Plasma Thawing System Service Manual

QuickThaw™

Model	Version
DH2	A
DH4	A
DH8	A

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Document History

Revision	Date	CO	Supersession	Revision Description
H	07 MAY 2013*	8409	Supersedes A, B, C, D, E, F, G	Revised layout for ease of navigation and locating information.
I	16 MAY 2014*	9492	I supersedes H	Removed 0086 mark from manual.

* Date submitted for Change Order review. Actual release date may vary.

Contents

Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the plasma thawing system and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “DH models” refers to all models of that type (DH2, DH4, DH8). This manual covers all plasma thawing systems, which may be identified singly, by their size, or by their “series” (DH).

1.3 Copyright and Trademark

Helmer, Inc., doing business as (DBA) Helmer Scientific and Helmer.

2 Safety

Includes general safety information for plasma thawing system operation.

2.1 Product Labels

Caution: Risk of damage to equipment or danger to operator

Caution: Hot surface

Caution: Shock/electrical hazard

Earth / ground terminal

Protective earth / ground terminal

2.2 Avoiding Injury

- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Before moving unit, ensure chamber water has been removed.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Use supplied power cords only.

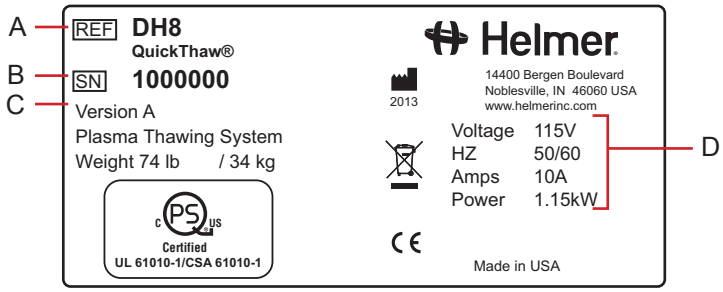
CAUTION Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 Configuration

3.1 Model and Input Power

NOTE Service information varies depending on the model and power requirements.

This information appears on the product specification label, located on the left side of the plasma thawer.



Product specification label.

Label	Description
A	Model
B	Serial number (SN)
C	Version
D	Power requirements

3.2 Remove Packing Materials

NOTE Keep the packaging materials for future use.

The plasma thawer is shipped with packing materials to ensure it is not damaged during shipping. Remove the packing materials prior to operating the plasma thawer.

1. Remove screws holding drain port cover, slide cover outward, and re-secure screws
2. Retain drain port cover, and all other accessories
3. Unscrew knob from underside of chamber cover
4. Relocate knob to top of cover

Left: Drain port cover. Right: Chamber cover with knob in proper position (DH4 model shown).

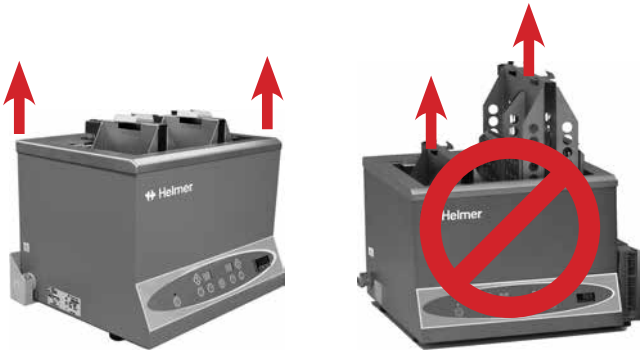
3.3 Lifting and Carrying the Plasma Thawer

CAUTION

- ► The plasma thawer may be too heavy for one person to move alone. Get assistance as needed.
- ► Never move plasma thawer while connected to power or with water in chamber.

NOTE Do not lift by holding the basket(s), as this may damage the basket(s).

When lifting the plasma thawer, hold the ends of the base of the plasma thawer and lift. If the base is not accessible, hold the ends of the storage frame and lift.



Lifting the plasma thawer.

4 References and Compliance

4.1 Alarm Reference

If an alarm condition is met, an alarm activates. The following table indicates if an alarm is audible (A) or visual (V). Messages for visual alarms, if applicable, appear in the table as well.

Alarm	Alarm Type
High Temperature	A, V (“-AL-” on temperature controller, “E1” on all cycle time indicators)
Low Temperature*	A, V (“-AL-” on temperature controller)
Lift Out System Malfunction	A, V (“E2” on affected cycle time indicator)

* Low temperature alarm is available but not used.

4.2 Regulatory Compliance

Pollution degree: 2 (for use in USA and Canada only)

This product is certified to applicable UL and CSA standards by a NRTL.

This device complies with the requirements of directive 93/42/EEC concerning Medical Devices, as amended by 2007/47/EC.

Sound level is less than 70 dB(A).

4.3 WEEE Compliance

The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

5 Warranty

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Be sure to have the model and serial number available.

5.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

5.2 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

5.3 Labor

For a period of one (1) year, Helmer will cover repair labor costs, provided that the product is returned to Helmer for warranty service. Alternatively, your facility's staff may work with a Helmer technician to make repairs on site. Labor costs for repairs performed at a location other than Helmer, or for repairs made without the assistance of a Helmer technician, will be the responsibility of the end user.

5.4 Additional Warranty Information

The time periods set forth above begin two weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

5.5 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: Service

6 Product Configuration

6.1 Install External Thermometer (Optional)

Install the external thermometer according to the manufacturer's documentation. If using a Helmer DT1 digital thermometer, refer to the instructions on the CD shipped with the plasma thawer.

7 Alarm Settings

7.1 Chamber Heater

When the chamber heater is providing heat to the chamber, a green light illuminates on the temperature controller display. The light may flash on and off to indicate that the heater is pulsing on and off to provide a minimal amount of heat to the chamber.

Temperature controller with chamber heater light (circled).

7.2 Active Alarms and Error Messages

If the temperature reaches the high temperature alarm setpoint or low temperature alarm setpoint, the temperature controller will alternately display "-AL" and the chamber temperature. The red light on the temperature controller display also flashes. "E1" also flashes on the cycle time indicator(s).

Temperature controller with a high temperature alarm. Alarm light is circled.

- ► If "E2" appears on the cycle time indicator, the basket lift-out system is malfunctioning.
- ► If "FAiL" alternately flashes on the temperature controller, there is an operational problem with the plasma thawer.

7.3 View or Change Temperature Alarm Setpoints

NOTE

- ► Changing parameter values affects plasma thawer operation. Do not change parameter values unless instructed in product documentation or by Helmer Technical Service.
- ► The low temperature alarm is not enabled, by default. If the low temperature alarm is enabled, follow your organization's regulations to determine the temperature setting. Ensure the low temperature alarm setpoint is no greater than 30 ºC.

The monitoring and control system has alarms which activate if the chamber temperature is too high (or too low, if the low temperature alarm is enabled). The setpoints for these alarms may be viewed and/or changed using the temperature controller.

Temperature controller display.

The high temperature alarm setpoint (AL.hi) specifies the temperature at which the High Temperature alarm should activate. If the temperature detected by the temperature control sensor is greater than or equal to this value, the alarm activates.

The low temperature alarm setpoint (AL.Lo) specifies the temperature at which the Low Temperature alarm should activate. If the temperature detected by the temperature control sensor is less than or equal to this value, the alarm activates.

