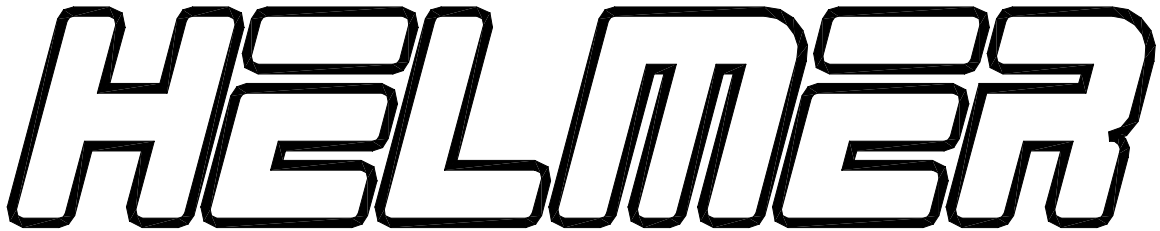


PLASMA THAWING SYSTEM

MODELS DH4 and DH8

VERSION K

Operation – Service - Maintenance



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Contents

Installation.....	PAGE 2
	1-360008/G

Controls and Components.....	5
General Operation.....	8
A. Step-by-Step Thawing Procedure	
B. Temperature Controller Programs - Descriptions and Input Values	
C. Controller Lockout System	
D. Accessing the Chamber Set Temperature	
E. Accessing the Low and High Alarm Programs	
F. Chamber Drain System	
G. Plasma Overwraps	
H. Chamber Cover	
I. Error Codes	
Quality Control.....	18
A. Calibration of the Temperature Controller	
B. Alarm System Test	
Suggested Cleaning Procedure.....	20
Recommended Periodic Maintenance.....	21
Troubleshooting.....	22
Parts List.....	28
Wiring Schematic.....	29

Installation

- 1) Carefully remove your new Helmer Plasma Thawer from the shipping container and remove the protective stretch wrap from the unit - be careful not to discard the power cord, drain tubing, video and instruction manual that may be held between the layers of the protective wrap or foam

packaging.

- 2) Remove the metal protective cover over the drain port, located on the lower portion of the left rear side panel of the unit, by loosening the two screws located on the back of the unit. These screws do not need to be removed, just loosened. Discard the protective cover, as it is used for shipping purposes only, and retighten the screws.
- 3) Select a location for the unit keeping the following points in mind:
 - a. There must be a grounded outlet with adequate power provisions to meet the electrical requirements as listed on the specification label on the back of the unit.
 - b. It is helpful to place the unit near a sink or drain to make draining and filling of the chamber bath easier. It is preferable to locate a laboratory sink on the drain valve side of the unit - if not, **contact Helmer for a drain tube "U-Fitting Assembly"** that will allow for easier draining to the right side of the unit.
 - c. Keep the unit away from direct sunlight or high temperature areas.
 - d. There should be at least 8 inches (20cm) of clearance above the unit for the Basket Assembly lift-out system to operate.
- 4) Make sure that the chamber is clean of any packaging debris and fill the chamber bath with **distilled or deionized water** until the water reaches the desired "Fill Line." There are two "Fill Lines" stamped in the center of the chamber back wall. The following describes what the two Fill Lines represent:

- Maximum water level for thawing random bags.

- Maximum water level for thawing apheresis bags

Caution:

For safety purposes it is recommended to turn the main power switch to OFF when the chamber bath is emptied of water. The power switch may be left ON while the chamber bath is dry. However, the bottom of the chamber will become hot and the controller temperature will initially exceed the set temperature and trigger the high alarm system - after a period of time it will decline back down to the set temperature and stabilize.

- 5) Insert the Helmer Digital Thermometer, if ordered, or a calibrated glass, digital, or small dial thermometer into the Thermometer Holder brackets located at the back right corner of the chamber.
- 6) If a Chamber Cover has been ordered with the unit, the knob on the top of the cover will need to be unscrewed and turned around so that the knob is on the exterior of the cover. The knob is installed upside down for protection during shipping.
- 7) Plug the power cord into a properly selected-grounded outlet.

- 8) Read through the following section “Controls & Components” to become better familiar with your Helmer Plasma Thawed before proceeding to the “General Operation” section.

Caution:

The technical complexities of the basket assembly lift-out system require special handling and operational guidelines by the user. Failure to follow the operational guidelines as listed in this manual may result in unit failure.

Installation Check-List:

*If Completed
Check:*

- 1. Remove drain port protector cover.*

- _____ 2. Chamber has been cleaned of any packaging debris
- _____ 3. Verify power source (refer to specifications on the unit)

_____ *Grounded power outlet*

_____ *Proper power capacity & voltage*

_____ 4. Nearby draining capability.

_____ 5. At least 8 inches (20mm) of clearance above the unit

6. Chamber temperature calibration:

	<u>Temperature Controller</u>	<u>Independent Thermometer</u>
Initial Reading	_____°C	_____°C
Calibrated Reading	_____°C	_____°C

_____ 7. High alarm system check.

Signature_____Title_____

Department_____Date_____

Controls and Components

Control Panel - The main control panel is conveniently located on the front of the unit. The power, agitation, alarm, mute and temperature controller systems are all located on the main control panel.

