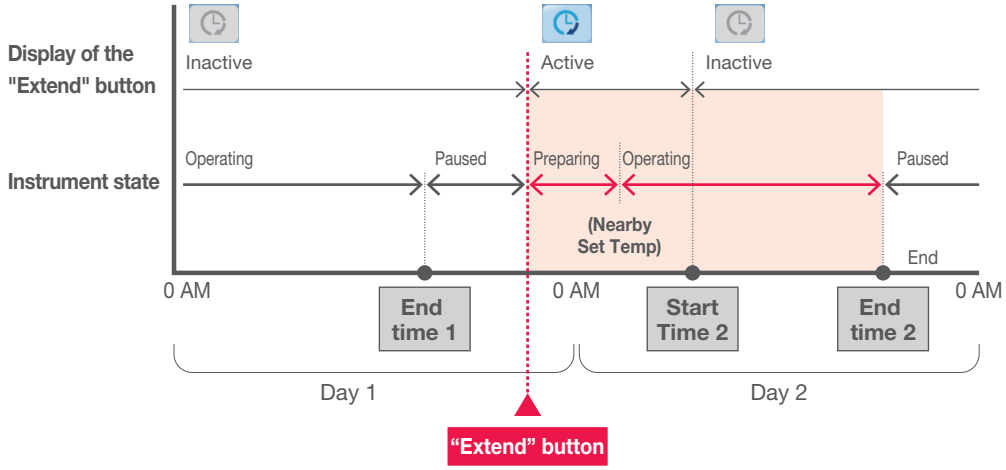
- The “Extend” button is touched while the instrument is active (operating):

  The end time of the day will be invalid and auto operation will be performed until the end time of the next day.



- The “Extend” button is touched while the instrument is paused or preparing:

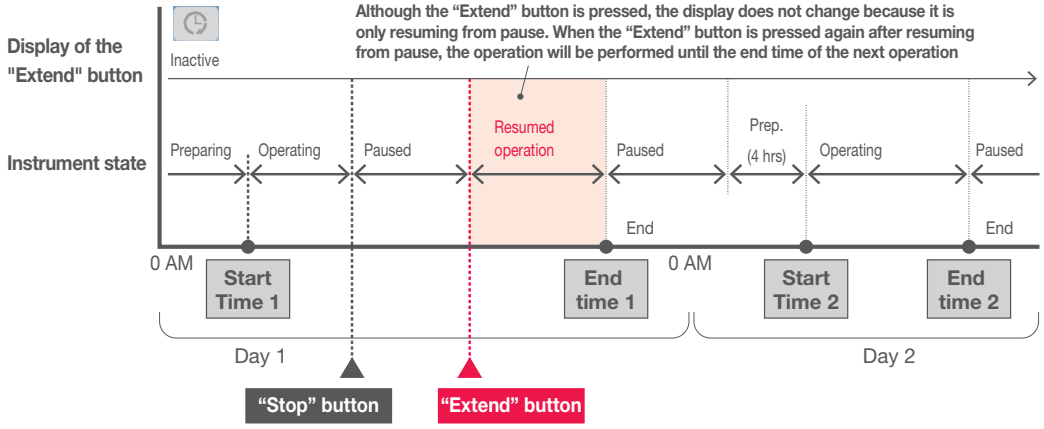
  The auto operation will continue until the end time of the next day if the auto operation of the day has already passed the end time.



If the auto operation of the day has not passed the end time, auto operation of the day will resume. The operation will end at the end time of the day.

NOTE:

Touch the “Extend” button again to extend the operation continuously till the end time for the next day and later.



NOTE:

In the following cases, the extension mode will be switched OFF from ON and the “Extend” button turns inactive.

- When the “Extend” button is touched again while in the extension mode.

- When the “End” button is touched during auto operation to end the auto operation.
- When next start time has come. (The extension mode will be OFF but the operation continues.)

3. Explanation of Operations

3. Explanation of Operations

3.1 Explanation of Operations

3.1.1 Basic Operations

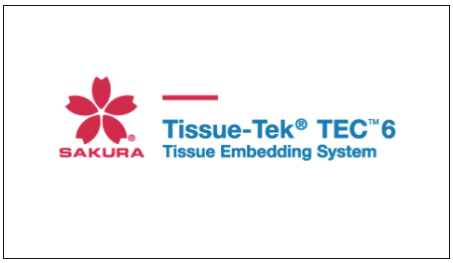
The following explains the day-to-day embedding process and the operations/ tasks that must be performed before/after the embedding process.

This instrument is commonly operated in the auto mode. In auto operation, normally the power switch remains on and the controls are started/stopped automatically at the preset start/end times.

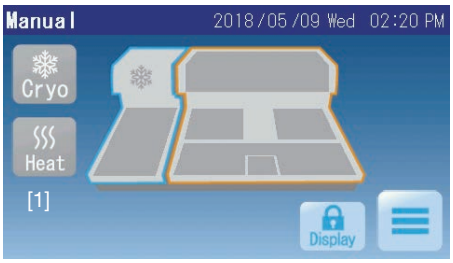
Preparations before Use

When the instrument is used for the first time or after the instrument has been cleaned, paraffin must be added into the instrument and melted. If the necessary quantity of molten paraffin* is already available, proceed to the embedding process. (*Approx. 2.5 kg in Paraffin chamber)

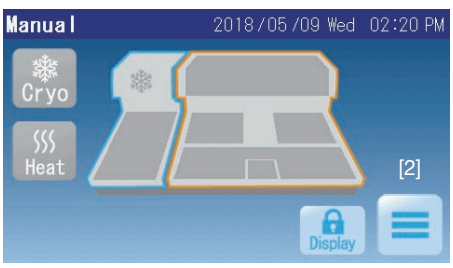
1. Turn on the respective power switch on the Embedding Module and Cryo Module.
2. The Start screen is displayed.



3. If “Manual” is displayed (manual operation), touch the “Heat” button [1].

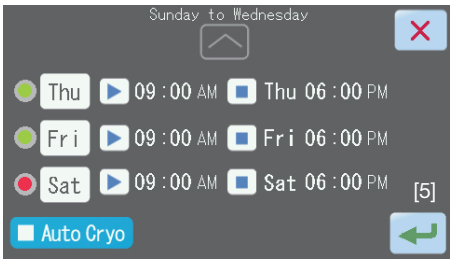


OR, touch the “Main Menu” button [2] and the “Auto” button [3] on the Main Menu screen.



Touch the "" button [4] on the Auto Operation Display screen to switch to the display of the second half of the week.

Touching the "" button [5] on the Auto Operation Display screen switches the operation mode to auto and “Auto” is displayed.



4. Add approx. 2.5 kg of paraffin into the paraffin chamber.

CAUTION

CAUTION:

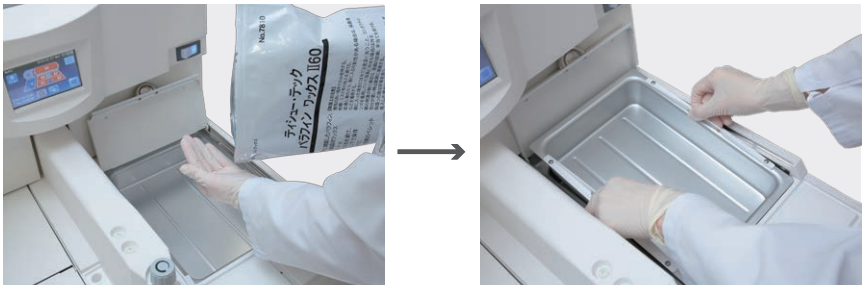
Either solidified or molten paraffin may be added into the paraffin chamber or warming chamber, but never add paraffin with temperature exceeding 80°C because it will lead to instrument failure.

Adding solidified paraffin is recommended, in order to prevent burns and dripping of paraffin.

5. Slide the lid of the warming chamber to the rear of the instrument [1] to open the lid [2].

6. Add approx. 80 g into the warming chamber, and then insert the large tray.

   This paraffin is used to keep the distribution of tray temperatures uniform. Add enough paraffin to uniformly cover the bottom of the tray.



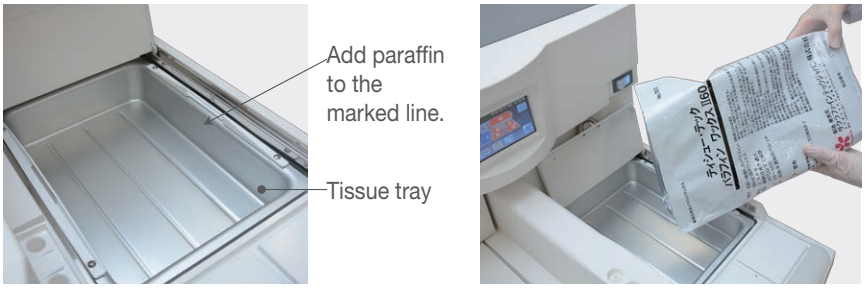
NOTES:

- In the figure above, the right warming chamber is set up. The left warming chamber can be set up in the same manner.
- When the optional small tray is used, the two small trays need to be placed in one warming chamber. Placing only the one small tray may cause thermal conduction to slow.

7. It is posiible to use paraffin in the warming chamber tary to soak cassettes containing tissues.

   Add paraffin to the graduation line marked on the warming chamber tray.

   The tray containing paraffin is called the “Tissue Tray.”