View or change parameter values:

NOTE

- ► Default high alarm setpoint is 37.6 °C.
- ► Low alarm setpoint is disabled by default (setpoint is 0.0 °C).
- ► When setting alarm setpoints, maintain at least a 1.0 °C difference above or below the plasma thawer setpoint.
- ► When there is no interaction for 60 seconds, the temperature controller exits program mode.

1. Enter Level 1 program mode:
   - **a** Press and hold the **UP** and **DOWN** buttons simultaneously for approximately 3 seconds.
   - **b** "tunE" and "oFF" flash on the display.
   - **c** The temperature controller is now in Level 1 program mode.
2. Select the parameter to be changed:
   - **a** Press and release the **UP** or **DOWN** buttons until the desired parameter flashes on the display.
   - **b** For the High Temperature setting, select the "AL.hi" parameter.
   - **c** For the Low Temperature setting, select the "AL.Lo" parameter.
3. Change a parameter value:
   - **a** Press and hold the ✱ button.
   - **b** Press the **UP** or **DOWN** buttons to change the parameter value.
4. Release all buttons to exit the parameter. New settings are saved.
5. Exit program mode:
   - **a** Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately 3 seconds, or
   - **b** the current chamber temperature is displayed.

8 Temperature Controller Setpoints

Temperature controller setpoints are programmed at the factory. Setpoints can be viewed and changed through the temperature controller. Parameter values reside in 4 program levels.

Temperature controller display.

Values that are frequently changed during operation are listed below:

Parameter	Program Level	Function
ZEro	3	Calibrate the temperature controller readout
AL.hi	1	Set high temperature alarm value
AL.Lo	1	Set low temperature alarm value

View or change parameter values:

NOTE

- ► Changing parameter values affects plasma thawer operation. Do not change parameter values unless instructed in product documentation or by Helmer Technical Service.
- ► When there is no interaction for 60 seconds, the temperature controller exits program mode.

1. Enter Level 1 program mode:
   - **a** Press and hold the **UP** and **DOWN** buttons simultaneously for approximately 3 seconds.
   - **b** “tunE” and “oFF” flash on the display.
   - **c** The temperature controller is now in Level 1 program mode.
2. Select the parameter to be changed:
   - **a** Press and release the **UP** or **DOWN** buttons until the desired parameter flashes on the display.
   - **b** To access Level 2 or Level 3 parameters, select the “LEVL” parameter.
3. Change a parameter value:
   - **a** Press and hold the ✱ button.
   - **b** Press the **UP** or **DOWN** buttons to change the parameter value.
   - **c** To access Level 2 parameters, change the value for the “LEVL” parameter to **2**.
   - **d** To access Level 3 parameters, change the value for the “LEVL” parameter to **3**.
4. Release all buttons to exit the parameter. New settings are saved.
   - ► If the “LEVL” parameter value is changed, the temperature controller returns to the selected program level.
5. Repeat steps 2 through 4 to access another program level, or to view or change parameter values in the selected level.
6. Access Level 4 parameters:
   - **a** Navigate to Level 3 program mode.
   - **b** Select the “UEr” parameter.
   - **c** Press and hold the **UP** and **DOWN** buttons simultaneously for approximately 10 seconds.
   - **d** The “LOCK” parameter flashes on the display.

7 Exit program mode:

a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately 3 seconds, or

b the current chamber temperature is displayed.

8.1 Level 1 Parameters and Values

NOTE

- ► Parameters are listed in order of appearance.
- ► SP1 refers to the chamber heater.
- ► SP2 refers to the temperature alarm.
- ► Temperature controller is programmed at the factory with a setpoint of 36.5 ºC.

Parameter	Description	Default Value
tunE	Autotune selection	oFF
bAnd	SP1 proportional band (gain) or hysteresis (in °C)	2.2
int.t	SP1 integral time/reset (in minutes)	2.0
dEr.t	SP1 derivative time/rate	10
dAC	SP1 derivative approach control	0.5
CYC.t	SP1 proportional cycle-time	0.5
oFSt	SP1 offset (manual reset)	0.5
SP.LY	Lock main setpoint	oFF
SPrr	Ramp rate (if ramp is on)	0
SPrn	Ramp selection	oFF
SoAY	Soak time selection	--
AL.Lo	SP2 low alarm setpoint (in °C)	0.0
AL.hi	SP2 high alarm setpoint (in °C)	37.6
bnd.2	SP2 hysteresis or proportional band (in °C)	0.1
CYC.2	SP2 mode selection (ON/OFF or proportional cycle-time)	on.oF
LEUL	Parameter level currently selected	1

8.2 Level 2 Parameters and Values

Parameter	Description	Default Value
SP 1.P	Display of SP1 output power percentage (read-only)	(read only)
hAnd	Selection for manual control of power for SP1	oFF
PL.1	SP1 power limit percentage	100
PL.2	SP2 power limit percentage (cooling)	0
SP2.A	Main SP2 operating mode (alarm strategy)	bAnd
SP2.b	Subsidiary SP2 mode	nonE
di SP	Display resolution	0.1°
hi.SC	Full scale	45.0
Lo.SC	Minimum scale	20.0
inPt	Input sensor type	rtd
unit	Units (°C/ °F)	°C
LEUL	Parameter level currently selected	2

8.3 Level 3 Parameters and Values

Parameter	Description	Default Value
SP 1.d	SP1 output device type	SSd1
SP2.d	SP2 output device type (read only)	SSd2
burn	Sensor burn-out protection type (upscale or downscale)	uP.SC
rEU.d	Output mode (reverse or direct)	1r.2r
rEU.L	LED indicator modes for SP1 and SP2 (normal or inverted)	1n.2n
SPAn	Sensor span adjust	0.0
2Ero	Zero sensor error (calibration across full scale)	(varies)
ChEt	Selection for the control accuracy monitor	oFF
rEAd	Read control accuracy monitor results (variance)	UAr°
tECh	Read autotune tuning cycle data	Ct A
UEr	Software version (select this parameter to access Level 4 parameters)	392b
rSEt	Functions reset	nonE
LEUL	Parameter level currently selected	3

8.4 Level 4 Parameters and Values

Parameter	Description	Default Value
LoCY	Program security lock	nonE
dEr.S	Derivative sensitivity	0.4
di S.S	Display sensitivity (or direct display of input)	6 (read only)
noAL	Disable SP2 alarm annunciator	oFF
ProG	Program mode auto-exit switch (returns display to normal mode if no activity for one minute)	Auto

8.5 Change the Plasma Thawer Setpoint

The default setpoint is 36.5 °C. The temperature controller adjusts chamber temperature around the setpoint. When chamber temperature is below setpoint, the controller activates the heater to warm the chamber.

NOTE Do not change the setpoint to a value outside the temperature control range.

The current chamber temperature is displayed. The temperature may be different from the setpoint, especially if the chamber temperature has not yet stabilized.

Temperature controller display.

1. Access the setpoint adjustment function:
   - **a** Press and hold the ✱ button.
     - ► The controller displays current setpoint value.
2. Change the setpoint:
   - **a** Press and hold the ✱ button.
   - **b** Press the **UP** or **DOWN** buttons to increase or decrease setpoint in increments of 0.1 °C.
3. Release all buttons to exit the setpoint parameter. New settings are saved.

8.6 Calibrate the Temperature Controller Display

The temperature controller senses chamber temperature through a probe in the chamber. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.

- ► Value is factory-preset and varies for each unit
- ► Offset value can be changed from -10.0 °C to +10.0 °C

Temperature controller display.