Main Power Switch

Main Power Switch - The main power switch is located on the left side of the control panel and activates power to the unit. When the main power switch is ON, the green LED light above the power switch is illuminated.



Agitation System



Basket Access Button - The basket assembly can be raised or lowered at any time by pressing this button. If the basket assembly is in a thawing cycle, pressing this button will raise the Basket Assembly and the Cycle Time Indicator will flash. To continue the thawing cycle press the Basket Access Button again and the Basket Assembly will lower into the chamber and the timing cycle will continue from where it was interrupted.

Caution:

Do not operate the Basket Access lift-out systems when the Basket Assemblies have been removed. The weight of the Basket Assembly helps to keep the internal lift-out rail and cable assembly properly positioned during operation.

Cycle Time Indicator - The two digital timers display the agitation cycle time (minutes), remaining cycle time, and error messages.



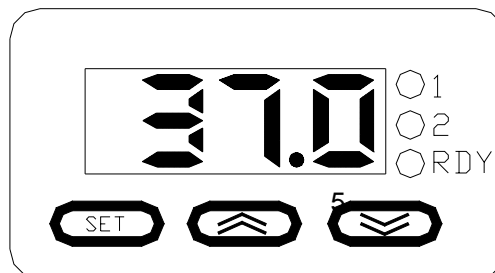
Time Set Button - Programmed time settings of 0, 3, 5, 8, 10, 12, 14, 16, 18, 20, and 25 minutes, as well as a hold ("HO") setting, are preprogrammed into the timing system. Press the Time Set Button to advance through each preprogrammed time setting. If you wish to extend a thawing cycle that is in progress, press this button (the digital timer display will read "HL") and the thawing cycle will continue indefinitely. Press the Time Set Button again and the cycle will finish its initial programmed time.



Cycle Start/Stop Button - This button starts or stops the thawing cycle. To start a thawing cycle after the frozen bags have been loaded and the timing cycle has been selected, press this button. The basket assembly will automatically lower into the chamber bath, the agitation system will start, and the timing cycle will begin to count down. To cancel a thawing cycle after it has been started, press the Cycle Button to raise the basket assembly. This will stop the agitation system and cancel the timing cycle.

Temperature and Alarm Systems

Digital Temperature Controller - Your Helmer Plasma Thawer incorporates a state-of-the-art PID digital controller system and RTD sensor to accurately control the temperature of the chamber. The controller system provides visual readouts of the chamber operating temperature, alarm system, heater output, and other pertinent functions. All temperature, calibration, and alarm settings are made



through the controller touch keys.

Set Key - Used to display the set temperature and to display the program function values.

Up Arrow Key - Used to increase the controller digit values in conjunction with the SET key and to enter into the program functions in conjunction with the DOWN key.

Down Arrow Key - Used to decrease the controller digit values in conjunction with the SET key and to enter into the program functions in conjunction with the UP key.

Heater On Indicator - This small round light, located next to the digital temperature readout and labeled "1", will light whenever the controller sends power to the heater. This indicator will light on and off continuously during normal use.

High Alarm Indicator - When the controller senses that the chamber temperature has exceeded the high alarm limit, the High Alarm Indicator, located next to the digital temperature readout and labeled as "2", will light and the audible alarm will sound. In addition, the baskets will automatically rise out of the water and the Timing Cycle Indicators will flash. The baskets will not be able to be lowered back into the water until the water temperature falls below the High Alarm limit. To change the program settings for the High Alarm refer to the section entitled "Setting the High Alarm".

Alarm Mute Button - If the High Alarm system is activated, the audible alarm can be silenced by depressing the "MUTE" button located between the two Time Set Buttons on the main control panel. When the MUTE button is pressed the Cycle Time Indicators will flash on and off. The High Alarm Indicator light will remain on until the alarm condition ceases.

Basket Assembly - Each coated stainless steel Basket Assembly holds various frozen bags during the thawing cycle. Metal holding fingers are located at the top of each compartment on the Basket Assembly to hold the Plasma Overwraps in an upright position. Each Basket Assembly can be removed by unscrewing the finger knob at the top of the Basket Assembly and carefully lifting the Basket Assembly out of the chamber. DH8 models have a removable divider that can be taken off of the Basket Assembly for larger bags requiring more space. Remove the divider by gently squeezing it and pulling the tabs out of the slots.

Caution:

Raising or lowering the Basket Assemblies by hand can cause mechanical failure to the internal lift-out system. Only raise or lower the basket assemblies by use of the control panel touch keys.

Plasma Overwraps - A box of 250 disposable Plasma Overwraps is included with each new Helmer Plasma Thawer. The Plasma Overwraps protect frozen plasma against contaminants and help to isolate a broken plasma bag. A plastic Overwrap Holder is located on the side of the unit to conveniently hold the Plasma Overwraps for easy access (the Overwrap Holder can be placed on either side of the DH8 units). **Large plasma Overwraps, part number 400303, are also available from Helmer for use on DH8 units.**

Heating System - The temperature of the water in the chamber is controlled by a thermostatically-

protected heater. The temperature controller activates power to the heater that is located on the underside of the bath chamber.