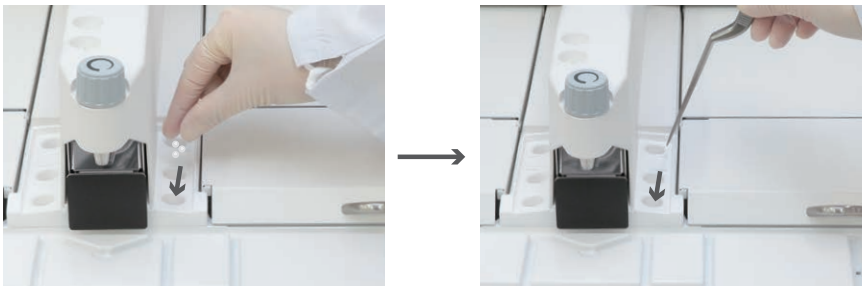
CAUTION:

Do not overfill the tray. Doing so may cause paraffin to spill out, resulting in instrument failure and/or accident.

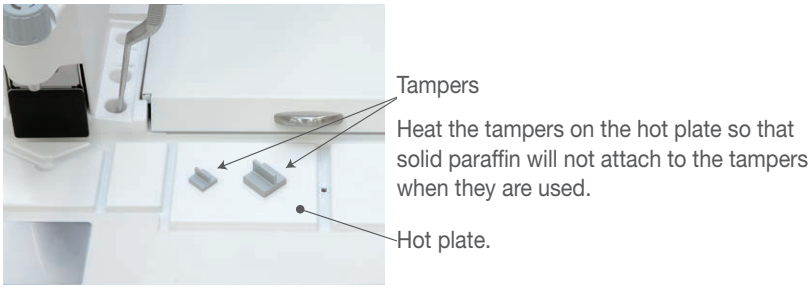
CAUTION

8. Put the base molds into the warming chamber in which the tissue tray is not stored.

9. Put approx. 2 g of paraffin into the forceps holder, and heat the forceps to be used in the holder.



10. Put tampers on the hot plate and heat the tampers.

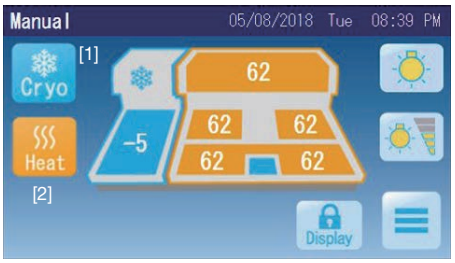


11. The embedding process can be started once the paraffin has melted in the paraffin chamber and warming chamber and the paraffin chamber temperature indicators change from a blinking light to a steady light.

3.1.2 Embedding Process

A flow of the embedding process is explained.

1. Confirm that the paraffin in the paraffin chamber is molten.



NOTE:

If the Cryo Module is not operating, touch the “Cryo” button [1] to operate the module.

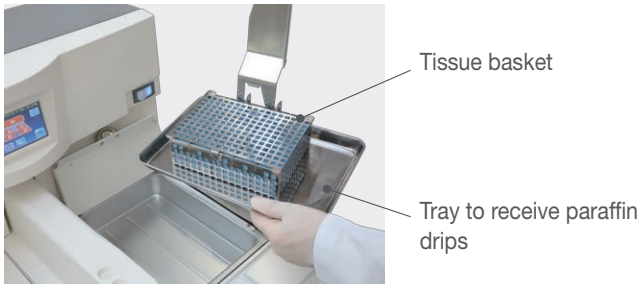
If the Embedding Module is not operating, touch the “Heat” button [2] to operate the module.

CAUTION:

CAUTION

Depending on the conditions, such as after switching the operation mode to manual once, only a small amount of paraffin near the wall of the paraffin chamber may be molten. In this case, only a small amount of tissues can be embedded.

2. Put cassettes containing tissues onto the tissue tray.

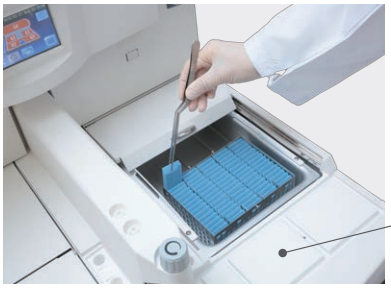


CAUTION:

CAUTION

In the figure above, the tissue basket that comes with Sakura Finetek’s Vacuum Infiltration Processor (VIP) is directly put into the tissue tray. Pay attention not to let paraffin drip, using a transfer tray.

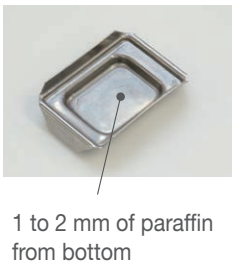
3. Move one cassette from the tissue tray onto the hot plate.



4. Remove the lid from the cassette.

5. Remove a base mold of a size suitable for the tissue from the warming chamber.

6. Press the finger plate with forceps or a finger to dispense a small amount of paraffin onto the base mold.



NOTE:

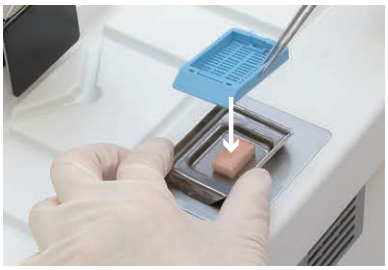
To make the area around the finger plate brighter, touch the “Light” button on the Operation screen to turn on the work light.

If the optional foot pedal is connected, paraffin can be dispensed by stepping on the foot pedal, instead of pressing the finger plate.

7. Place the tissue into the base mold and slightly press to the bottom by forceps.

8. Cool the bottom of the base mold with the cold spot, and push the tissue with a tamper to fix its position. (Cool the bottom of the base mold until a thin layer of solidified paraffin is formed.)

9. Place the cassette on the base mold with the tissue side up.



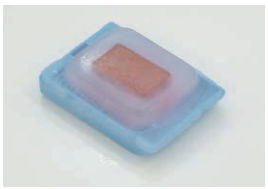
10. Press the finger plate and add paraffin to around 80% of the depth of the cassette.

11. Place the base mold onto the cooling plate of the Cyro Module and cool the mold.

NOTE:

To cool the paraffin block completely, place the base mold so that its bottom contacts with the cooling plate.

12. Wait for several minutes until the paraffin has solidified, remove the paraffin block from the base mold.



Completed paraffin block

13. Clean the tamper and the interior surface of the base mold using a lint-free paper.

    If the interior surface of the base mold is dirty, the paraffin block may not be removed easily in the next process.

    If there are still tissues to be embedded, repeat the steps from 3.

Interior surface of a base mold (red area)

3.1.3 Tasks after Use

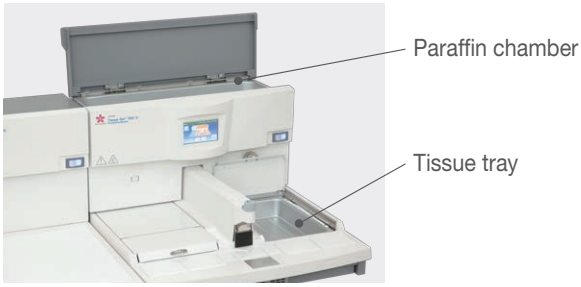
The tasks to be performed after the embedding process are finished for the day.

1. If the work light was used, touch the “Light” button to turn it off.

NOTE:

In auto operation, the work light turns off automatically at the end time.

2. Check the paraffin levels in the paraffin chamber and tissue tray, and add paraffin, if necessary.



CAUTION:

CAUTION

Never add paraffin with temperature exceeding 80°C into the paraffin chamber or warming chamber, because it will lead to instrument failure. Also, add solidified paraffin in order to prevent burns and dripping of paraffin.

3. Close the lids of the paraffin chamber and right/left warming chambers.

   Clean each component after use. For details on the cleaning, refer to **5.2 “Cleaning”**.

4. If manual operation was performed, turn off the power switch.

   If auto operation was performed, keep the power switch on.

NOTE:

In auto operation, the instrument switches to the paused mode once the end time has passed.

3.2 Other Operations

The following explains operations that are not required in daily work, but are performed as necessary.

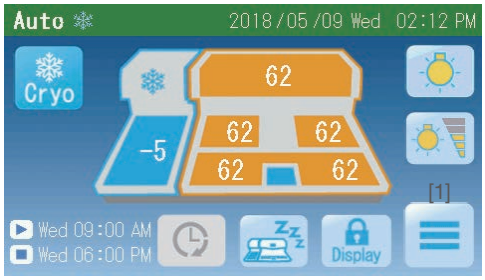
3.2.1 Various Settings

There are items that determine the operations of this instrument. How these items are set, and how the instrument operates according to different settings, are explained.

Setting the Order of Year/Month/Date and Time Mode (12/24)

Set the order in which year, month and date are displayed on the screen, and whether to display time in the 12-hour mode or 24-hour mode.

1. Touch the “Main Menu” button [1] on the Operation screen.



2. Touch the “Maintenance” button [2] on the Main Menu screen.

3. Touch the “Date & Time Settings” button [3] on the Maintenance Menu screen.

4. A desired order of year/month/day can be selected on the left, and the 12-hour or 24-hour display mode can be selected on the right.

   When selected, “○” changes to “●”.

   y indicates year, m indicates month, and d indicates day. Depending on the selected order, dates are displayed as follows:

   - yyyy/mm/dd: Year/Month/Day
   - mm/dd/yyyy: Month/Day/Year
   - dd/mm/yyyy: Day/Month/Year

   To display time in the 24-hour mode, select “24H.”

   To display time in the 12-hour mode accompanied by AM/PM, select “12H.”

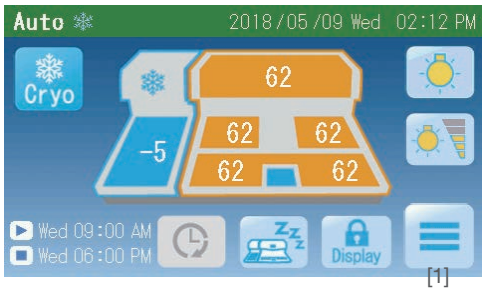
5. Touching the "↵" button saves the setting, after which the display returns to the Maintenance Menu screen.

