Helmer SCIENTIFIC

AABB STANDARDS-COMPLIANT

Automatic Cell Washing System Service Manual

UltraCW®II

360387/C

Document History

Revision	Date	CO	Supersession	Revision Description
A	04 MAY 2017	13502	n/a	Initial release.
B	20 AUG 2018	13866	B supersedes A	Updated Setup Instructions; Added information regarding the Fill button in Calibration section; Removed Calibrate Saline step from the Flushing instructions; Added Calibrate Motor in the Motor Replacement section
C	03 NOV 2020	15534	C supersedes B	Updated Section 4.1 to include instruction regarding imbalance sensor change in units with serial number 827 and greater.

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

Document Updates

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The screenshots and component images appearing in this guide are provided for illustrative purposes only, and may vary slightly from the actual software screens and/or product components.

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1 About This Manual

This manual provides information on how to operate the UltraCW®II in blood banking and other laboratory procedures. This manual is intended for use by end users of the UltraCW®II Automatic Cell Washing System and authorized service technicians.

1.1 Safety Symbols and Precautions

Symbols found in this document

The following symbols are used in this manual to emphasize certain details for the user:

Task Indicates procedures which need to be followed.

Note Provides useful information regarding a procedure or operating technique when using Helmer Scientific products

NOTICE Advises the user against initiating an action or creating a situation which could result in damage to equipment; personal injury is unlikely.

CAUTION Advises the user against initiating an action or creating a situation which could result in damage to equipment or impair the quality of the products or cause minor injury.

Symbols found on the unit

The following symbols may be found on the cell washer or cell washer packaging:

CE Mark (European units only)

Product falls under the scope of the WEEE (Waste Electrical and Electronic Equipment) directive.

Caution: Risk of damage to equipment or danger to operator

Caution: Biohazard

Manufacturer

Avoiding Injury

Review safety instructions before installing, using, or maintaining the equipment.

- Do not move or bump the cell washer during operation.
- Before moving unit, disconnect and secure the power supply and cord.
- Never physically restrict any moving component.
- Avoid removing electrical service panels and access panels unless so instructed.
- Avoid sharp edges when working inside the base of the unit.
- Use only manufacturer supplied power cords.
- Using the equipment in a manner not specified by Helmer may impair the protection provided by the equipment.

⚠ CAUTION

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

1.2 General Recommendations

Indications for Use

The Helmer UltraCW®II automatic cell washing system is intended to be used for the washing portion of routine blood bank and laboratory procedures calling for washed red blood cells such as antiglobulin testing, ABO compatibility, Rh, cross matching and anti-body screening.

The UltraCW®II automatic cell washing system should be operated by a trained individual, such as a clinical laboratory technologist or similar education, as determining whether desired results have been achieved is subjective and dependent upon user preparation of blood sample, and parameter selection/adjustment.

General Use

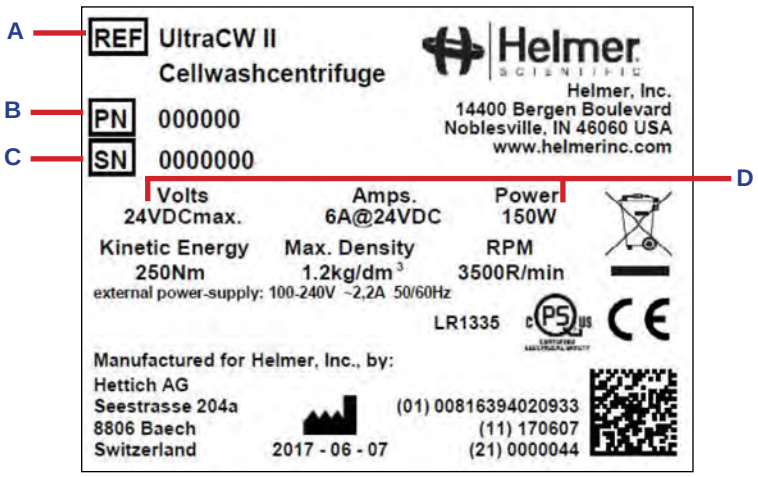
Allow the cell washer to come to room temperature before switching power on.

1.3 Model Input and Power

This information appears on the product specification label, located on the right side of the unit.

Note

Information contained in the specification label varies depending on the model and power requirements.