Thermometer Holder - Located at the back right corner of the chamber is a set of holes for holding a thermometer. The Helmer Digital Thermometer, or a thermometer of your choice (glass, digital, dial), may be placed through the top hole in the bracket that has the rubber grommet, making sure that the thermometer extends down through the hole of the bracket within the chamber bath to keep the thermometer in a safe position.

Circuit Breaker - The unit is protected by circuit breaker(s) that are located at the back of the unit.

Chamber Drain Connection - Located on the left side of the exterior, towards the back of the unit, is the drain valve plug. To empty the chamber bath, simply push the one end of the drain tube that has the drain fitting (included with the unit) into the drain valve plug until it locks into position. This will automatically open the valve system and allow the water to flow out of the chamber. After the chamber is empty, disconnect the drain tube fitting from the drain valve plug by pushing down on the button located at top of the drain valve plug. If you are draining the chamber water to the right side of the unit, contact Helmer and request a "U-Fitting Assembly." The U-Fitting Assembly will allow for the drain tubing to run behind the unit and towards the right without kinking the drain tubing.

Specification:

Weight	DH4 = 58 lbs.	DH8 = 74 lbs.
115 volt	amps = 6	amps = 10
	watts = 690	watts = 1150
230 volt	amps = 3	amps = 5
	watts = 690	watts = 1150

General Operation

A. Step-by-Step Thawing Procedure

- 1) **Start:** Turn the power switch to ON and allow the chamber temperature to stabilize to the factory preset controller value of 36.5°C.
- 2) **Verify Temperature Calibration:** After the chamber temperature has stabilized, verify that the chamber temperature displayed on the digital controller matches the temperature that is displayed on a calibrated thermometer. If the controller temperature does not match with the calibrated thermometer, refer to the section entitled "Calibration of the Digital Controller."
- 3) **Load the Plasma Bag(s):** Press the Basket Access Button to raise the basket assembly if it is still lowered into the chamber bath. Insert a frozen plasma bag into a Helmer Plasma Overwrap and place it into the basket assembly. Make sure that the metal finger tab on the top of the basket assembly is inserted through the slot in the top of the Plasma Overwrap.

***When loading two bags into each side of a DH8 basket assembly, place**

the bag with the widest profile in the basket assembly compartment that is towards the front of the unit. If the wider bag is placed in the back compartment the front door will not close against the thinner bag.

***The metal basket assembly dividers located between each compartment on the DH8 units may be removed to allow for large size bags to be held in the basket assembly. Large size Overwraps are available from Helmer to protect larger bags from water contamination.**

- 4) **Set the Cycle Time:** Press the Time Set Button to advance through the pre-programmed times until the desired cycle time is selected. The following are some general timing guidelines to work from:

<u>Bag Size</u>	<u>Manner Frozen</u>	(minutes) <u>Timing Range</u>
250ml random	Fully Flat	8-12
300ml random	Fully Flat	12-16
250ml random-thick plastic	Fully Flat	14-18
250ml random	Folded	14-20
Apheresis or "Jumbo" bag	Flat	16-20

The above are common time ranges that have been experienced by other users. As a result of the many various factors that effect the thawing time of frozen plasma, your thawing times may differ from the above listed time ranges.

- 5) **Start the Thawing Cycle:** Press the Start/Stop Button to begin the thawing cycle. The basket assembly will automatically lower into the chamber bath and begin agitating. The Cycle Time Indicator(s) will begin to count down the minutes remaining in the thawing cycle for the corresponding basket assembly.
- 6) **Interrupting the Thawing Cycle:** You can raise and lower the basket assembly at any time throughout the thawing cycle by two means:
 - 1) Pressing the Basket Access Button will raise the basket assembly and the digital Cycle Time Indicator will hold and flash. Press the Basket Access Button again and the basket assembly will lower back into the chamber and continue the thawing cycle from where it was interrupted.
 - 2) Pressing the Start/Stop Button will raise the basket assembly, stop the thawing cycle, and reset the digital Cycle Time Indicator.
- 7) **Completion of the Thawing Cycle:** After the thawing cycle is completed the agitation will stop, the basket assembly will automatically lift out of the chamber, a tone will sound five times, and the cycle Time Indicator will reset itself in preparation for the next thawing cycle.

For maximum performance, the Helmer Plasma Thawing Systems are designed to be used for one thawing cycle and then set idle until the bath water returns to the set temperature. Running consecutive cycles will in no way damage the unit

but will result in progressively slower thawing cycles if the bath water is not allowed to return to the set operating temperature.