NOTE

- ► Do not change the control sensor offset unless instructed in product documentation or by Helmer Technical Service.
- ► If the variance is within acceptable limits for your organization, changing the offset value is optional.

Obtain:

- ► Independent thermometer, calibrated and traceable per national standards.

Determine the new offset value:

1. Fill the chamber and press the AC ON/OFF switch to switch the plasma thawer **ON**.
2. Place the independent thermometer in the chamber. Do not allow the thermometer to touch the sides or bottom of the chamber.
3. Allow the chamber to stabilize for 30 minutes.
4. Observe the temperature displayed on the independent thermometer temperature for 10 minutes and determine temperature range.
5. From the range, calculate the average temperature.
6. Remove the thermometer from the chamber.
7. Determine the change in value to reach desired setpoint.

EXAMPLE

- ► Current setpoint is 36.5 ºC
- ► Average temperature is 35.0 ºC
- ► Offset adjustment value is +1.5 ºC

Enter the new offset value:

NOTE When there is no interaction for 60 seconds, the temperature controller exits program mode.

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1. Enter Level 1 program mode:
   - **a** Press and hold the **UP** and **DOWN** buttons simultaneously for approximately 3 seconds.
   - **b** “tunE” and “oFF” flash on the display.
   - **c** The temperature controller is now in Level 1 program mode.

2 Switch to Level 3 program mode:
   a Press and release the **UP** or **DOWN** buttons until “LEVL” flashes on the display.
   b Press and hold the ✱ button.
   c Press the **UP** or **DOWN** buttons to change the parameter value to **3**.
   d Release the ✱ button.
3 Enter the offset adjustment value:
   a Press and release the **UP** or **DOWN** buttons until “ZEro” flashes on the display.
   b Press and hold the ✱ button.
   c Press the **UP** or **DOWN** buttons to change the value to the calculated offset adjustment value.
   d Release the ✱ button.
4 Release all buttons to exit the parameter. New settings are saved.
   ► If the “LEVL” parameter value is changed, the temperature controller returns to the selected program level.
5 Exit program mode:
   a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately 3 seconds.
   b The current chamber temperature is displayed.

8.7 Change the Control Sensor Offset

The temperature controller senses chamber temperature through a probe in the chamber. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.

► Value is factory-preset and varies for each unit
► Offset value can be changed from -10.0 °C to +10.0 °C

NOTE
► Do not change the control sensor offset unless instructed in product documentation or by Helmer Technical Service.
► If the variance is within acceptable limits for your organization, changing the offset value is optional.

Obtain:

► Independent thermometer, calibrated and traceable per national standards
► Zip tie, to attach thermometer to chamber temperature probe

Determine the new offset value:

1 Use the zip tie to attach the independent thermometer to control probe.
2 Close door and allow chamber temperature to stabilize for 30 minutes.
3 Observe independent thermometer temperature for 10 minutes and determine temperature range.
4 From the range, calculate the average temperature.
5 Remove the thermometer from the control probe.
6 Determine the change in value to reach desired setpoint.

EXAMPLE
► Current setpoint is 22.0 ºC
► Average temperature is 23 ºC
► Offset adjustment value is -1.0 ºC

Enter the new offset value:

NOTE When there is no interaction for 60 seconds, the temperature controller exits program mode.

1 Enter Level 1 program mode:
   a Press and hold the **UP** and **DOWN** buttons simultaneously for approximately 3 seconds.
   b "tunE" and "oFF" flash on the display.
   c The temperature controller is now in Level 1 program mode.
2 Switch to Level 3 program mode:
   a Press and release the **UP** or **DOWN** buttons until "LEVL" flashes on the display.
   b Press and hold the ✱ button.
   c Press the **UP** or **DOWN** buttons to change the parameter value to **3**.
   d Release the ✱ button.
3 Enter the offset adjustment value:
   a Press and release the **UP** or **DOWN** buttons until "ZEro" flashes on the display.
   b Press and hold the ✱ button.
   c Press the **UP** or **DOWN** buttons to change the value to the calculated offset adjustment value.
   d Release the ✱ button.
4 Release all buttons to exit the parameter. New settings are saved.
   ► If the "LEVL" parameter value is changed, the temperature controller returns to the selected program level.
5 Exit program mode:
   a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately 3 seconds.
   b The current chamber temperature is displayed.

9 Maintenance

9.1 Test the High Temperature Alarm

Regularly test the High Temperature alarm to ensure it is working correctly.

Test the alarm:

NOTE	Testing the alarm requires a temporary change to the plasma thawer setpoint. Protect items in the plasma thawer from extended exposure to adverse temperatures.

1 Verify the temperature controller display has been calibrated.
2 Identify the current settings for the plasma thawer setpoint and the High Temperature alarm setpoint.
3 Test the high temperature alarm:
   a Change the plasma thawer setpoint to a value at least 0.5 °C above the high temperature alarm setpoint.
   b Observe the chamber temperature reading on the temperature controller. The displayed temperature will increase slowly.
   c When the displayed temperature reaches the high alarm setpoint, the High Temperature alarm will activate.
      ► An audible alarm will sound and "AL.hi" will flash on the temperature controller.
   d The baskets should also lift out of the chamber and "E1" should flash on both cycle time indicators.
4 Change the plasma thawer setpoint back to the original value. Allow the temperature to stabilize at the setpoint before use.

9.2 Clean the Plasma Thawer

The following table describes the advantages and disadvantages of each type of water used in an open water bath system.

Water Type	Advantages	Disadvantages
Tap water	► Availability ► Accessibility	► Varying levels of purity ► Iron and sediment content
Distilled water	► Cleanliness ► Purity	► Availability ► Accessibility

NOTE Do not use deionized water as it may be corrosive to the chamber and baskets.

9.2.1 Exterior

Clean the exterior with soap or mild cleaning agent and water. Disinfect using a mild disinfectant solution. Clean the vents as needed to maintain airflow and prevent the motors from overheating.

9.2.2 Chamber and Baskets

NOTE
- ► Various factors can cause staining, discoloration, and rust spots on the chamber and baskets. These factors include the type of water used, regularity of cleaning, and the usage environment.
- ► Although the chamber and basket are stainless steel, corrosive matter can adhere to the surfaces and crevices, causing discoloration.

1. Confirm the basket(s) have been lowered into the chamber. Lower the basket(s) if necessary by pressing the LIFT OUT button for each basket.
2. Press the AC ON/OFF button to power the plasma thawer **OFF**. Disconnect the plasma thawer from AC power.
3. Drain the chamber:
   - **a** Insert the end of the drain tube into a waste container or sanitary drain.
   - **b** Connect the drain line to the plasma thawer by inserting the drain coupling into the drain port on the side of the plasma thawer.
4. Remove the baskets:
   - **a** Unscrew the finger knobs securing the basket(s) to the lift-out system.
   - **b** Remove the basket(s) from the lift-out system.

Basket installed on lift-out arm. Finger knob circled.

5. Remove the 2 V-shaped brackets from the rear wall of the chamber (optional).
6. Using a soft cloth or sponge and a disinfectant cleaner suitable for stainless steel, thoroughly clean the chamber walls and basket(s). If stains or discoloration remain after general cleaning, use a stain, scale, or rust remover suitable for stainless steel.

7 Reinstall the V-shaped brackets.
8 Reinstall the basket(s).
9 Reinstall the finger knobs to attach the basket(s) to the lift-out system.
10 Reconnect the plasma thawer to AC power. Press the AC ON/OFF button to power the plasma thawer **ON**.