   Touch the "×" button, and the display will return to the Maintenance Menu screen without the setting being saved.

3.2.2 Melting Paraffin Quickly

Quick heating, where the control temperature is 5˚C higher than the set temperature, can be used to melt the paraffin in the paraffin chamber or tissue tray quickly.

1. Touch the “Main Menu” button [1] on the Operation screen.



[1]

2. Touch the “Quick Heating” button [2] on the Main Menu screen.

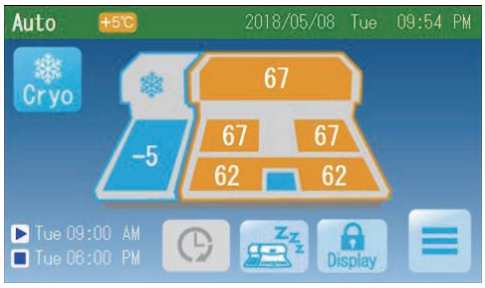
[2]

NOTE:

This button is not displayed unless the instrument is operating.

3. Return to the Operation screen.

   “+5˚C” illuminates at the top of the screen and the temperature rises.



   When quick heating ends after 4 hours, the previous set temperature is restored for temperature control.

   To stop or cancel the quick heating in progress, touch the “Quick Heating” button again.

CAUTION

CAUTION:

Dispensing is disabled during quick heating and also until the set temperature is restored.

NOTE:

The quick heating is automatically turned off in 4 hours.

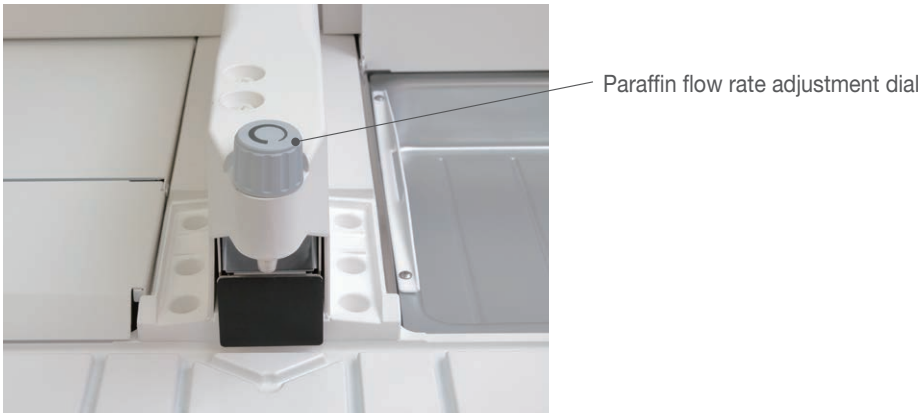
3.2.3 Changing the Paraffin Flow Rate

Turning the dial 3.5 times counterclockwise from the fully closed position (achieved by turning the dial all the way in the clockwise direction), opens the dial fully.

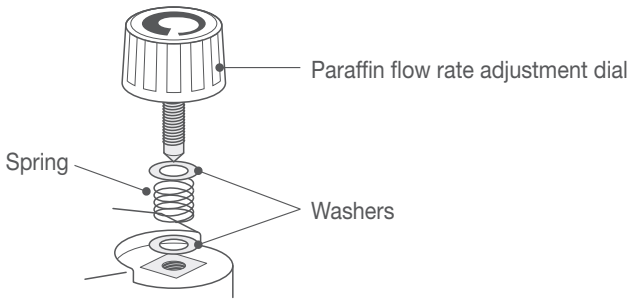
Turn the paraffin flow rate adjustment dial when paraffin is molten (can be dispensed).

If the dial is forcibly turned when the paraffin is solid, failure may result.

The paraffin flow rate for dispensing can be adjusted using the paraffin flow rate adjustment dial.



Continue turning the dial, and it will come off. The dial need not be removed in normal conditions, but if it was removed, be careful not to lose the spring inside the dial.



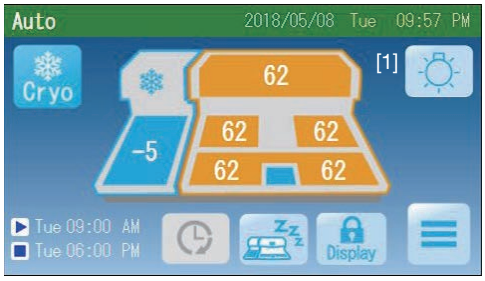
CAUTION:

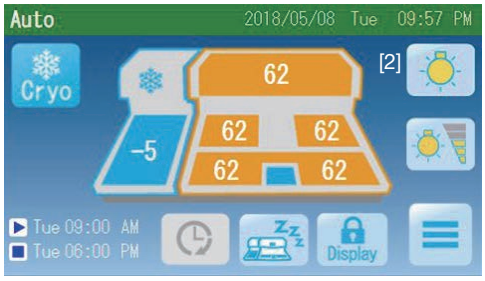
CAUTION

Do not close the paraffin flow rate adjustment dial of the Embedding Module fully after the process. If the paraffin cools down and solidifies when the flow rate adjustment dial is fully closed, the paraffin may expand the next time it is melted, and leak out from the flow rate adjustment dial.

3.2.4 Turning On/Off the Work Light

Touching the “Light” button [1] on the Operation screen turns on the work light to brighten the dispensing area. Touching the “Light” button [2] again turns off the work light.



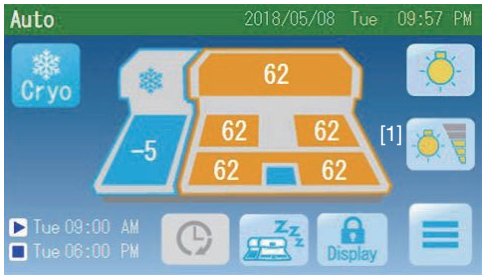


NOTE:

The “Light” button [1] is displayed when the paraffin temperature reaches an appropriate level and paraffin can be dispensed.

Adjusting the Brightness

Touch the “Light” button on the Operation screen to turn on the work light, and the “Brightness Setting” button [1] will appear below the “Light” button.



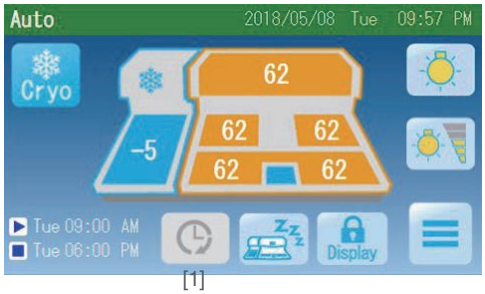
The brightness increases by one level every time the “Brightness Setting” button is touched. There are five brightness levels, and once the brightness is increased to the highest level, the next touch of the button brings it back to the lowest level.

Level1 Level2 Level3 Level4 Level5 Level1

3.2.5 Continuing Embedding after the End Time of Auto Operation

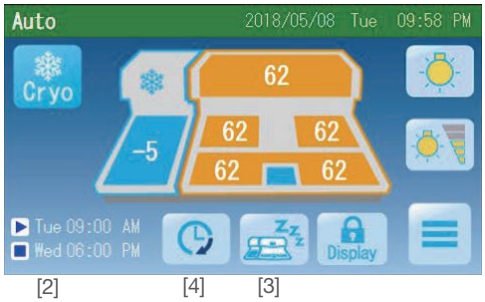
During auto operation, you may want to continue the embedding work because there are still tissues to be embedded although the end time comes soon and the instrument enters the paused mode. In this case, you can continue the embedding process by following the steps below:

1. Touch the “Extend” button [1] on the Operation screen.



[1]

2. The displayed end time temporarily changes to the next end time [2].
3. Continue the embedding process.
4. When the process is over and you want to pause the instrument, touch the “End” button [3].



[2] [4] [3]

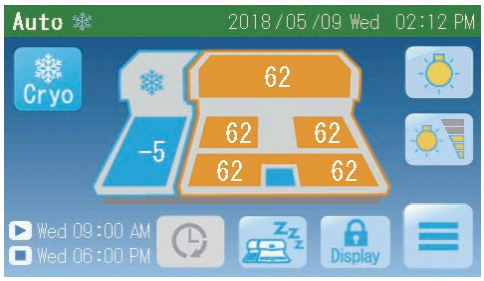
NOTE:

When the “Extend” button [4] is touched again without touching the “End” button [3], the instrument will go back to the user-scheduled auto operation mode. Refer to **2.3.1 Operation Method** for details of the operation of the Extend button.

3.2.6 Ending the Auto Operation before the End Time

During auto operation, you may want to put the instrument in the paused mode because the day's work is over although it is not yet the end time. In this case, follow the steps below to end the operation:

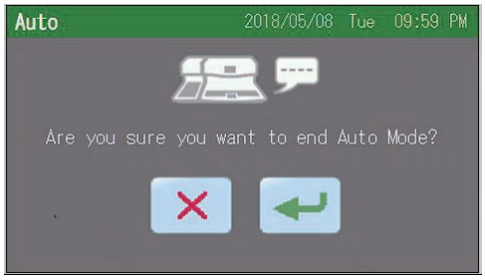
1. Touch the "End" button [1] on the Operation screen.



[1]

2. To end the operation, touch the "↵" button.

   To cancel the operation, touch the "✕" button.

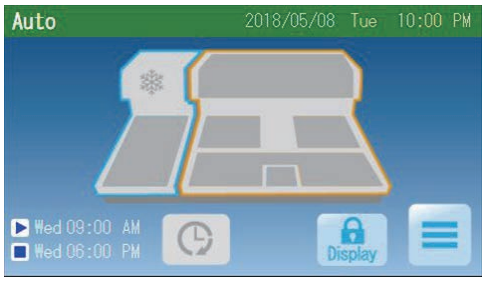


NOTE:

Once the instrument stops, it will remain in the paused mode until the next start time.