B. Temperature Controller Programs

The PID digital controller contains internal programs that effect the operation and accuracy of the controller and alarm system. A few of the internal programs may be altered by the operator for specific requirements and are noted below by an asterisk (*). **The remaining program functions must not be altered without consulting Helmer - doing so could effect the operation of the unit and the manufacturer's warranty.** The following is a summary of the controller's internal programs with their description and proper value settings:

<u>Main Program Titles and Access</u>	<u>Program Description</u>	<u>Program Display</u>	<u>Program Value</u>
1. Operating Set Temp. <i>Press SET key</i>	Chamber Set Temperature		*36.5
2. Operations Menu <i>Press UP and DOWN keys together for 3 seconds</i>	Auto-tune	Aut	no
	Low Alarm Deviation	ALO	*OFF
	High Alarm Deviation	Ah1	*37.6
	PID Menu	Pid	no
	Configuration Menu	CnFg	no
3. PID Menu <i>Change the "Pid" Menu setting to "yes"</i>	Proportional Band	Pb h	2.0
	Cycle Time	Ct h	0.5
	Integral Function	It	30.00
	Derivative Function	dE	0.40
	Calibration Offset	CAL	*varies
4. Configuration Menu <i>Change the "CnFg" Menu to "yes"</i>	Input Type	In	rt.d
	Celsius	C_F	°C
	Temperature Low Limit	rL	20.0
	Temperature High Limit	rh	45.0
	Output 1 Function	Ot1	hEAt
	Output 2 Function	Ot2	ALr7
	Display Default	dISP	Ac
	Alarm Type	ALty	Prno
	Alarm Hysteresis	AhyS	0.1
	Alarm Latch	LAt	no
	Alarm Silencing	SIL	no
	Failure Mode	FAIL	bPLS
	Set Point Lockout	SLOC	*no
	Controller Lockout Tag	tAg	_C_A

C. Controller Lockout System

A) Factory Lockout Mode: tag = (_C_A)

The digital Temperature Controller has been set in a “factory lockout” mode. This means that the user can access the Set Temperature, Low and High Alarms, Calibration Offset and the Controller Lockout program values.

B) Full Lockout Mode: tag = (PCOA)

If the Controller Lockout is set to “PCOA” then all controller programs will be inaccessible, except the Set Temperature.

C) Unlocked Mode: tag = (_ _ _ _)

If the Controller Lockout Tag is set to “_ _ _ _”, then all controller programs will be accessible to the user.

D) Set Point Lockout: (SLOC) = “yes” or “no”

If the Set Point Lockout is set to “no”, the operating set temperature can be changed by the user. If the Set Point Lockout is set to “yes”, the operating set temperature is locked and can not be changed.

1) Accessing the Controller Program Lockout:

- 1) Press and hold the Up and Down arrows until a controller program is displayed. If the lockout is in the factory lockout setting, the first controller program to appear will be “ALO”. If the "Aut" prompt appears, the controller programs are fully unlocked. If the "CnFg" prompt appears, the controller programs are fully lockout.
- 2) Press the up or down arrow until the "CnFg" prompt appears.
- 3) While pressing the SET key in (the digital readout will display "no") press the Up or Down key to display "YES", and then release the SET key. If the "IN" prompt appears, proceed to step 4. If the "tAg" prompt appears, you are at the program display for the Controller Lockout Tag, proceed to step 5.

CAUTION

Do not change the “In” or “°C” program values. Doing so automatically changes many of the controller program values causing uneven temperature controlling of the chamber bath.

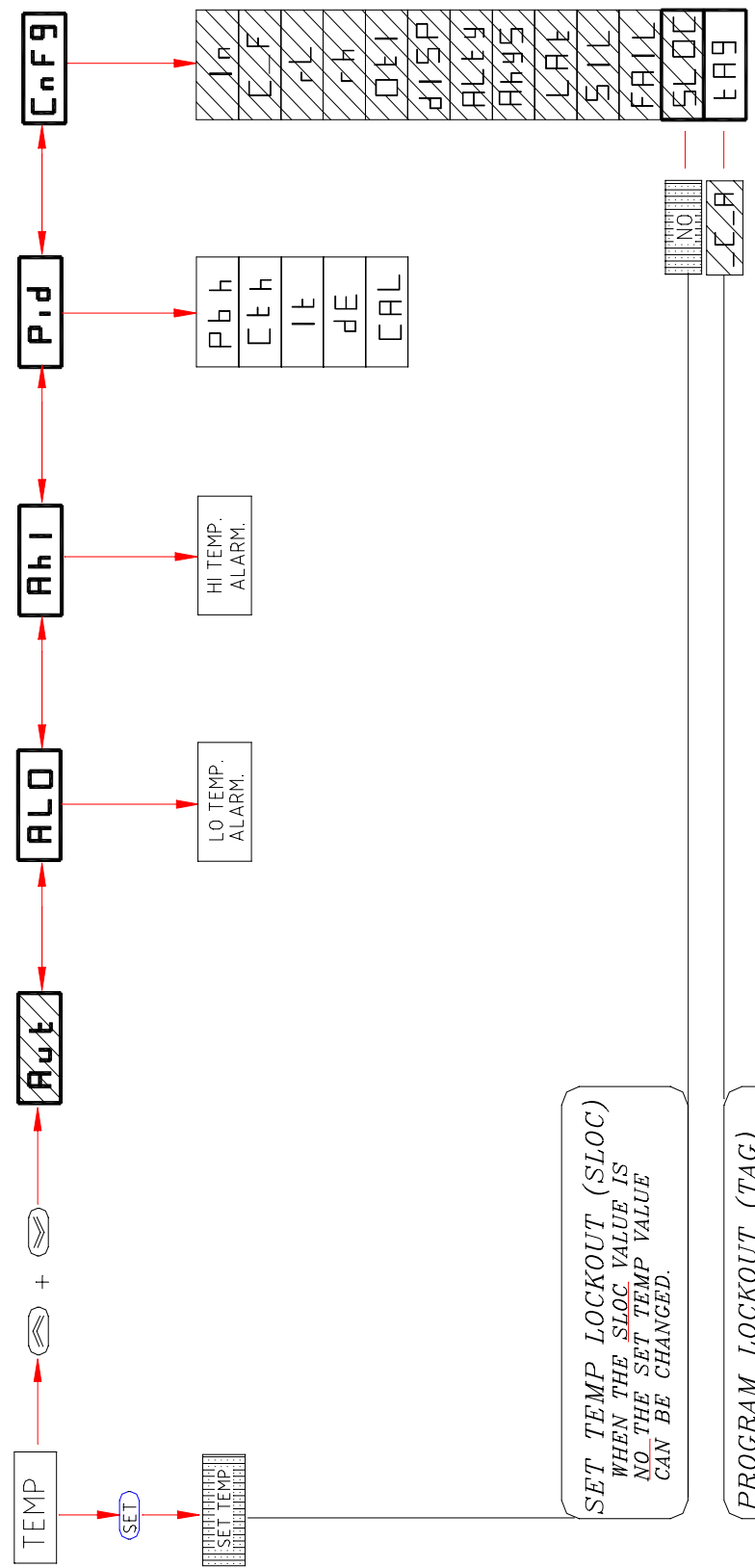
- 4) Press the Up arrow once to display the "tAg" prompt. You are now at the program display for the Controller Lockout Tag.
- 5) Press and hold the SET key to display the current input value of the "tAg" program.
- 6) To change the lockout program value, hold the SET key in and press the Up or Down arrows to change the program value.
- 7) To exit back to the main operating mode, release the SET key and press both the UP and Down arrows until the operating temperature appears on the digital display.