9.2.3 Fan (100 V DH8)

NOTE Cleaning the fan is applicable to 100 V DH8 models only.

The fan must be kept clean to maintain airflow and prevent the agitation motors from overheating.

In environments where the plasma thawer is exposed to excessive lint or dust, the fan may need to be cleaned more frequently than stated in the maintenance schedule.

Clean the fan:

1 Press the AC ON/OFF button to power the plasma thawer (and the fan) **OFF**.
2 Clean the fan using a soft brush and a vacuum cleaner.
3 Press the AC ON/OFF button to power the plasma thawer **ON**.

9.3 Maintaining Water Cleanliness

When the plasma thawer is not being used, place the chamber cover over the chamber to reduce contamination of the water.

NOTE Do not use the chamber cover while a thaw cycle is in progress. When the thaw cycle is completed, the lift-out system raises the basket(s) and pushes on the cover. This may push the cover off the plasma thawer and strain the lift-out motor.

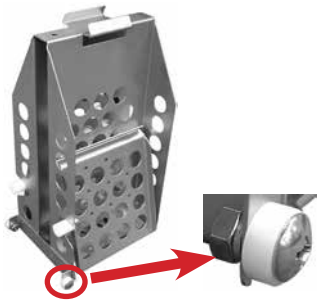
Chamber cover in place (DH4 model shown).

Helmer CleanBath (400348-1) may be added to the water in the chamber to inhibit bacterial growth.

9.4 Lubricate and Service Internal Parts

NOTE
- ► Do not press the LIFT OUT button if the basket is not attached to the lift-out system. The weight of the basket is required for proper positioning of the rail and cabling.
- ► Lubricate the rails with lightweight oil. Do not use grease.

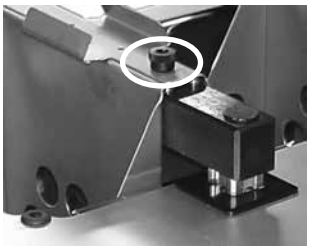
The bearings on the baskets should be checked regularly for wear. Signs of worn bearings include noisy or rough agitation, and markings on the chamber walls where the bearings make contact with the chamber. Lubricate the rails and bearings according to the maintenance schedule for optimal performance.



Bearing on the basket (DH4 model shown).

Lubricate components:

1. Confirm the basket(s) have been raise from the chamber. Raise the basket(s) if necessary by pressing the LIFT OUT button for each basket.
2. Press the AC ON/OFF button to power the plasma thawer **OFF**. Disconnect the plasma thawer from AC power.
3. Drain the chamber:
   - **a** Insert the end of the drain tube into a waste container or sanitary drain.
   - **b** Connect the drain line to the plasma thawer by inserting the drain coupling into the drain port on the side of the plasma thawer.
4. Remove the baskets:
   - **a** Unscrew the finger knobs securing the basket(s) to the lift-out system.
   - **b** Remove the basket(s) from the lift-out system.



Basket installed on lift-out arm. Finger knob circled.

5. Lubricate the lift-out rail:
   - **a** Place a maximum of 3 drops of lightweight oil on your finger.
   - **b** Spread the oil along the length of all 4 sides of each lift-out rail.
     - ► Lubricating all 4 sides ensures the bearing is properly lubricated.
6. Reinstall the basket(s).
7. Reinstall the finger knobs to attach the basket(s) to the lift-out system.

8 Press the AC ON/OFF button to power the plasma thawer **ON**. Reconnect the plasma thawer to AC power.

9 Press the **LIFT OUT** button(s) to lower the basket(s) into the chamber.

9.5 Supplies

Overwrap bags, standard size (4 boxes of 250 bags per box): 400273-1

Overwrap bags, large size (1 box of 250 bags): 400303-1

CleanBath bacterial growth inhibitor (8 oz / 237 mL bottle): 400348-1

10 Troubleshooting

CAUTION Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).

10.1 Error Messages

Error Message	Possible Cause	Action
"E1" (high temperature alarm) appears on both cycle time indicators.	Temperature controller has improper settings or is faulty.	► Verify plasma thawer setpoint is set below High Temperature alarm setpoint, and the difference is at least 1.0 °C. Replace controller if necessary.
	Connection between control board and heater is faulty, or a part is faulty.	► Check power to heater. Replace heater or control board if necessary.
	Connection between control board and heater triac is faulty, or a part is faulty.	► Check power to heater triac. Replace heater triac or control board if necessary.
	Connection between control board and temperature control sensor is faulty, or a part is faulty.	► Check connections from control board to temperature controller, and from temperature controller to temperature control sensor. Secure the connections if necessary. Replace temperature control sensor, temperature controller, or control board if necessary.
	Temperature has reached high alarm setpoint.	► Verify chamber has water. High Temperature alarm will activate quickly if chamber is empty. ► Verify plasma thawer setpoint is set below High Temperature alarm setpoint, and the difference is at least 1.0 °C.
"E2" (lift-out system malfunction) appears on one or both cycle time indicators.	Loose connection or faulty part is preventing lift-out pulley from winding properly.	► Visually compare operation of faulty lift-out system with operational lift-out system (DH8 models only). Verify there are no loose parts blocking movement. Secure or tighten parts as necessary. Replace lift-out cable or lift-out pulley if necessary.
	Loose connection or faulty part is preventing lift-out motor from operating properly.	► Check connections from control board to terminal strip, and from terminal strip to lift-out motor and lift-out motor capacitor. Secure connections if necessary. Replace lift-out motor or capacitor if necessary.
	Fuse for lift-out motor has opened.	► Verify the fuse has not blown on the circuit board. Replace fuse if necessary.

Error Message	Possible Cause	Action
"E2" (lift-out system malfunction) appears on one or both cycle time indicators.	Loose connection or faulty part is preventing basket position from being sensed correctly.	► Check connections from control board to terminal strip, and from terminal strip to microswitches. Secure connections if necessary. ► Visually compare operation of faulty lift-out system with operational lift-out system (DH8 models only). Check operation of microswitches. Replace one or both microswitches if necessary.
	Control board is faulty.	► If lift-out system for one basket is operating correctly, swap the connections at P4 and P6 on control board (DH8 models only). Press **LIFT OUT** button for basket for which the error message appeared. ► If error code remains on the same indicator, even after connections have been swapped, control board is faulty. ► If error code appears on indicator for the other basket, control board is working properly and problem is with another part in the lift-out system.
	Bearing block is faulty.	► Contact Helmer Technical Service.
	Lift-out system is malfunctioning.	► Reset electronics by turning power **OFF**. Wait 10 seconds then switch power **ON**. Press the **LIFT OUT** button. If error message reappears, contact a qualified service technician.
".nPt" and "FAiL" (alternately flashing on the temperature controller).	Connection between temperature controller and temperature control sensor is faulty, or a part is faulty.	► Check connections between temperature controller and temperature control sensor. Secure connections if necessary. Replace temperature control sensor or temperature controller if necessary.
"dAtA" and "FAiL" (alternately flashing on the temperature controller).	Memory error with the control system.	► Reset electronics by turning power **OFF**. Wait 10 seconds then switch power **ON**. If problem persists, contact a qualified service technician.