Sample Product Specification label.

Label	Description
A	Model (REF)
B	Part number
C	Serial number
D	Power requirements

2 Installation and Configuration

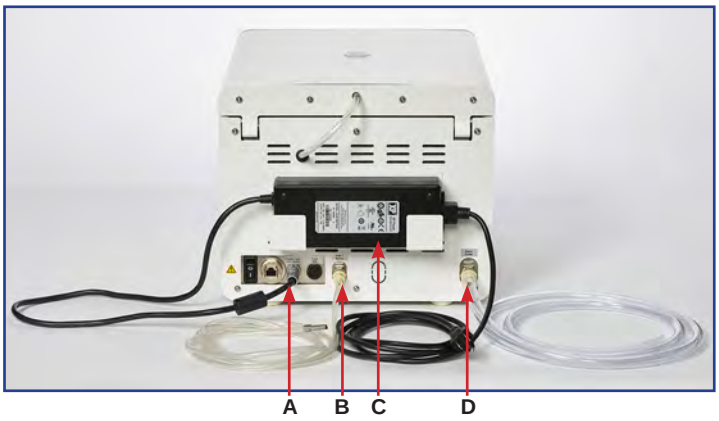
2.1 Location and Placement

- Has a sturdy, level surface.
- Has a grounded outlet meeting National Electric Code (NEC) and local electrical requirements.
- Has access to a supply of saline solution.
- Has access to a waste container or drain suitable to receive decanted saline and human blood waste.
- When the cell washer is running, per EN/IEC 61010-2-020, no individuals or dangerous objects such as flammable or explosive materials may be within a safety margin of 12” (300 mm) around the unit.

⚠ CAUTIONS

- Use only manufacturer supplied power cord.
- Ensure drain tube is installed at a downward slope for proper drainage.
- Unplug power cord from power receptacle prior to moving.
- Ensure rotor is empty prior to moving.

2.2 Setup



	Description
A	Power Input
B	Inlet 1 Saline
C	Power Supply
D	Drain Outlet

1. Plug saline tube in inlet 1 and place the weighted end of the tube in the Saline box.
2. Connect drain tube in drain outlet.
3. Connect power supply to Power-Input.
4. Connect power cord to power supply.

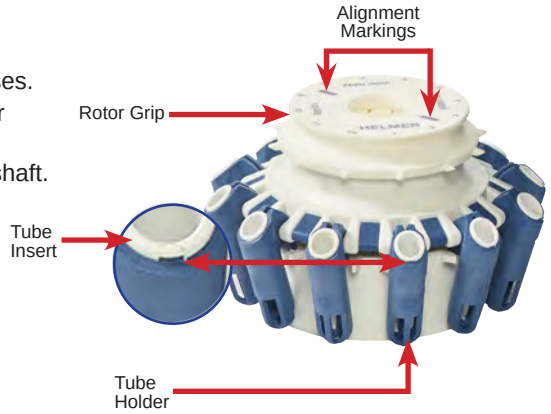
2.3 Initial Start-Up

1. Plug the power cord into a grounded outlet that meets the electrical requirements on the product specification label.
2. Switch the ON/OFF switch ON. Initialization takes approximately one minute. The Start screen will appear.

Start screen

2.4 Rotor Installation

Either a 12-place rotor or a 24-place rotor may be installed in the cell washer. Both rotors can hold either 10 mm x 75 mm tubes or 12 mm x 75 mm tubes. Inserts must be used to secure the 10 mm tubes to prevent damage during operation.



Install Rotor

1. From the Start screen, select the open lid button. The lid latch releases.
2. With the lid open, grasp the rotor on the grip area and place the rotor over the shaft.
3. Align the markings on the top of the rotor with the slots on the rotor shaft.
4. Lower the rotor onto the shaft.

Install Tube Inserts

1. Remove rotor by lifting upward and place on solid surface.
2. Align the key on the insert with the groove in the tube holder.
3. Press the insert into the tube holder all the way down until the lip of the insert is flush with the tube holder.

Remove Tube Inserts

1. Remove rotor by lifting upward and place on solid surface.
2. While holding the tube holder with one hand, insert a flat-head screwdriver into the slot and slightly twist the screwdriver to raise the top of the insert.
3. Grasp the top of the insert and pull straight out.