2) Accessing the Set Point Lockout (SLOC):

- 1) With the controller fully unlocked, (refer to steps 1-6 in the Accessing the Controller Program Lockout), press and hold the Up and Down arrows until a controller program is displayed.
- 2) Press the Up or down arrow until the "CnFg" prompt appears.
- 3) While pressing the SET key in (the digital readout will display "no"), press the Up or Down key to display "YES", and then release the SET key. The "In" prompt will appear.
- 4) Press the Up arrow twice to display the "SLOC" prompt. You are now at the program display for the Set Point Lockout.
- 5) Press and hold the SET key to display the current input value of the Set Point program - either "YES" or "no" will be displayed. The "YES" prompt means that the Set Point Lockout is in the Lockout mode. The "no" prompt means that Set Point Lockout is Unlocked.
- 6) To exit back to the main operating mode, release the SET key and press both the UP and Down arrows until the operating temperature appears on the digital display. If you want to reset the lockout function, do so before returning to the main operating mode.
- 7) To change the program value simply hold the SET key in while pressing either the Up or Down key once.

CONTROLLER PROGRAMS IN THE FACTORY LOCKOUT MODE.

* TO ACCESS THE CONTROLLER PROGRAMS, REFER TO THE " CONTROLLER PROGRAM FLOWCHART."



SET TEMP LOCKOUT (SLOC)
WHEN THE SLOC VALUE IS
NO THE SET TEMP VALUE
CAN BE CHANGED.

PROGRAM LOCKOUT (TAG)
WHEN THE TAG VALUE IS
C A NONE OF THE VALUES
THAT ARE SHADED ()
CAN BE ACCESSED OR CHANGED.

D. Accessing the Chamber Set Temperature

To alter the chamber temperature setting:

- 1) Press and hold the SET key to display the current set temperature input value.
- 2) Press either the Up or Down keys to alter the set point as desired. If the set point temperature will not change, the Set Point Lockout is in the lockout mode - refer to "Accessing the Set Point Lockout" to unlock this program value.
- 3) Release the SET key to complete the chamber temperature setting change.

E. Accessing the Low and High Alarm Programs.

To alter the Low and/or High Alarm settings:

- 1) Press and hold the Up and Down arrow keys until a controller program is displayed. If the "CnFg" prompt appears, the Controller Program Lockout will need to be unlocked - refer to "Accessing the Controller Program Lockout" to unlock this program value.
- 2) Press the Up or Down arrow key until the "ALO" program appears for the Low Alarm, or "Ahl" for the High Alarm program.
- 3) While holding the SET key down, press the Up or Down arrow keys to alter the set point value as desired.
- 4) To exit back out to the main operating mode, release the SET key and press both the UP and Down arrows until the operating temperature appears on the digital display.