10.2 General Operation Problems

Problem	Possible Cause	Action
Main power switch is on, but nothing is working.	Outlet connection is faulty.	► Verify power at the outlet. Repair original outlet or connect to a different outlet if necessary.
	Power cord is faulty.	► Check condition of the power cord. Replace if in poor condition. ► Verify voltage through cord is appropriate. If not, replace power cord.
	Power connector is faulty.	► Verify connections between power cord and power connector are secure. ► Verify voltage through power connector is appropriate. If not, replace power connector.
	Circuit breaker is tripped.	► Verify all circuit breakers are seated. Push circuit breaker to reset.
	Fuse for main power has opened.	► On the circuit board, verify fuse has not opened. Replace fuse if necessary.
	Power switch on control board is faulty.	► Verify control board is supplying power to other components. Replace control board if necessary.
Main power switch is on, but temperature controller is not working.	Connection between control board and temperature controller is loose, or a part is faulty.	► Check connections between control board and temperature controller. Secure connections if necessary. Confirm control board is supplying power to temperature controller. Replace temperature controller or control board if necessary.
Main power switch is on, but fan is not running (100 V DH8).	Fan is faulty.	► Check fan connections. Verify correct voltage is being received. Replace fan if necessary.
Basket does not lift out or lower when LIFT OUT button is pressed.	Connection in lift-out system is loose, or a part is faulty.	► Review possible causes for error message “E2” and take recommended actions.
Basket lifts out when LIFT OUT button is pressed, then lowers slightly and activates an “E2” alarm.	Lift-out motor is faulty.	► Replace lift-out motor.

Problem	Possible Cause	Action
Basket does not agitate during thawing process, even though agitation is enabled for the basket.	Loose connection or a faulty part is preventing agitation motor from operating properly.	► Check connections from control board to terminal strip, and from terminal strip to agitation motor. Secure connections if necessary. Replace agitation motor or capacitor if necessary. Replace agitation switch if necessary.
	Loose connection or a faulty part is preventing basket from agitating properly.	► Visually compare operation of the faulty agitation system with operational agitation system (DH8 models only). Verify there are no loose parts blocking movement. Secure or tighten parts as necessary. Replace agitation motor and gearbox if necessary. Replace agitation cam if necessary.
	Control board is faulty.	► On the circuit board, verify fuse has not opened. Replace fuse if necessary. ► If agitation system for one basket is operating correctly, swap the connections at P4 and P6 on the control board (DH8 models only). Verify both agitation switches are switched ON, then press **CYCLE START** button for the basket exhibiting the agitation problem. ► If basket exhibiting the agitation problem is now agitating, control board is faulty. ► If basket is still not agitating, control board is working properly and problem is with another part in agitation system.
Basket does not lift out or lower when the LIFT OUT button is pressed.	Basket movement is obstructed by something in the chamber.	► Confirm there are no obstructions in chamber.
	Basket movement is obstructed by something in the lift-out system.	► Check for debris on lift-out rail. Remove debris and lubricate rail if necessary.
Cannot change values on the temperature controller.	Temperature controller has been locked out.	► Contact Helmer Technical Service.
Agitation is noisy or rough.	Rails and bearings on lift-out system are not lubricated.	► Confirm lift-out rails and bearings have been lubricated according to the maintenance schedule. Lubricate if necessary.
	Bearing on the basket is worn.	► Check for marks where bearing contacts chamber. Replace basket bearing assembly if necessary.
	Loose connection or a faulty part is preventing basket from agitating properly.	► Visually compare operation of faulty agitation system with operational lift-out system (DH8 models only). Verify there are no loose parts blocking movement. Secure or tighten parts as necessary. Replace agitation motor and gearbox if necessary. Replace agitation cam if necessary. Replace lift-out rail if necessary.
	Bearing block is faulty.	► Contact Helmer Technical Service.

Problem	Possible Cause	Action
Plasma thawer is connected to power but will not turn on.	Power cord is loose.	► Verify power cord is connected securely to plasma thawer and outlet. Tighten connections if necessary. ► Verify outlet is operational and meets power requirements for the plasma thawer. Repair original outlet or connect to a different outlet if necessary.
	Circuit breaker(s) have tripped or are not seated correctly.	► Confirm circuit breaker(s) are seated. Push circuit breaker to reset if necessary. If a reset is not possible, or breaker(s) trip again, contact a qualified service technician.
	Component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
Basket does not agitate, even though agitation is enabled for the basket.	Agitation switch was accidentally turned off.	► Confirm appropriate agitation switch on back of plasma thawer is switched ON.
	Basket movement is obstructed by something in the chamber.	► Confirm there are no obstructions in chamber.
	Component is faulty or internal connections are loose.	► Contact Helmer Technical Service.
Chamber is draining more slowly than usual.	Drain is obstructed.	► Confirm there is no debris in chamber. ► Backflush drain to clear any debris in the internal tubing between chamber and drain. To backflush the drain, empty chamber by whatever means necessary. Connect drain tube using coupling valve. Backflush drain by forcing water through opposite end of drain tube into chamber.
Drain is leaking.	Drain is faulty.	► Contact Helmer Technical Service.

10.3 Chamber Temperature Problems

Problem	Possible Cause	Action
Chamber temperature does not stabilize at plasma thawer setpoint.	Temperature controller has improper settings or is faulty.	► Verify plasma thawer setpoint is set below High Temperature alarm setpoint, and the difference is at least 1.0 °C. Replace controller if necessary.
	Connection between control board and heater is faulty, or a part is faulty.	► Check power to the heater. Replace heater or control board if necessary.
	Connection between control board and heater triac is faulty, or a part is faulty.	► Check power to the heater triac. Replace heater triac or control board if necessary.
	Connection between control board and temperature control sensor is faulty, or a part is faulty.	► Check connections from control board to temperature controller, and from temperature controller to temperature control sensor. Secure connections if necessary. Replace temperature control sensor, temperature controller, or control board if necessary.
	Heater fuse has opened.	► On the circuit board, verify fuse has not opened. Replace fuse if necessary.
Displayed chamber temperature is higher or lower than actual temperature.	Connection between control board and temperature control sensor is faulty, or a part is faulty.	► Check connections from control board to temperature controller, and from temperature controller to temperature control sensor. Secure connections if necessary. Replace temperature control sensor, temperature controller, or control board if necessary.
	Connection between control board and heater is faulty, or a part is faulty.	► Check power to the heater. Replace heater or control board if necessary.
	Connection between control board and heater triac is faulty, or a part is faulty.	► Check power to the heater triac. Replace heater triac or control board if necessary.
	Temperature controller is not calibrated.	► Confirm temperature control sensor is reading correctly. Calibrate temperature controller readout if necessary.