NOTE:

The sample screen on the right shows the instrument in the paused mode.



3. Explanation of Operations

3.3 Handling of Standard and Optional Accessories

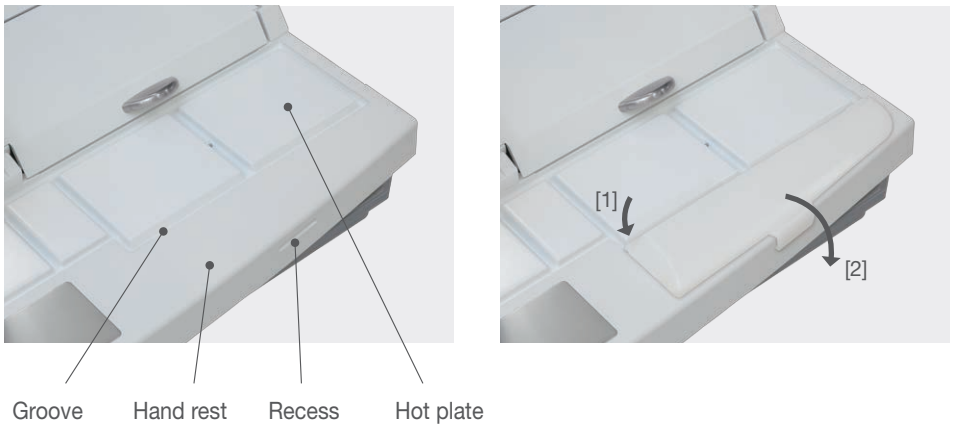
How to install and handle the accessories is explained. For optional accessories, please order from the Sakura instrument distributor.

3.3.1 Wrist Rest

The wrist rest can be attached to reduce the stress the wrist receives from work, and to prevent burns.

Attaching the Wrist Rest

After cleaning the hand rest surface and the groove, hook the rear side of the wrist rest at the groove between the hand rest and the hot plate [1], and push the wrist rest into a recess (attachment point) on the front side [2].



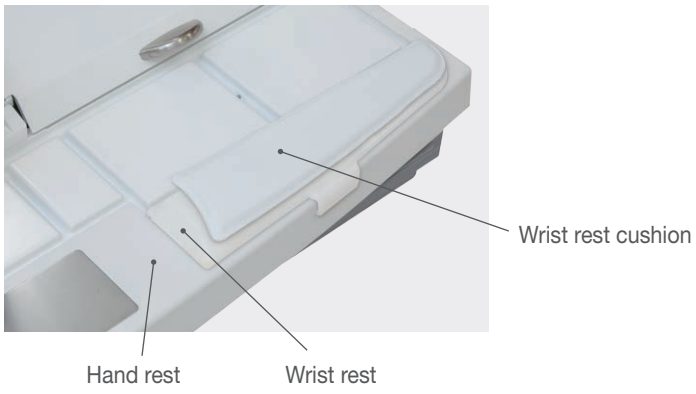
CAUTION:

To remove the wrist rest, carefully push it up from the recess on the front side, using the scraper, etc. to avoid injuring your fingertip.

3.3.2 Wrist Rest Cushion

A cushion can be attached on the hand rest or wrist rest.

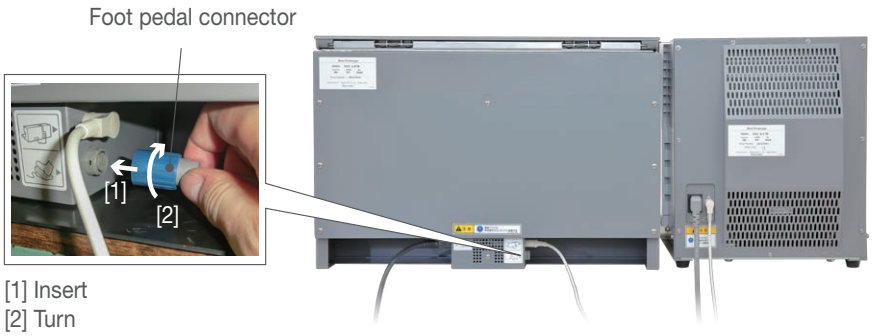
The cushion is made of a self-adhesive material, so clean the attaching surface and simply press the cushion onto the surface.



3.3.3 Foot Pedal

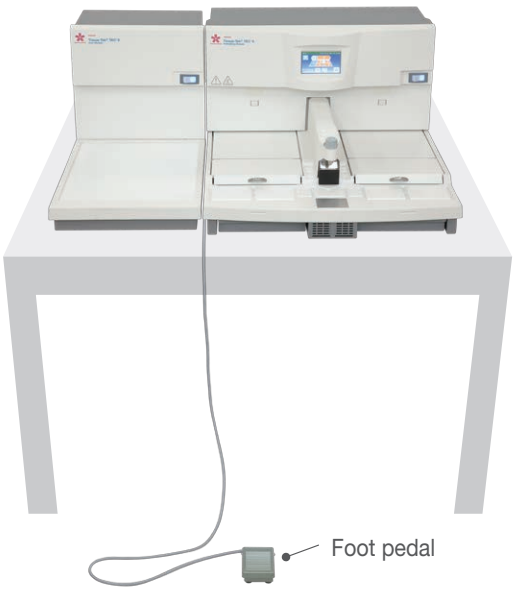
Paraffin can be dispensed by stepping on the foot pedal, just like when the finger plate is pressed.

Insert the connector of the foot pedal to the connector on the rear of the Embedding Module [1], and turn the screw [2] to secure the connectors.



[1] Insert
[2] Turn

It should be noted that the foot pedal cord can be guided between the Embedding Module and the Cryo Module.

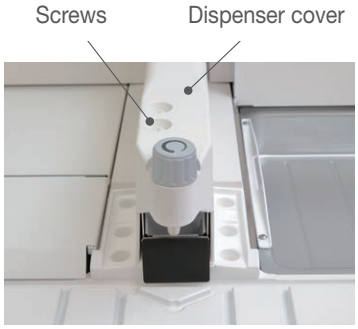


3.3.4 Magnifying Lens

The magnifying lens is used to embed small tissues and achieve accurate positioning. Use a cross-slot (Phillips) screwdriver to install the magnifying lens.

1. Use the screwdriver to remove one screw on the dispenser cover.

   There are two screws. Either one of the screws can be used to install the magnifying lens.

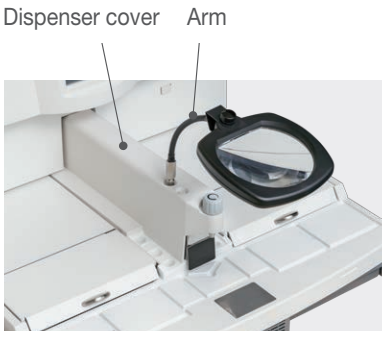


CAUTIONS:

CAUTION

- **The screws are made of resin, so be careful not to damage the screw when installing/removing it.**
- **Keep the screw removed from the dispenser separately so that you can easily identify it as the screw for installing the magnifying lens.**

2. Using the provided wrench, turn the lens arm, while holding down the dispenser cover, to install the magnifying lens.



WARNINGS:

WARNING

- **Do not remove the dispenser cover. If this instruction is not followed, you may suffer a burn and/or the instrument may fail.**
- **When the optional magnifying lens is attached, keep it away from direct sunlight exposure. The lens subjected to direct sunlight may cause fire and/or accident because of refraction of light.**

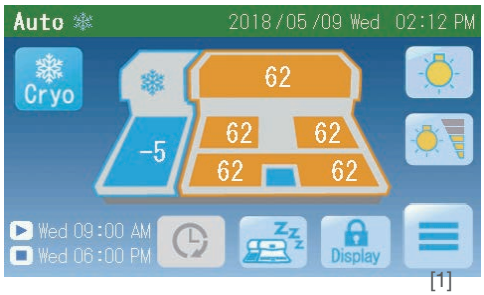
4. Error Log

4.1 Error Log

4.1.1 Viewing the Error Log

You can view a log of errors, etc., that have occurred/generated in the past.

1. Touch the “Main Menu” button [1] on the Operation screen.



2. Touch the “Maintenance” button [2] on the Main Menu screen.

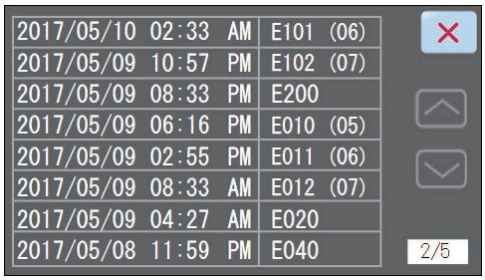
3. Touch the “Error Log” button [3] on the Maintenance Menu screen.

4. Errors occurred in the past are displayed each with the date and time of occurrence and the corresponding error code.

   Touch the "▲"/"▼" buttons to navigate through the display pages.

   Up to 40 errors are displayed. When errors exceed 40, the errors are deleted from the oldest.

   Touch the "×" button to return to the Maintenance Menu screen.



NOTE:

For details on the error codes, refer to **5.1.2 Message Window**.

5. Troubleshooting

5.1 Troubleshooting

5.1.1 Instrument Condition and Solution

Before requesting repair, check the condition by following the table below. If the problem persists or the applicable condition is not listed, contact the Sakura instrument distributor or representative.