F. Chamber Drain System

The Helmer Plasma Thawers are equipped with a unique disconnect drain valve system to empty the chamber bath quickly and easily. The built-in quick drain system provides for frequent and fast draining of the chamber - it can even be done daily - which will greatly help in maintaining a clean chamber. The procedure for draining the chamber bath is as follows:

Caution:

**For safety purposes turn the power switch OFF
before draining the chamber bath.**

- 1) Place the open end of the drain hose securely into a sink or drain.
- 2) Push the other end of the drain hose with the coupling valve into the drain plug that is located on the left side of the unit towards the back, until it "clicks" securely in place. The chamber water will immediately begin to flow out of the chamber until it is empty. Squeeze the tubing just after the coupling and release to remove any air pockets, improving the speed of draining.
- 3) After the chamber bath has fully drained, press down on the button located on the top of the drain plug to disconnect the drain hose.

If draining to the right side of the unit, contact Helmer and request a drain tube "U-Fitting Assembly." This will allow the drain tubing to be easily run to the right side of the unit.

G. Plasma Overwraps

Included with the unit is a dispenser box of 250 Helmer Plasma Overwraps. The disposable Plasma Overwraps protect frozen random and apheresis plasma against contaminants, as required by AABB standards, and isolate a broken FFP bag. To access the Plasma Overwraps carefully remove the perforated section at the one end of the dispenser box and place the dispenser box into the plastic holder on the side of the unit. Individual Plasma Overwraps can now be easily removed from the dispenser box as needed.

Carefully fit a frozen plasma bag into a Plasma Overwrap and place it into one of the compartments in the Basket Assembly. Make sure that the metal finger tab on the top of the Basket Assembly is inserted through the slot at the top of the Plasma Overwrap - this will prevent the Overwrap from falling down into the chamber.

**To order more Helmer Plasma Overwraps - part number 400273 -
contact Helmer (USA and Canada) at 1-800-743-5637 or your local
Helmer distributor. Helmer also has available large size Overwraps for
use with DH8 units.**

H. Chamber Cover

The chamber cover is designed to aid in the reduction of airborne contaminants, bacterial growth, and water evaporation. The chamber cover is intended to be used only during those times that the

Plasma Thawer is not being used to thaw frozen plasma - if the chamber cover is placed on the unit during a thawing cycle it will be pushed off when the basket assembly automatically lifts out of the chamber at the end of the thawing cycle. Chamber covers are an optional accessory on units sold in the USA and Canada.

I. Error Codes

The system software can diagnose certain problems with the unit and communicates the diagnosis through error messages on the Cycle Time Indicator. Following is a summary of the error codes and their respective problems. Refer to the "Troubleshooting" section of the manual for further information on resolving problems that occur.

Control Panel

<u>Error Code</u>	<u>Problem</u>
E1	The water temperature has exceeded the high alarm setting.
E2	Liftout mechanism malfunction. Turn the main power switch OFF and refer to the "Basket Assembly and Agitation System" section in "Troubleshooting".

Temperature Controller

<u>Error Code</u>	<u>Problem</u>
Er 1	Reversed sensor wires.
Er 2	Incorrect input value ("In") in the configuration menu or open RTD.
Er 3	Sensor type mismatch.
Er 4	Open RTD sensor, bad connection, broken wire.

Quality Control

A. Calibration of the Temperature Controller

To verify that the digital temperature controller is calibrated correctly allow the chamber temperature

to stabilize and then take a temperature reading from a calibrated thermometer inside the chamber bath. If the thermometer reads the same as the controller display, the temperature controller is calibrated correctly. If there is a temperature variance, the temperature controller needs to be calibrated.

As an example, if a calibrated thermometer reads 35.5°C and the Temperature Controller reads 36.5°C, then the controller display ("CAL" function) needs to be reduced by 1.0°C. If the thermometer reads 37.5°C and the Temperature Controller reads 36.5°C, then the controller display ("CAL" function) needs to be increased by 1.0°C.

To recalibrate the Temperature Controller:

- 1) Press and hold the Up and Down arrow keys until a controller program is displayed. (If the "CnFg" prompt appears first, the Controller will need to be unlocked - refer to "Accessing the Program Lockout").
- 2) Press the Down arrow key until the "PId" Menu prompt appears.
- 3) While pressing the SET key in (the digital readout will display "no"), press the Down arrow key to display "yes", and then release the SET key.
- 4) Press the Up arrow once to display the "CAL" prompt.
- 5) While holding the SET key down, press either the Up or Down arrow keys to alter the calibration program value.
- 6) To exit back to the main operating mode, release the set key and press the Up and Down arrow keys simultaneously until the operating temperature appears on the digital display.

After making any calibration changes to the Temperature Controller allow the chamber temperature to stabilize and make a new reading to verify that the controller is properly calibrated. Make any additional adjustments as needed until the controller readout is properly calibrated.

B -Alarm System Test

To test that the High Alarm System is working properly, it is recommended to follow methods that may be recommended by the AABB or other governing organizations for such alarm system checks. A suggested method to activate an actual high alarm test condition is as follows:

- 1) Remove any plasma or other such critical products from the unit.
- 2) Increase the Set Temperature value at least 0.5°C above the High Alarm set point (refer to Accessing the Chamber Set Temperature). As an example, if the High Alarm is set at 37.6°C, then change the Set Temperature value to 38.1°C.
- 3) Watch the chamber temperature digital readout until it reaches the High Alarm setting, whereupon, the visual and audible alarms should activate, the basket assemblies should lift out of the chamber, and the digital agitation timers should blink "E1."
- 4) After conducting this high alarm system test, reset the chamber Set Temperature to the desired value and allow the chamber temperature to stabilize before using.