10.4 Alarm Activation Problems

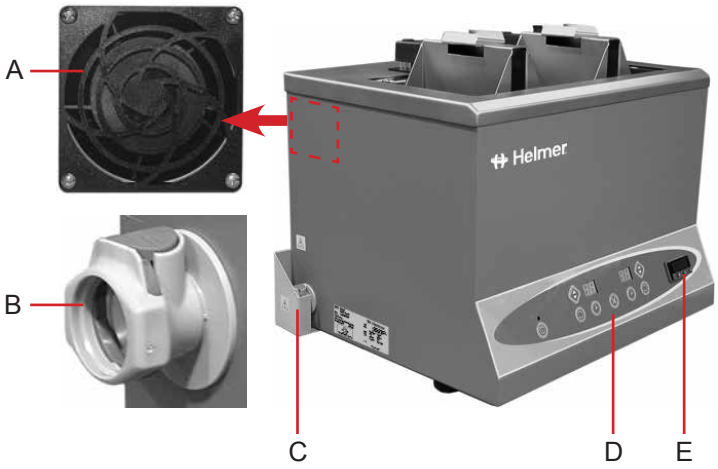
Problem	Possible Cause	Action
Chamber temperature meets high alarm condition, but High Temperature alarm is not active (visual or audible).	Temperature controller has improper settings or is faulty.	► Verify plasma thawer setpoint is set lower than High Temperature alarm setpoint, and the difference is at least 1.0 °C. Confirm parameters are set correctly. Change parameter values or replace controller if necessary.
	Control board is faulty.	► Replace control board.
	High Temperature alarm setpoint was changed.	► Check setpoint for High Temperature alarm. Change setpoint if necessary.
	High Temperature alarm setpoint and plasma thawer setpoint are too close together.	► Verify plasma thawer setpoint is set below High Temperature alarm setpoint, and the difference is at least 1.0 °C. Replace controller if necessary.
	Component is faulty or internal connections are loose.	► Contact a qualified service technician.
Plasma thawer meets high alarm condition, but the alarm is not audible.	The alarm buzzer is faulty.	► Replace alarm buzzer.
	Temperature controller has improper settings or is faulty.	► Confirm temperature controller parameters are set correctly. Change parameter values or replace controller if necessary.
	Control board is faulty.	► Replace control board.
	Audible alarms have been muted.	► Verify audible alarms are not muted.
	Component is faulty or internal connections are loose.	► Contact a qualified service technician.
High Temperature alarm activates quickly after plasma thawer has been turned on.	Chamber is empty.	► Verify chamber has water. High Temperature alarm will activate quickly if chamber is empty.

11 Parts

NOTE

- ► Before replacing parts, protect items in plasma thawer from extended exposure to adverse temperature.
- ► Allow plasma thawer temperature to stabilize at setpoint after replacing parts.

11.1 Front and Sides

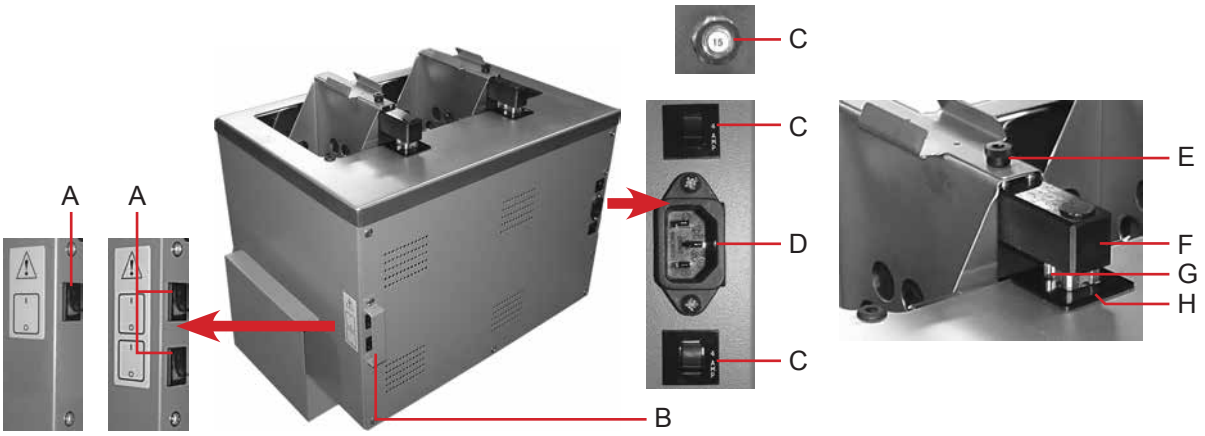


Front and left side features (115 V DH4 model shown).

Label	Description	Part Number	Schematic Label
A	Fan guard	220145 (100 V DH8)	-
B	Drain port valve	220232	-
C	Drain port cover	320520-1	-
D	Control panel touchpad	370099-1 (DH2) 370067-1 (DH4 and DH8)	-
E	Temperature controller	400591-1	F

NOTE Replace the drain port valve when the drain line coupling is replaced.

11.2 Top and Rear

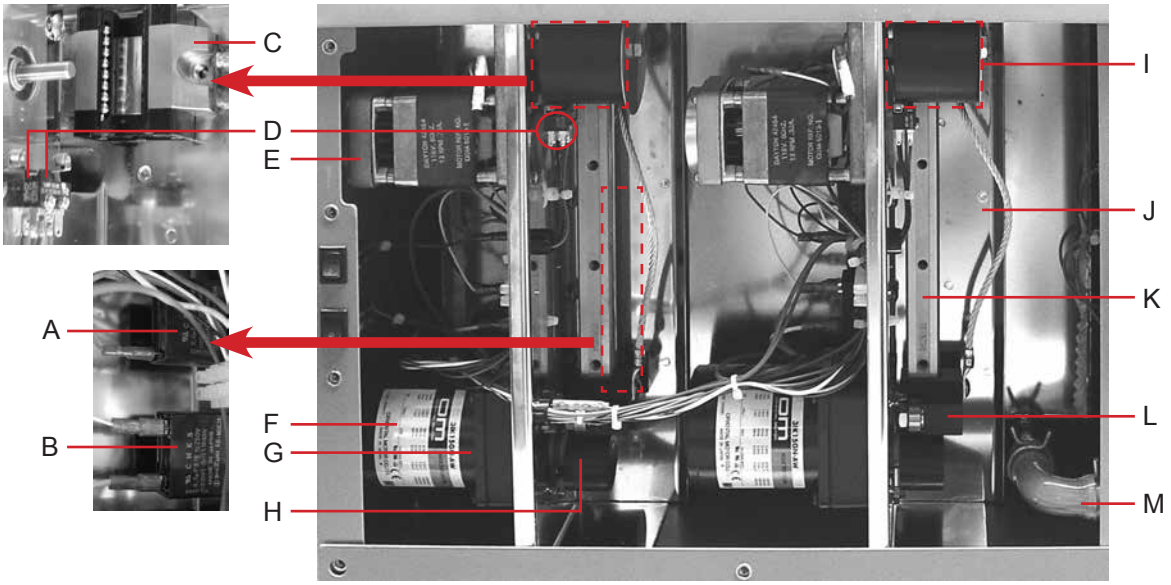


Top and rear of thawer (230 V DH4 model shown with parts from various models).