Instrument condition	Check	Solution
Nothing is shown on the screen. The instrument does not operate.	Power switch is OFF.	Turn on the power switch.
	The power plug is removed.	Connect the power plug to an electrical outlet.
	Power is not supplied.	Check the breaker, etc., on the facility side.
	The auto panel display off timer is working.	Touch the panel display or change the timer setting.
	The circuit protector was triggered.	If abnormal current flows through the instrument, the circuit protector in the power switch operates and the power switch turns off automatically. Turn on the power switch again. If the problem is repeated after the power switch is turned back on, the instrument may be faulty. Contact the Sakura instrument distributor or representative.
Temperature control is not performed as scheduled during auto operation.	The “End” button was pressed to end the operation.	Touch the “Extend” button. Temperature control resumes.
Paraffin in the paraffin chamber is not molten.	Ambient temperature is too low.	Use the instrument at an ambient temperature within 10°C to 35°C or raise the set temperature of the paraffin chamber.
	The paraffin chamber lid is open.	Close the paraffin chamber lid.
	The set temperature of the paraffin chamber is too low.	Raise the set temperature of the paraffin chamber.
	High melting point paraffin is used in the paraffin chamber.	Raise the set temperature of the paraffin chamber.
Paraffin does not come out (cannot be dispensed).	The operation mode is not yet “Operating.”	Wait for the mode to change to “Operating.” If the operation mode is not “Operating,” paraffin is not dispensed even by operating the finger plate or foot pedal (optional).
	The cleaning mode is in operation.	End the cleaning mode. Paraffin is not dispensed even by operating the finger plate or foot pedal (optional) in the cleaning mode.
	Solid paraffin was added during operation.	Wait for the paraffin to be molten or touch the “Quick Heating” button to melt the paraffin quickly.
	High temperature molten paraffin was added during operation.	Wait until the paraffin chamber temperature indicator changes from a blinking light to a steady light.
	The quick heating is in progress.	Wait until the quick heating is finished or touch the quick heating button to cancel the quick heating.

Instrument condition	Check	Solution
Paraffin does not come out in the “Operating” mode.	The operation has just started in the manual mode (the set temperature was obtained but paraffin has not melted enough).	Touch the “Quick Heating” button to raise the set temperature. Paraffin is not dispensed during the quick heating in operation or when the instrument status is “Preparing” (see 2.3.1 “Operation Method”).
	Paraffin tries to be dispensed just after operation has been started in the manual mode.	Wait for the paraffin to be molten. Or, touch the “Quick Heating” button to melt the paraffin quickly.
	The flow rate adjustment dial is closed.	Turn the flow rate adjustment dial counter- clockwise.
	There is no paraffin in the paraffin chamber.	Check the paraffin chamber and if there is no paraffin inside, add paraffin.
	Air is trapped underneath the strainer in the paraffin chamber.	Raise the strainer with forceps and release the air. 
	Ambient temperature is too low.	Use the instrument at an ambient temperature within 10°C to 35°C or raise the set temperature of the paraffin chamber.
	The set temperature of the paraffin chamber is low.	Raise the set temperature of the paraffin chamber.
	High melting point paraffin is used in the paraffin chamber.	Raise the set temperature of the paraffin chamber.
	The foot pedal (optional) is not connected	Connect the foot pedal to the Embedding Module.
Paraffin is not molten in the warming chamber and the warming chamber tray.	Ambient temperature is too low.	Use the instrument at an ambient temperature within 10°C to 35°C or raise the set temperature of the warming chamber.
	The warming chamber lid is open.	Close the warming chamber lid.
	The set temperature of the warming chamber is low.	Raise the set temperature of the warming chamber.
	The large warming chamber tray was replaced with the small one.	Place the two small trays in one warming chamber when the optional small tray is used. Placing only the one small tray may cause thermal conduction to slow.
	The instrument is exposed directly to the air blowing from an air-conditioner.	Adjust an air flow direction of the air-conditioner.
	High melting point paraffin is used in the warming chamber.	Raise the set temperature of the warming chamber.
The warming chamber tray cannot be removed.	Paraffin is solidified in the warming chamber.	Start up the instrument. Remove the tray after waiting for paraffin to be molten in the warming chamber.
The paraffin drain tray cannot be removed.	Paraffin is attached around the paraffin drain tray.	Do not pull the tray forcibly. Switch on the power, and wait for a while until the hot plates and warming chambers warm up. After paraffin around the tray gets warm and soft, pull the tray slowly. After taking the tray out of the instrument, clean around the paraffin drain tray (inside of the instrument, on the bench, the bottom of the tray, etc.). (See **5.2.2 Cleaning Each Part of the Embedding Module** for cleaning the Paraffin Drain Tray)
Paraffin cannot be removed from the paraffin drain tray.	Paraffin gets cold and solidified over time.	Warm up the paraffin drain tray in a paraffin oven or on the cleaned hot plate, etc., soften the paraffin and remove by the scraper. Or, cool the paraffin drain tray on the Cryo Module to harden and shrink the paraffin and remove it from the tray. If the underside of the tray gets dirty with paraffin, etc. after this solution, remove it by the scraper, etc.
The cold spot will not cool.	Ambient temperature is too high.	Use the instrument at am ambient temperature within 10°C to 35°C.
The “Cryo” button is not displayed on the Operation screen.	The control cable is not connected.	Connect the Cryo Module and Embedding Module with the control cable.

5. Troubleshooting

Instrument condition	Check	Solution
Any function button on the control panel display does not react.	The display was locked.	Hold down the “Lock Display” button for at least 3 seconds to unlock the display.
	The display is dirty with paraffin, dust, etc.	Clean the display.
	Two places are pressed on the display at a time	Be careful not to press two places on the display at a time.
Air bubbles are often trapped in dispensed paraffin.	The air is present in the paraffin flow line.	Turn the flow adjustment dial counterclockwise 3 times and half. Keep paraffin running for 2 ~ 3 seconds to expel the air. After the air has been removed, put the dial back to its original setting.
A small lump of paraffin is dispensed.	A droplet of paraffin is sticking to the tip of the dispensing nozzle.	Prior to dispensing, remove the droplet using forceps. To avoid producing such droplets, increase a little bit the paraffin chamber temperature or the paraffin flow rate.

5.1.2 Message Window

When an error occurs, notification with buzzer sounds and message window are displayed on the current screen at the same time.

There are two types of messages: caution messages and warning messages.

NOTE:

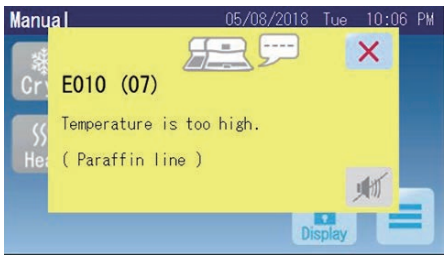
If a new error occurs while the message window is still displayed, the new message is put on hold. After closing the current message window, the message window on hold will be displayed.

The message window shows an error code and a message.

Touching the "🔇" button stops the buzzer notification.

Touching the "✕" button closes the message window.

Caution message



Warning message

Structure of Error Code

E000 (00)

Type of error — Additional code

NOTE:

There is no additional code depending on the type of error.

Error Messages and Types of Errors

Error code	Overview	Displayed message	Description	Instrument operation when the error occurs	Solution
E001	Invalid nonvolatile memory	Unable to restore setting data.	The set data in the non-volatile memory was not valid.	Operation continues based on the factory-set data. If the factory-set data is invalid, operation continues using the default value.	Contact the Sakura instrument distributor or representative.
E002		The operation status has been initialized	The operating status data in the non- volatile memory was not valid.	Operation continues in the manual mode (“Paused” state).	If the problem persists after reconnecting the power, contact the Sakura instrument distributor or representative.
E003		The record has been initialized	The log data in the non-volatile memory was not valid.	Operation continues.	If the problem persists after reconnecting the power, contact the Sakura instrument distributor or representative.
E004	Power outage	Power outage occurred	The power was cut off while the instrument was preparing or operating. (If the power is cut off or the plug is pulled out without stopping the operation, the instrument recognizes as power outage.)	Operation continues from the Operation screen. If the light was on when the power was cut off, operation continues with the light turned off.	Check the molten state of paraffin, and then resume using the instrument.
E010	Caution for high temperature	Temperature is too high.	The temperature of each location is too high compared to the set temperature.	If the problem location is the paraffin chamber, paraffin line, dispenser or dispensing solenoid valve, paraffin cannot be dispensed. If the problem location is the left/right warming chamber or left/right hot plate, normal operation continues.	Wait until the temperature of the applicable location displayed on the Operation screen stops blinking and changes to a steady light. Wait for a while, and if the temperature does not stop blinking, contact the Sakura instrument distributor or representative. (Check if any equipment that generates strong electromagnetic waves is nearby.)
			High temperature molten paraffin was added.		
E011	Low temperature caution	Temperature has fallen	The temperature of each location is too low compared to the set temperature.	If the problem location is the paraffin chamber, paraffin line, dispenser or dispensing solenoid valve, paraffin cannot be dispensed. If the problem location is the left/right warming chamber or left/right hot plate, normal operation continues.	Use the instrument at an ambient temperature within 10°C to 35°C. Close the paraffin chamber lid it is open. Close the warming chamber lid if it is open. Remove the tray, etc. if placed on the hot plate. Wait until the temperature of the applicable location displayed on the Operation screen stops blinking and changes to a steady light. Wait for a while, and if the temperature does not stop blinking, contact the Sakura instrument distributor or representative. (Check if any equipment that generates strong electromagnetic waves is nearby.)
			Solid paraffin was added.		
			Unmelted paraffin has sunk down in the paraffin chamber.		
			A cassette basket was placed in the warming chamber.		
			Something (e.g. small tray or paraffin drain tray which contains unmelted paraffin) is placed on the hot plate.		
			Ambient temperature is too low.		
			The paraffin chamber lid is open.		
			The warming chamber lid is open.		