Suggested Cleaning Procedure

Water Type: Use DISTILLED or DEIONIZED water – the use of “hard” non-purified waters can result in stains and Deposits within the chamber bath and on the basket assemblies.

Bath Cleaner/ Inhibitor: Use a sanitizing / algacide agent such as:

***Professional Lysol No Rinse Sanitizer®
Roccal II®
Clear Bath®***

*The active ingredient for the above products is
Alkyl Dimethyl Ammonium Chloride.*

On a weekly basis, or as is determined to be needed for your conditions, clean your Helmer Plasma Thawer as follows:

1. Turn the power switch Off.
2. Fully drain the existing water from the chamber bath – refer to “Chamber Drain System” section.
3. Remove the basket assemblies from the unit. The two V-shaped stainless steel brackets located on the back wall of the chamber bath are held in place by two screws and may also be removed for cleaning when necessary.
4. Using a soft cloth or sponge and a solution of distilled or deionized water with bath cleaner/inhibitor, thoroughly clean the chamber bath walls and basket assemblies. If water stains or deposits remain, use a general-purpose stain or scale remover that is compatible with stainless steel.
5. Install the V-brackets if removed.
6. Refill the chamber with distilled or deionized water and add the proper amount of bath cleaner/inibitor.
7. Install the basket assemblies.

Recommended Maintenance

1. Routine cleaning of the chamber bath, basket assemblies, and unit exterior will help to increase the units operating life.
2. A high alarm test and temperature controller calibration test should be conducted on a regularly scheduled basis.

3. On a quarterly basis lightly lubricate the basket assembly lift-out rail. This is done by placing no more than 2 or 3 drops of a light duty oil (not grease) on your finger and rubbing the oil up and down the rail. Apply the thin coat of lubrication to each of the 4 sides on both lift-out rails.

Troubleshooting

Main Power

<u>Problem</u>	<u>Possible Cause</u>	<u>Action to be taken</u>
Unit does not turn on	- Circuit breaker activated	- Reset circuit breaker
	- Faulty outlet connection	- Verify power outlet is good

- Verify power cord is plugged in unit
- Faulty power cord
- Verify proper cord connections
- Change power cord
- Faulty power switch
- Replace switch on circuit board

Chamber Temperature

Chamber bath getting too cold or getting too warm

- Controller not calibrated
- Verify calibration with thermometer. Refer to "Calibration of Temperature Controller"
- Faulty controller
- Verify controller is giving DC power output to heater circuit
- Replace controller as needed
- Faulty heater
- Verify voltage to heater
- Replace heater as needed
- Faulty circuit board
- Verify voltage to heater
- Replace circuit board as needed
- Faulty RTD sensor
- Verify sensor is adhered to chamber
- Verify connections to the controller
- Replace as needed

Chamber temperature not calibrated to controller

- Calibrate Controller
- Refer to "Calibration of the Temperature Controller"

Temperature Controller and High Alarm Systems

Controller does not turn on

- Faulty connections
- Verify connections from circuit board to controller
- Faulty controller
- Verify voltage to controller Change controller

Controller not calibrated

- Calibrate controller
- Refer to "Calibration of Temperature Controller"

Cannot change controller values	- Controller is locked out	- Refer to "Setting the Lockout Function"
Audible alarm not sounding	- Faulty connections	- Verify proper line connections
	- Faulty controller	- Verify that High Alarm Indicator light is operating
		- Verify voltage from the alarm outputs on the controller to circuit board
		- Replace controller as needed
	- Faulty circuit board	- Verify voltage from the alarm outputs on the controller to circuit board
		- Verify DC voltage to the alarm
		- Replace circuit board as needed
	- Faulty alarm	- Replace alarm as needed
Alarm not activating at high alarm setting	- Incorrect alarm function value	- Verify that the desired high alarm temperature value is correctly inputted into the controller Refer to "Setting the High Alarm"
	- Calibrate controller	- Refer to "Calibration of Temperature Controller"
	- Temperature & Alarm settings are too close to each other.	- Adjust the settings so that there is a minimum 0.5 to 1.0°C range between the Temperature & alarm setting.
Alarm sounding after thawing of plasma	- Adjust controller ramping speed	- Increase the "dE" controller program value by "0.20" increments until the temperature over-shooting stops.
Displays "Er 1"	- Reversed sensor connections	- Change the sensor leads on terminals 1 & 2.
Displays "Er 2" or "Er 3"	- Sensor type mismatch	- Verify the "In" value reads "rt.d"

Displays “Er 4”

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| - Open RTD sensor | - Replace RTD sensor. |
| - Faulty sensor or sensor connection | - Check the sensor and sensor connection. Replace as necessary. |