Label	Description	Part Number	Schematic Label
A	Agitation switch	120202	J
B	Agitation switch cover	320524-1	-
C	Circuit breaker (2 A)	120552 (230 V DH2)	B
	Circuit breaker (4 A)	120279 (115 V DH2 and 230 V DH4)	
	Circuit breaker (5 A)	120558 (100 V DH2)	
	Circuit breaker (6 A)	120288 (230 V DH8)	
	Circuit breaker (7 A)	120272 (115 V DH4)	
	Circuit breaker (10 A)	120110 (100 V DH4)	
	Circuit breaker (15 A)	120259 (115 V DH8) 120281 (100 V DH8)	
D	Power connector (includes power line filter)	120299	A
E	Finger knob	230193	-
F	Basket arm assembly	400302-1 (includes hardware)	-
G	Lift-out rail	320516-1	-
H	Lift-out rail gasket	320491-1	-

11.3 Interior

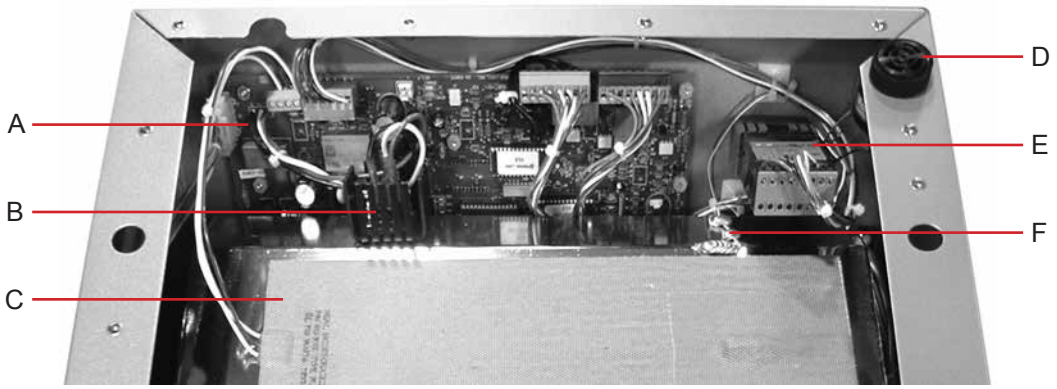
11.3.1 Parts Accessible from the Rear



Plasma thawer with rear panel removed (DH4 model shown).

Label	Description	Part Number	Schematic Label
A	Lift-out motor capacitor	120204 (110 V and 115 V) 120260 (230 V)	M
B	Agitation motor capacitor	Included with agitation motor	-
C	Bearing block	Contact Helmer for repair options	-
D	Basket position microswitch	120266	L
E	Lift-out motor	400504-2 (all 230 V models) 400504-3 (all 115 V models and 100 V DH4) 400504-4 (100 V DH8)	N
F	Agitation motor (includes capacitor)	120449 (110 V and 115 V) 120307 (230 V)	K
G	Agitation motor gearbox	220231	-
H	Agitation motor cam	320508-1	-
I	Pulley (includes lift-out cable)	400295-1	-
J	Lift-out cable	400289-1	-
K	Lift-out rail	320516-1	-
L	Bearing block assembly	400304-1	-
M	Elbow hose	220238	-
Not shown	Fan	120150 (100 V DH8)	I

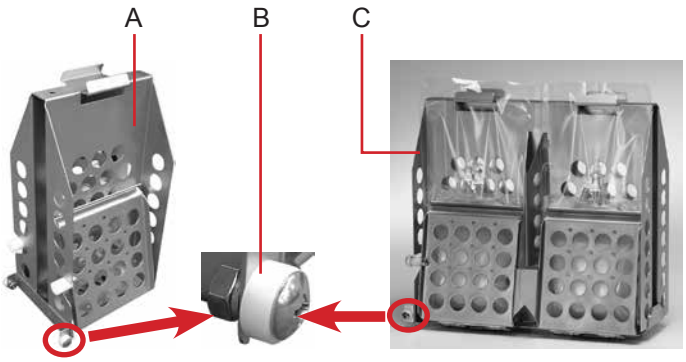
11.3.2 Parts Accessible from the Bottom



Plasma thawer with bottom panel removed (DH4 model shown).

Label	Description	Part Number	Schematic Label
A	Control board	400716-1 (DH2) 400272-2 (DH4 and DH8)	E
B	Heater triac	120269 (DH4 and DH8)	D
C	Chamber heater	120551 (100 V DH2) 120550 (115 V DH2 and 230 V DH2) 120294 (100 V DH4) 120263 (115 V DH4 and 230 V DH4) 120295 (100 V DH8) 120264 (115 V DH8 and 230 V DH8)	C
D	Alarm buzzer	120160	H
E	Temperature controller	400591-1	F
F	Temperature control sensor	120280	G

11.4 Basket

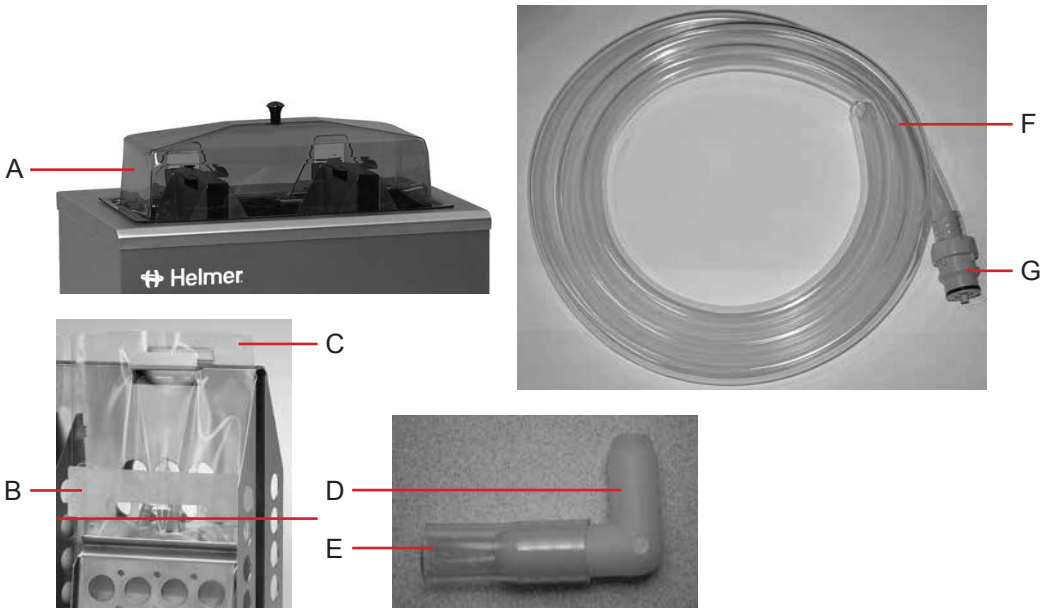


Basket and lift out system parts.

Label	Description	Part Number
A	Basket assembly (2 compartment, includes bearing assemblies)	400299-1 (DH2 and DH4)
B	Basket bearing assembly (includes hardware)	400625-1

Label	Description	Part Number
C	Basket assembly (4 compartment, includes bearing assemblies)	400301-1 (DH8)