Error code	Overview	Displayed message	Description	Instrument operation when the error occurs	Solution
E012	Heating failure	Warming operation failure	The temperature of each location does not rise even after each heating operation has started.	Heating operation continues.	Use the instrument at an ambient temperature within 10°C to 35°C. Close the paraffin chamber lid it is open. Close the warming chamber lid if it is open. Remove the tray, etc. if placed on the hot plate. Wait until the temperature of the applicable location displayed on the Operation screen stops blinking and changes to a steady light. Wait for a while, and if the temperature does not stop blinking, contact the Sakura instrument distributor or representative. (Check if any equipment that generates strong electromagnetic waves is nearby.)
			Solid paraffin was added.		
			Unmelted paraffin has sunk down in the paraffin chamber.		
			A cassette basket was placed in the warming chamber.		
			Something (e.g. small tray or paraffin drain tray which contains unmelted paraffin) is placed on the hot plate.		
			Ambient temperature is too low.		
			The paraffin chamber lid is open.		
			The warming chamber lid is open.		
E020	Abnormal Cryo operation caution	Cryo Module Error	The cooling fan of the Cryo Module does not operate.	The CM switches to the “Paused” state. The EM continues to operate normally.	Check the condition of power connection and power switch state of the Cryo Module. If the problem persists, contact the Sakura instrument distributor or representative.
E021			The cooling fan of the Cryo Module does not stop.		
E022			The cooling plate temperature of the Cryo Module does not come down.	The CM switches to the “Paused” state. The EM continues to operate normally.	Check the condition of power connection and power switch state of the Cryo Module. If the problem persists, contact the Sakura instrument distributor or representative.
E023			The cooling plate temperature of the Cryo Module rose.		
E024			The cooling plate temperature of the Cryo Module does not rise.	The CM switches to the “Paused” state. The EM continues to operate normally.	Use the instrument at an ambient temperature within 10°C to 35°C. Check if the cooling plate has frost buildup and remove it if any. Check the condition of power connection and power switch state of the Cryo Module. If the problem persists, contact the Sakura instrument distributor or representative.
			Ambient temperature is too low.		
			Frost was built up on the cooling plate.		
E025	Abnormal Cryo operation caution	Cryo Module Error	The cooling plate temperature of the Cryo Module does not reach the specified value.	Operation continues.	Use the instrument at an ambient temperature within 10°C to 35°C. Check if the cooling plate has frost buildup and remove it if any. Check the condition of power connection and power switch state of the Cryo Module. If the problem persists, contact the Sakura instrument distributor or representative.
			Ambient temperature is too high.		

5. Troubleshooting

Error code	Overview	Displayed message	Description	Instrument operation when the error occurs	Solution
E040	Low battery caution	Battery voltage has dropped	The voltage of the clock battery dropped below the specified value.	Operation continues.	Contact the Sakura instrument distributor or representative and replace the battery within one month.
E041	Clock reset	The clock was reset.	Unable to restore time data. Button battery is dead.	If the instrument was operating in the auto mode, operation pauses. If the instrument was operating in the manual mode, operation continues.	Contact the Sakura instrument distributor or representative and replace the battery.
E042	Invalid clock	The time data is incorrect	The clock generated an error. The battery case came off.	Operation continues.	Check if the date and time displayed on the screen is correct. If the date and time is not correct, set the correct date and time. If the problem persists, contact the Sakura instrument distributor or representative and replace the battery.
E050	Momentary power failure	Momentary power outage	A momentary power failure occurred.	Operation continues from the Operation screen. If the light was on when the power was cut off, operation continues with the light turned off.	Check the molten state of paraffin, and then resume using the instrument.
E100 E101	Abnormal tempera-ture sensor	Temperature sensor error	Signals cannot be received from the temperature sensor.	Operation aborts.	Turn off the power to the instrument and contact the Sakura instrument distributor or representative.
E102			An abnormal signal was received from the temperature sensor.	Operation aborts.	Turn off the power to the instrument. When paraffin in the problem location starts solidifying (below 60°C, as a guide), turn on the power again. (The power should be off for at least 10 seconds.) If the problem persists, turn off the power to the instrument and contact the Sakura instrument distributor or representative. (Check to see if any equipment that generates strong electromagnetic waves is nearby.)
E103	Abnormally high tempera-ture	Abnormally high tempera-ture	The temperature of each location exceeds the allowable value. (The temperature is higher than the E010 level.) High temperature molten paraffin was added.	Operation aborts.	Turn off the power to the instrument. When paraffin in the problem location starts solidifying (below 60°C, as a guide), turn on the power again. (The power should be off for at least 10 seconds.) If the problem persists, turn off the power to the instrument and contact the Sakura instrument distributor or representative. (Check to see if any equipment that generates strong electromagnetic waves is nearby.)
E901 E902 E903 E904	Abnormal nonvolatile memory	Memory error during data update	Data could not be saved because the nonvolatile memory operated abnormally.	Operation aborts.	Operation aborts. Turn off the power to the instrument and contact the Sakura instrument distributor or representative.

Descriptions of Additional Codes

Additional code	Description (Applicable location)
01	Cooling plate (Cryo Module)
02	Paraffin chamber (Embedding Module)
03	Left side warming chamber (Embedding Module)
04	Right side warming chamber (Embedding Module)
05	Left side hot plate (Embedding Module)
06	Right side hot plate (Embedding Module)
07	Paraffin line (Embedding Module)
08	Dispensing solenoid valve (Embedding Module)
09	Dispenser (Embedding Module)
10	Forceps holder (Embedding Module)
11	Hot plate heater
21	Set value data
22	Operation status data
23	Dispensing log data
24	Error log data
25	Temperature record data

Buzzer Notification

This instrument notifies the following events with a buzzer sound.

Type of notification	Notification sound	Condition for notification	How to stop
Startup notification	Short beep	The display has started after the power was turned on. (Approx. 15 seconds later)	Stops automatically.
Start notification	Short beep	The TEC 6-EM is operating.	Stops automatically.
End notification	Short beep	Auto operation has ended.	Stops automatically.
Dispensing notification	3 short beeps	An attempt was made to perform dispensing operation when dispensing was not possible.	Stops automatically.
Paraffin solidified notification	15-second continuous beep	The paraffin solidification process was complete in the cleaning mode.	Stops automatically or by toughing the “” (stop) button.
Paraffin heated notification	Intermittent short beeps (for one minute)	The paraffin melting process was complete in the cleaning mode.	Stops automatically or by toughing the “” (stop) button.
Error notification (Caution)	One-minute continuous beep	An caution-level error occurred	Stops automatically or by toughing the “” (stop) button.
Error notification (Warning)	Continuous beep	An warning-level error occurred.	Touch the “” (stop) button.

NOTE:

The buzzer notification cannot be disabled. The volume of the buzzer is fixed.

5.1.3 What to Do Following a Power Outage

If a power outage occurs when the instrument is not in the “Paused” mode, the temperature control stops and therefore the paraffin will start to solidify, while the cooling plate temperature of the Cryo Module will start to rise.

Nothing can be done when the temperature control stops.

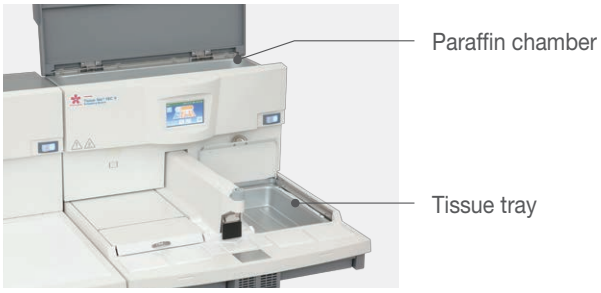
The following explains what to do when the power is restored.

Turning off the power switch or removing the power plug is essentially the same as a power outage.

1. When the power is restored, a message window saying, “Power outage occurred” appears.

   Touch the "×" button to close the message window.
2. Check if the paraffin inside the paraffin chamber and tissue tray is molten.

- Paraffin is molten: You can perform work.
- Paraffin is not molten: Wait for paraffin to be molten.



NOTE:

To start work quickly, touch the Quick Heating button. For details, refer to **3.2.2 Melting Paraffin Quickly**.

5.1.4 What to Do When the Low Battery Alarm Icon is Indicated

The low battery alarm icon comes on when the voltage of the battery inside the display becomes low.

The battery must be replaced within one month. Contact the Sakura instrument distributor or representative.

The nominal service life of the battery that its manufacturer announces is 5 years.

NOTE:

If the battery runs out, the time data is lost when the power switch is set to OFF. This will cause the day and time setting to go wrong and the Auto operation not to work properly.

5.2 Cleaning

Inspect and clean the instrument and replace consumables as described in this manual, to prevent instrument malfunction and failure.

5.2.1 Inspection and Cleaning

When inspecting or cleaning the instrument, be careful not to get burned by the molten paraffin or the hot water used for cleaning. When cleaning the instrument, do not use any organic solvents such as xylene. The coatings and materials on/of the exterior panels, control panel display and labels may deteriorate.

5.2.2 Cleaning Each Part of the Embedding Module

Maintenance Action	Frequency
Clean the tissue tray	After every use
Clean the paraffin drain tray	After every use
Clean the forceps holders	On condition
Clean the hot plates and cold spot	On condition

Maintenance Action	Frequency
Clean the finger plate	On condition
Clean the paraffin chamber	On condition
Clean the wrist rest cushions	On condition
Clean the display screen	On condition

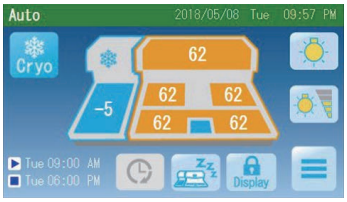
To clean each part, follow the instructions described in this section.

Use the scraper to scrape off, or use a lint-free paper to wipe off, any paraffin adhered to or foreign matters attached to the areas other than those mentioned above.

NOTE:

The Lock Display button is provided on the control panel display to prevent function buttons from being pressed inadvertently when cleaning with the scraper or wiping with a lint-free paper.