Basket Assembly and Agitation Systems

The Basket Assembly does not raise and lower

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| - Blown fuse on circuit board | - Check fuse on circuit board. (See schematic for location.) |
| - Faulty lift-out motor | - Verify power to the lift-out motor
- Replace lift-out motor as needed |
| - Faulty motor capacitor | - Verify power to the motor capacitor
- Replace motor capacitor as needed |
| - Lift-out roller wheel is loose | - Verify that the roller wheel is tight to the shaft of the lift-out motor.
- Tighten the roller wheel set screw |
| - Faulty connection | - Verify wiring connections from the circuit board to the lift-out motor assembly |
| - Faulty positioning switches | - Verify that the two positioning micro-switches at the roller wheel are operating properly |
| - Faulty lift-out cable assembly | - Verify that the lift-out cable is properly secured to the lift-out roller wheel and to the roller block attached to the rail
- Replace cable as needed |
| - Faulty circuit board | - Verify voltage out of the main circuit board to the lift-out motor assembly
- Verify that circuit board push-button switch is operating correctly
- Replace circuit board as needed |

	- Debris in lift-out assembly	- Verify that the roller bearing block is not jammed and has free movement
		- Verify that the screw attaching the cable to the roller wheel is tightened
	- Basket assembly	- Verify that the basket assembly is not catching on something in the chamber
		- Verify that the finger screw is secure and that the basket assembly is properly attached
The basket assembly does not agitate	- Blown fuse on circuit board	- Check fuse on circuit board.(See schematic for location.)
	- Agitation Power Switches not in ON position	- Switch to ON position
	- Faulty connections	- Verify that connections from the circuit board to the agitator motor assembly
	- Loose cam wheel	- Verify that the cam wheel is securely attached to the agitation motor shaft
	- Faulty motor capacitor	- Verify that the motor capacitor is operating correctly
		- Replace as needed
	- Faulty agitation motor	- Verify that the agitation motor is operating correctly
		- Replace as needed
	- Debris in bearing system	- Verify that the rail slides freely up and down in the bearing block
	- Basket assembly	- Verify that the basket assembly is not catching on something in the chamber
		- Verify that the finger screw is secure and that the basket assembly is properly attached.

It is very noisy when the basket assembly raises and lowers and/or when agitating

- Faulty lift-out motor
 - Verify that the lift-out motor is operating properly
 - Replace as needed
- Faulty roller bearing block
 - Verify that the rail moves freely up and down in the roller bearing block
 - Verify that there is no debris in the roller bearing block or on the rail
- Faulty agitation motor
 - Verify that the agitation motor is operating properly
 - Replace as needed
- Basket assembly
 - Verify that the finger screw on the top of the basket assembly is tight
- Basket assembly bearing
 - Verify that the plastic roller bearings at the bottom of the basket assembly are operating properly
 - Replace as needed

Thawing Cycle

Thawing cycle will not start

- Faulty push button
 - Verify Start/Stop button is activating the timing cycle; replace as needed
- Faulty circuit board
 - Verify wiring connections from circuit board to motor assemblies
 - Verify that the circuit board is securely mounted to the chassis studs
 - Replace circuit board as needed
- Faulty positioning switches
 - Verify that the two positioning micro-switches at the roller wheel are operating properly

Cycle Time Indicator does not count down correctly	- Circuit board	- Verify wiring connections on circuit board
		- Verify Start/Stop button is activating the timing cycle
		- Verify that the circuit board is securely mounted to the chassis studs
		- Replace circuit board as needed
Digital timer does not display	- Faulty digit light	- Replace the digit light or circuit board
Preprogrammed time settings do not advance when the Time Set Button is pressed	- Push button not activating	- Verify Time Set Button activates when pressed; replace as needed
		- Verify that the circuit board is securely mounted to the chassis studs
	- Faulty circuit board	- Replace as needed

DH4 and DH8 Parts List

<u>Description</u>	<u>Part Number</u>		
Digital Temperature Controller	400330		
Main Controller Board	400272		
Heater Triac	120269		
RTD sensor	120280		
Power inlet	120282		
Alarm	120160		
Heater (DH4)	120263 – 115v	120263 – 230v	120294 – 100v
Heater (DH8)	120264 – 115v	120264 – 230v	120295 – 100v
Circuit breaker (DH4)	120272 – 115v	120279 – 230v	120110 – 100v
Circuit breaker (DH8)	120281 – 115v	120288 – 230v	120281 – 100v
Fan (DH8)			120150 – 100v

Lift-out motor (DH4)	120274 – 115v	120277 – 230v	120276 – 100v
Lift-out motor (DH8)	120274 – 115v	120277 – 230v	120278 – 100v
Lift-out capacitor	120204 – 115v	120260 – 230v	120204 – 100v
Lift-out wheel assembly	400295		
Lift-out cable	400289		
Microswitch	120266		
Agitation motor	400257 – 115v	400258 – 230v	400257 – 100v
Agitation motor gearbox	220231		
Agitation motor capacitor	120047 – 115v	120301 – 230v	120047 – 100v
Agitation cam wheel	1-320508		
Agitation roller bearing block assembly	400304		
Basket Assembly (DH4)	400299		
Basket Assembly (DH8)	400301		
Basket Thumb Screw	230193		
Basket Arm Assembly	400302		
Thermometer Grommet	220038		
Overwrap bags (1000/case)	400273		
Large Overwrap Bags (250/case)	400303		
Overwrap plastic holder	1-320513		