11.5 Accessories

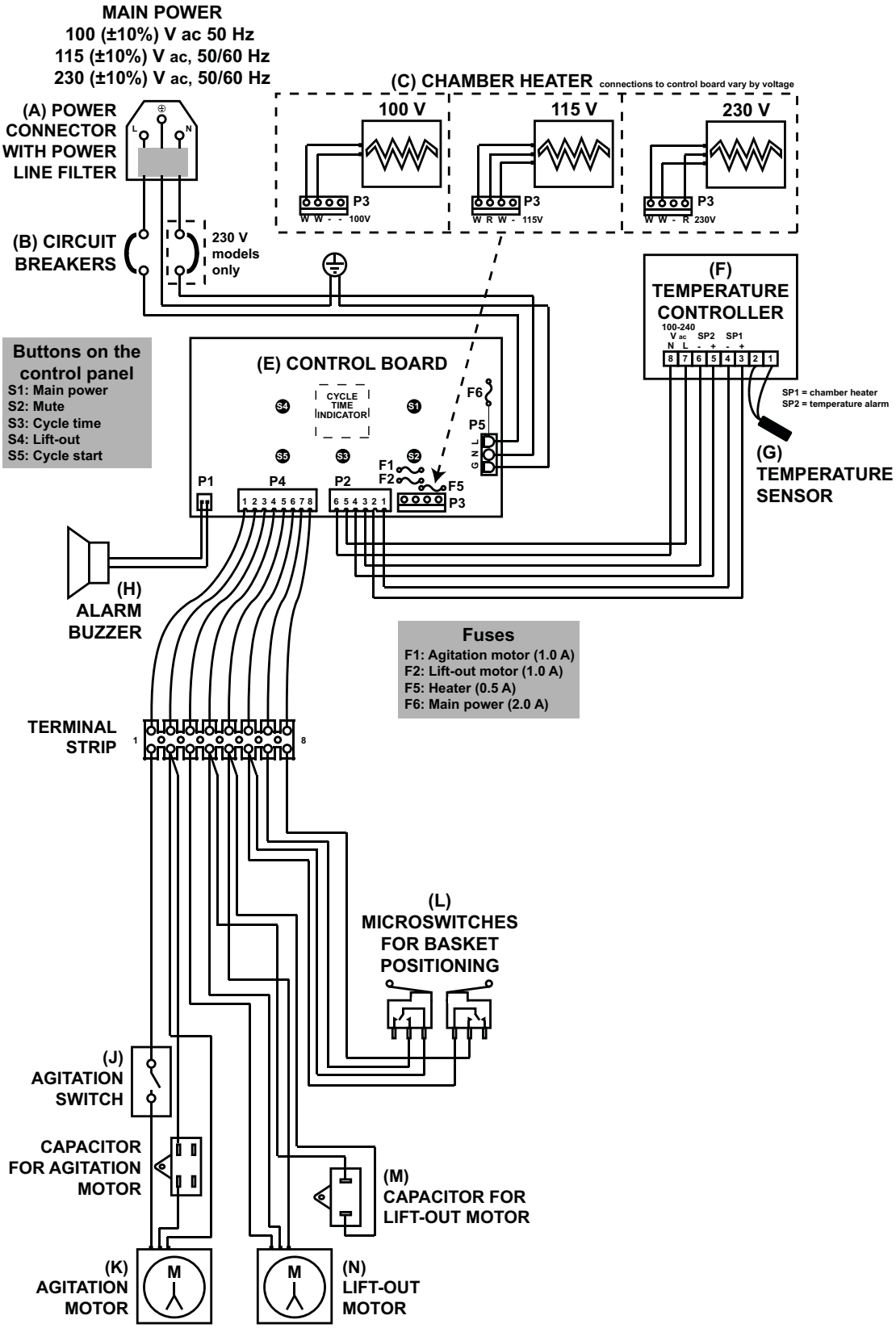


Accessories.

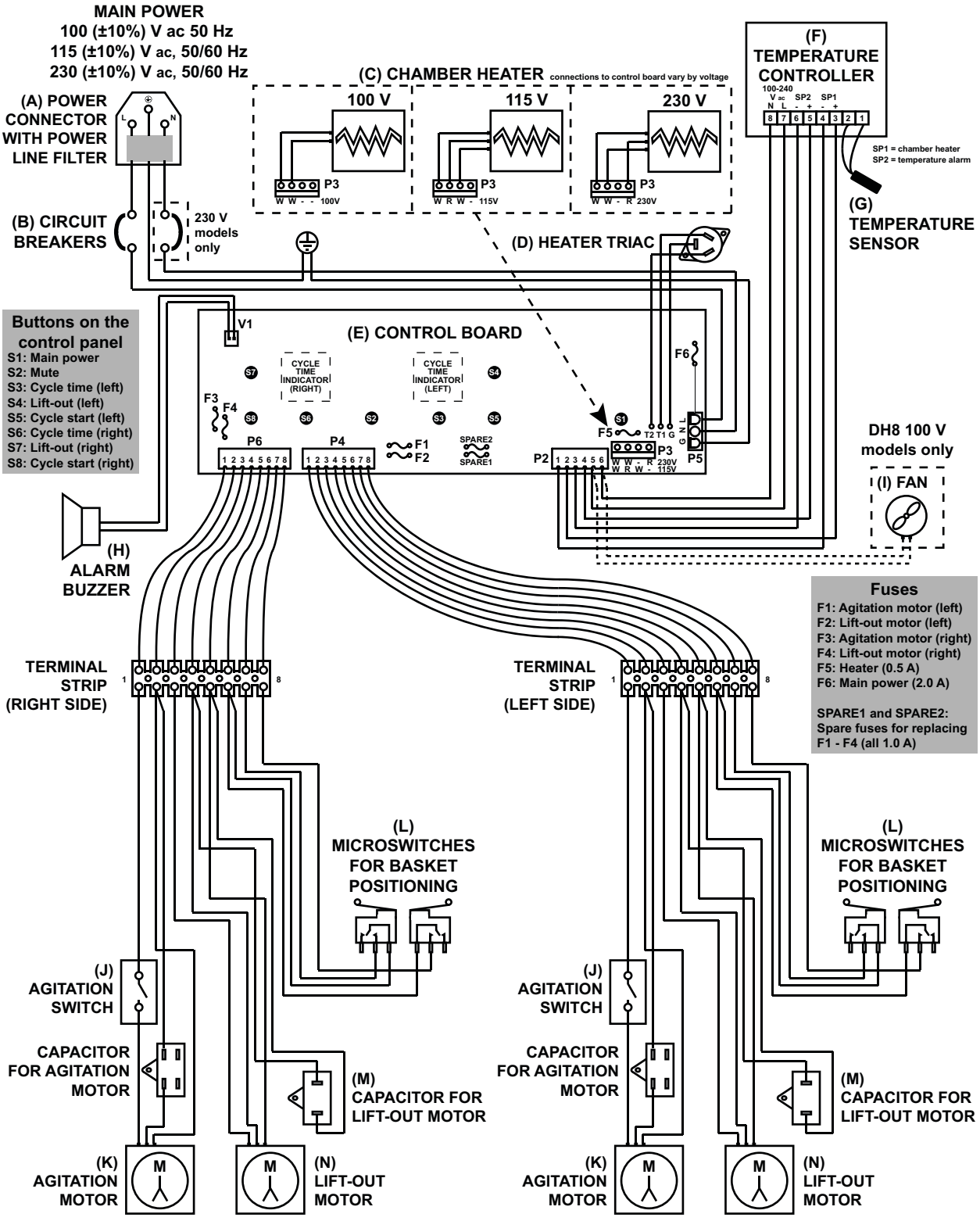
Label	Description	Part Number
A	Chamber cover	400769-1 (DH2) 400275-1 (DH4) 400276-1 (DH8)
B	Security snap	320532-1
C	Overwrap bags (standard size, 4 boxes of 250 bags each)	400273-1
D	Coupling tube (1.75” / 45 mm)	212041-1
E	90° fitting	220267
F	Drain tube (6’ / 1830 mm)	320515-1
G	Coupling valve	220233
Not shown	Overwrap bags (large size, 250 bags)	400303-1 (DH8)
Not shown	Power cord	120155 (110 V and 115 V DH2 and DH4) 120271 (100 V and 115 V DH8) 120156 (230 V)
Not shown	CleanBath bacterial inhibitor (8 oz / 237 mL bottle)	400348-1

12 Schematics

12.1 DH2



12.2 DH4 and DH8



END OF MANUAL

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