To lock the display, hold down the Lock Display button [1] for at least 3 seconds. To unlock, hold down the button [2] again.



[1]

Cleaning the Tissue Tray

The paraffin inside the tissue tray gradually becomes dirty because this tray holds cassettes containing tissues. It is recommended to replace the paraffin in this tray with fresh one regularly (after every use).

1. Remove or fully open the lid of the warming chamber, take the tissue tray out of the warming chamber, and discard the paraffin.

CAUTION:

Be careful of handling if the tray is hot.

2. Wash the tissue tray with warm water (approx. 70 °C).

3. Wipe down the tray using a lint-free paper.

Cleaning the Paraffin Drain Tray

Discard the paraffin in the paraffin drain trays every time after use.

Before switching off the Embedding Module, clean the paraffin drain tray while the paraffin is warm and soft.

CAUTION:

Continuing to use the paraffin drain trays without cleaning may cause them to overflow and dirty the surrounding areas.

1. Remove the paraffin on the hot plate. (Refer to **Cleaning the Hot Plate and Cold Spot** in this paragraph)

NOTE:

Clean the hot plates first before removing the paraffin drain trays from the instrument to prevent paraffin residues to drip onto the bench from the hot plates.

2. Draw the paraffin drain trays (left/right) out of the Embedding Module and discard paraffin buildup while it's warm and soft, using the scraper.

NOTE:

Paraffin buildup in the trays will be still soft and easy to remove within 30 minutes from the end of embedding work. When paraffin is difficult to remove by the scraper, refer to **5.1.1 Instrument Condition and Solution** for troubleshooting.

3. Before inserting the tray back into the instrument, check if the inside, bench surface and the bottom of the trays are clean of paraffin. If they are dirty, remove by the scraper, forceps, etc.

CAUTION

CAUTION:

- **When paraffin dirties the periphery of the tray, it sticks to the inside of the instrument or the bench and may become hard to pull out.**
- **When cleaning the inside of the instrument, there is a risk of scattering the paraffin or getting burned by heated rear cover underneath the hot plate. Wear rubber gloves and protective eye gear during cleaning.**

4. Insert the paraffin drain trays into the original positions.

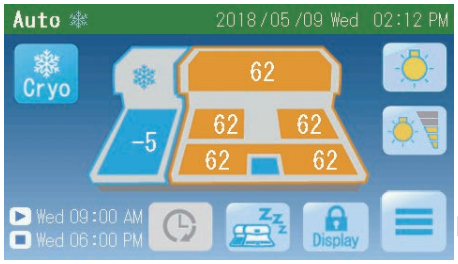
NOTE:

Paraffin may build up like a pillar in the paraffin drain tray and reach the ceiling inside. If the paraffin pillar hits inside, increase the temperature setting of the hot plate to soften the pillar so that the tray can be removed smoothly.

Cleaning the Forceps Holder

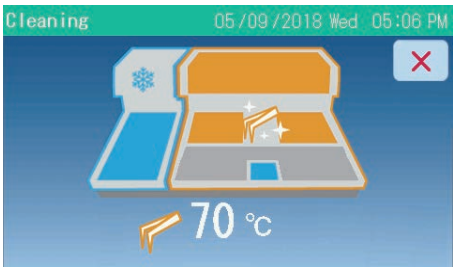
If foreign matters enter the forceps holder wells, they may attach to the forceps and find their way into the paraffin blocks. Clean the forceps holder wells once they have become dirty with paraffin residues and foreign matters, etc. Cool and solidify the paraffin inside the wells and remove the paraffin.

1. Touch the “Main Menu” button [1] on the Operation screen.



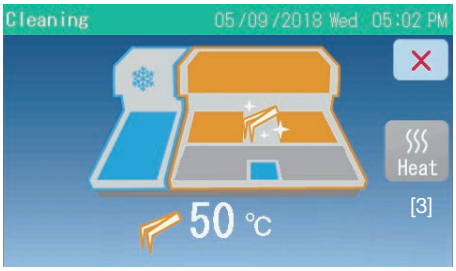
2. Touch the “Cleaning Mode” button [2] on the Main Menu screen, and the display will switch to the cleaning mode screen and the cleaning mode will start.

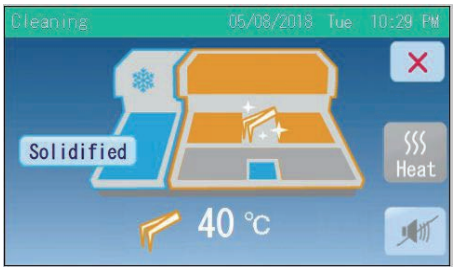
   During the cleaning mode, the heaters for the forceps holders and hot plate stop and the temperatures drop. On this screen, the current temperature of the forceps holders is displayed.



3. When the forceps holder temperature reaches 50°C, the “Heat” button [3] appears.

   Then, when it reaches 40°C, the instrument recognizes that paraffin has hardened enough and displays a message, “Solidified”, with sounding an alarm.



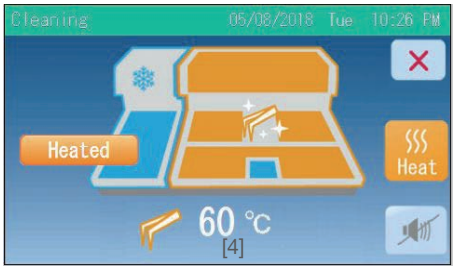


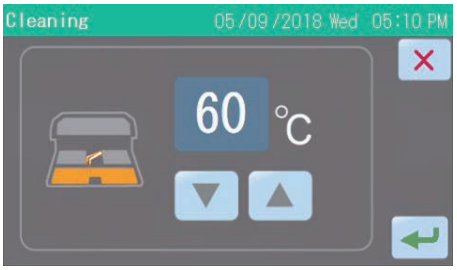
4. Touch the “Heat” button to heat again the paraffin hardened in the forceps wells.

5. When the forceps holder temperature reaches a preset value and the paraffin surface has slightly softened in each forceps well, a message, “Heated” is displayed with sounding an alarm again.

NOTE:

A temperature setting to trigger the “Heated” message and the alarm is user-selectable. Tap the temperature area [4] on the screen to display the setting window and change to a desired value.

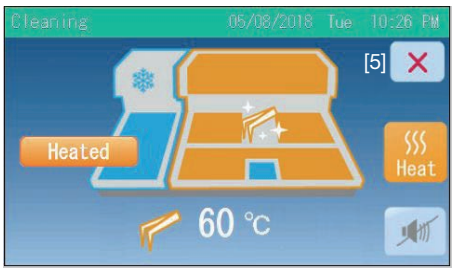




6. Remove the paraffin from each forceps well, using forceps.

7. Wipe down the interior of each forceps well, using a lint-free paper or cotton swab, to remove foreign matters.

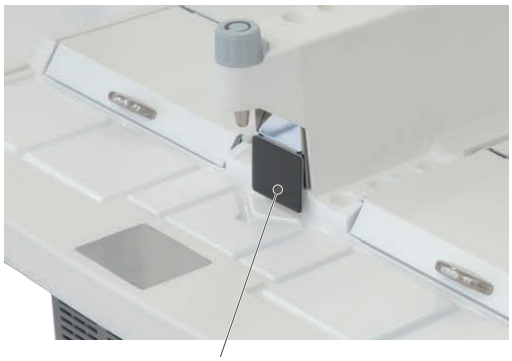
8. After the cleaning is finished, touch the "✕" button [5] to end the Cleaning mode.



Cleaning the Finger Plate

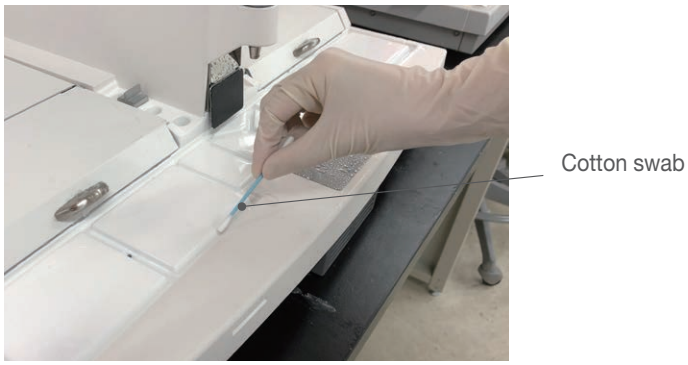
Remove paraffin attached to or around the finger plate using the scraper or cotton swabs.

Paraffin attached to or around the finger plate will prevent the plate from operating properly.



Cleaning the Hot Plates and Cold Spot

1. Remove paraffin attached to the hot plate and cold spot, using the scraper wrapped with a lint-free paper.
2. For paraffin or foreign matters in the grooves of the hot plate, remove it using cotton swabs.



CAUTION:

The hot plates are very hot. Wear rubber gloves or other protective gears to prevent burns.

Cleaning the Paraffin Chamber

Normally the paraffin chamber does not get very dirty because it always receives fresh paraffin. However, foreign matters may enter the chamber during the opening and closing of the lid. To clean the paraffin chamber of foreign matters, drain the paraffin from the chamber.

This should be done when the paraffin level in the chamber is low.

Start cleaning when the paraffin inside the paraffin chamber is molten.

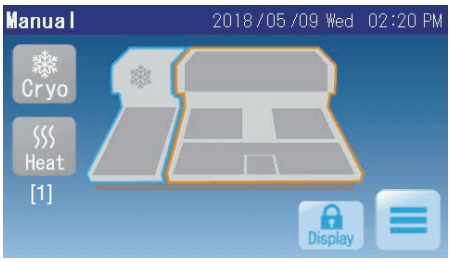
WARNING

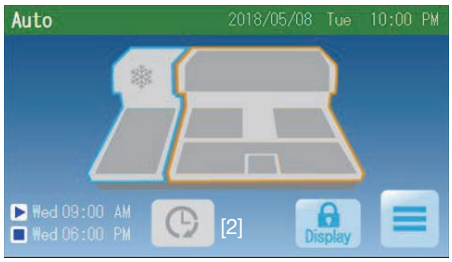
WARNING:

- **The paraffin melting part and paraffin in the instrument become hot.**
- **Exercise caution to prevent burns.**

1. Turn on the Embedding Module power switch.
2. If the instrument is paused, touch the “Heat” button [1] to activate the instrument.

   If the instrument is in the auto operation mode, touch the “Extend” button [2] to activate the instrument.

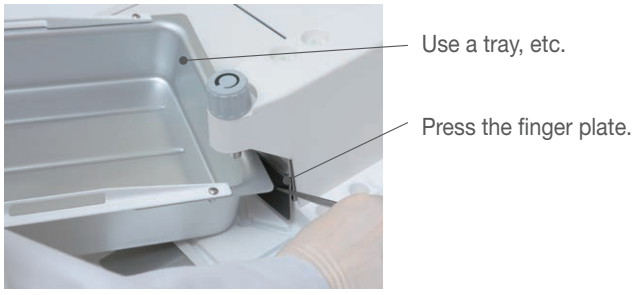




3. Check if the paraffin inside the paraffin chamber is molten. If not, wait for the paraffin to be molten or touch the Quick Heating button. (Refer to **3.2.2 Melting Paraffin Quickly** for the Quick Heating button.)
4. Place a container underneath the dispenser and press the finger plate to drain all paraffin from the paraffin chamber.

NOTE:

If the finger plate is pushed for one minute, the dispensing stops automatically for safety reasons. Push the plate again.

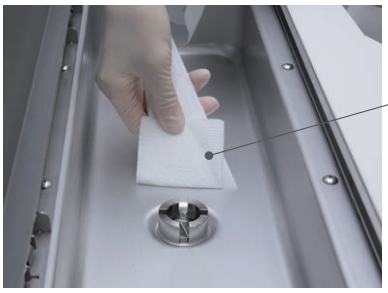


5. Wipe down the interior of the paraffin chamber using the scraper wrapped with a lint-free paper, to remove foreign matters.

CAUTION:

CAUTION

When cleaning the instrument, do not use any organic solvents such as xylene. If any organic solvent flows into the paraffin line between the paraffin chamber and the dispenser, the internal parts may degrade or deform, which will cause an instrument failure.



6. Remove the strainer and wash it with warm water (approx. 70 ºC).

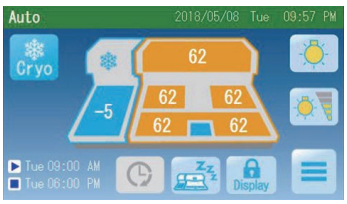
7. Completely wipe off any water droplets and return the strainer into the paraffin chamber.

Cleaning the wrist rest cushions

Remove paraffin attached to the cushions and rinse with warm water at 70°C or below.

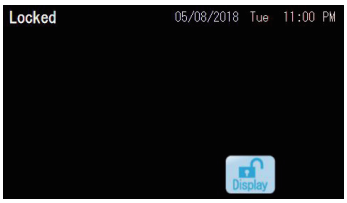
Cleaning the Display Screen

1. Hold down the Lock Display button [1] for at least 3 seconds to lock the display.



[1]

2. Gently remove paraffin attached to the screen surface using the scraper wrapped with a lint-free paper.
3. Hold down the Lock Display button again to unlock the display.



NOTE:

To order the screen protection sheet, contact the Sakura instrument distributor or representative.

5. Troubleshooting

6. Replacement Parts

6. Replacement Parts

6.1 Replacement Parts

When replacing consumables or options, use the parts specified in this manual. Use of other parts may result in malfunction or failure.

6.1.1 Embedding Module

Description	Product code	Quantity				
		TEC 6-EM-J0	TEC 6-EM-A1	TEC 6-EM-E2	TEC 6-EM-JC2	TEC 6-EM-J2
Warming chamber tray (large)	5120	1	1	1	1	1
Tray (small)	5782	1	1	1	1	1
Scraper	1550	1	1	1	1	1
Tamper (large)	1551	1	1	1	1	1
Tamper (small)	1552	1	1	1	1	1
Foot pedal	5785	1	1	1	1	1
Base mold dividers	5783	1	1	1	1	1
Magnifying lens assembly with wrench and dust cover	5127	1	1	1	1	1
Wrist rest R	5121	1	1	1	1	1
Wrist rest L	5122	1	1	1	1	1
Wrist rest cushion R	5123	1	1	1	1	1
Wrist rest cushion L	5124	1	1	1	1	1
Screen protection sheet	5125	1	1	1	1	1
Power cord	A4010541	1	-	-	-	-
	A4010537	-	1	-	-	-
	A4010534	-	-	1	1	1

6.2 Service Life and Maintenance

The service life of the instrument is 8 years after shipment from manufacturer.

Conditions: Follow the precautions for use and periodic maintenance procedures described in this operating manual. Replace the following major components as needed to maintain the proper operations of the instrument.

Major components	Life of use
Controller board	5 years
Control panel display	5 years
Power unit	5 years
Temperature sensor	5 years
Cold spot unit	5 years
Heater unit	8 years
Solenoid valve unit	8 years
Fan unit	8 years
Work light	5 years

* The service life of the instrument and major components is not a warranty period but average life of use which depends on conditions, how to use, etc.

7. Glossary of Terms

7. Glossary of Terms

7.1 Glossary of Terms

Auto operation

An operation mode where the instrument starts up automatically to be ready for the embedding work at the preset start time and comes to a pause at the preset end time.

Base mold tray

A tray that accommodates base molds of various sizes used for embedding process. It is set in a warming chamber and heated.

Base mold warming chamber

A warming chamber in which an embedding tray has been set. Base molds can be stored directly.

CM

This represents the Cryo Module.

Cold spot

A cooling device on the Embedding Module side. It is a local cooling plate used to quickly cool the bottom of the base mold during embedding process, to help position the tissue.

Control panel display

Used for running/stopping the instrument and setting various parameters and conditions. It also serves as a monitor that displays the operating status of the instrument.

Cooling plate

A cooling device on the Cryo Module side. It is a cooling plate that cools/solidifies the embedded paraffin block.

Dispenser

A dispenser that dispenses paraffin used for embedding according to the user's operation. There is a mechanism to adjust the paraffin flow rate.

Dispensing

To pour molten paraffin into a base mold.

EM

This represents the Embedding Module.

End time

A time at which the instrument comes to a pause in the automatic operation mode.

Finger plate

A switch for dispensing paraffin used for embedding.

Pressing the switch starts dispensing, and releasing it stops dispensing. Dispensing will stop after the switch is held for 1 minute.

Foot pedal (optional)

A foot pedal for dispensing paraffin used for embedding. Pressing the switch starts dispensing, and releasing it stops dispensing. The finger plate functions even when the foot pedal is connected.

Forceps holder

A forceps holder for keeping the various types of forceps used for embedding process, warm (temperature cannot be set). One holder is provided on either side of the dispenser, to accept a total six forceps. The forceps holders can also accommodate tampers.

Hot plate

A work surface on which embedding process is performed. The hot plate has a heater.

Magnifying lens (optional)

This lens makes embedding of small tissues easy.

Manual operation

An operation mode where user turns on and off the instrument manually, using the buttons on the control panel display.

Paraffin chamber

A container for storing molten paraffin used for embedding, and equipped with a heater. The paraffin chamber also has a lid to keep dust out, etc., and temperature drop.

There is a mesh filter at the bottom of the chamber to filter out dust from the paraffin to be dispensed.

The capacity is 4 L of paraffin in molten state. Graduations are provided on the interior of the chamber for reading the remaining level.

Paraffin drain tray

A tray for collecting the excess paraffin generated by embedding process. One paraffin drain tray is located on the right and another on the left below the hot plate. Each tray has a capacity of 500 mL.

Paraffin flow rate adjustment dial

A dial to adjust the flow rate of the paraffin dispensed from the dispenser.

Paraffin line

A tube that runs inside the instrument, connecting the paraffin chamber and the dispenser.

Start time

A time at which the instrument is ready to use in the auto operation mode. The instrument calculates an automatic “start-up” time from the preset start time.

Tamper

A tamper is a tool used to fix the position of tissue in the base mold during embedding.

7. Glossary of Terms

Tissue tray

A tray that accommodates unembedded cassettes containing paraffin-infiltrated tissues.

It is set in a warming chamber along with molten paraffin of appropriate temperature, and kept warm.

Tissue warming chamber

A warming chamber in which a tissue tray has been set.

Warming chamber

The warming chamber in which tissues and base molds are stored has a heater and a lid to keep dust out, etc., and prevent temperature drop. The warming chamber is provided at each side of the dispenser, and these chambers are used as the tissue warming chamber or base mold warming chamber depending on your dominant hand and/or direction of your work flow.

Warming chamber tray

A tray set in a warming chamber. It is used as either a base mold tray or tissue tray depending on the purpose.

A large tray can accommodate one 150-cassette basket or two 75-cassette baskets of the Vacuum Infiltration Processor (VIP) series. The optional small tray can accommodate one 75-cassette basket.

Work light

A LED light that illuminates the work surface.

Wrist rest

A resin cover that can be set in front of the hot plate so that the operator's hand will not come in contact with the hot plate accidentally during embedding process.

Wrist rest cushion

This soft cushion can be attached to the top face of the hand rest or wrist rest to prevent hand fatigue. Made of a self-adhesive urethane gel, the cushion can be attached and detached multiple times. Paraffin deposits on the cushion can be removed using hot water below 70˚C.

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www.sakura-finetek.com
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