Load Tubes

Gently place tubes in tube holder. If loading fewer tubes than the rotor can hold, distribute the tubes evenly around the rotor to maintain balance.

2.5 Rotor Type

It is necessary to enter the rotor type prior to running a program. Either a 12-place or 24-place rotor may be used in the cell washer. Both rotors can hold either 10 mm x 75 mm tubes or 12 mm x 75 mm tubes.

Select Rotor Type

1. From the Start screen, select the settings button . The Settings screen opens.
2. Select the desired rotor type (12-place or 24-place).
3. Select the green check mark to save.
4. Select the return button to return to the previous screen.

3 Operation

Operational settings for the UltraCW®II can be viewed and changed through System Settings. Some operational functions are restricted by user level.

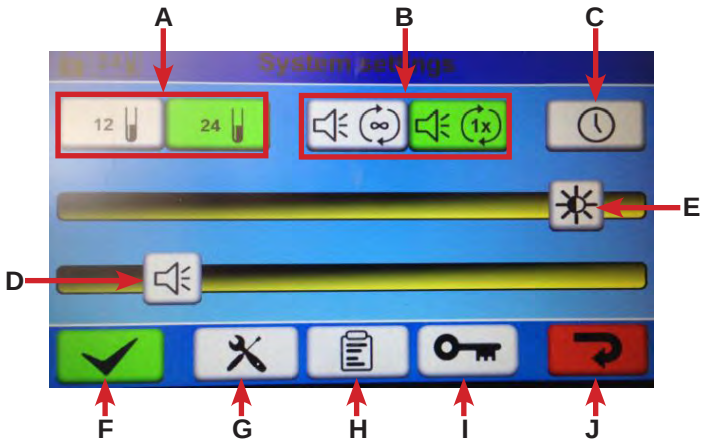
Function	User (no password)	Advanced User	Service User
Select/Start Program	✓	✓	✓
Stop Program	✓	✓	✓
Check Program	✓	✓	✓
Add/Edit Program			✓
Select Rotor Type		✓	✓
View History	✓	✓	✓
Change Time/Date Setting			✓
Add/Delete/Change User Name			✓
Add/Delete/Change User Password			✓
Calibrate Filling Volume			✓
Change Device settings			✓

3.1 System Settings

From the Start screen, select the Settings button to view or change settings.

Notes

- Entering the System Settings screen requires an authorized user.
- If accessing unit for the first time, use factory created Service User password 46060.



System Settings screen

Label	Description	Label	Description
A	Rotor Type	F	Save/Accept
B	Signal Pattern	G	Service Menu
C	Time/Date	H	Device History
D	Alarm Volume	I	Edit Service User Password
E	Brightness	J	Back/Return

Rotor Type

The rotor type must be entered prior to running a program.

Select Rotor Type

1. From the Start screen select the Settings button . The System Settings screen appears.
2. Select the desired rotor type (12-place or 24-place).
3. Select the green check mark to save.
4. Select the red return button to return to the previous screen.

Program End Signal Pattern

An audible signal will sound upon completion of a program. This signal can be adjusted from a single beep tone to a repeated beep tone which sounds every 10 seconds for up to one hour. The audible signal can be stopped by opening the lid or pressing any button on the display.

Select Signal Pattern

1. From the Start screen select the Settings button . The System Settings screen appears.
2. Select the desired signal pattern.
3. Select the green check mark to save.
4. Select the red return button to return to the previous screen.

Date and Time Settings

Date and time information can be changed as necessary.

Time Settings screen

Set Date and Time

1. From the Start screen, touch the login button .
2. Enter a Service User password and select the green check mark to confirm.
3. Select the Settings button . The System Settings screen appears.
4. Select the Clock button at the top of the screen. The Time Settings screen appears.
5. Rotate the Day, Month, Year and Time dials up or down to select the correct date and time.
6. Select the green check mark to save.
7. Select the red return button to return to the previous screen.

Brightness Setting

Screen brightness can be adjusted from low (left) to high (right) by sliding the brightness control.

Volume Setting

The alarm volume may be changed by sliding the volume control from low (left) to high (right).

Service Menu

Service Menu screen

Label	Description
A	Calibration
B	User Settings
C	Device Settings
D	Back

The Service Menu displays recent service information including the previous pump calibration and run time statistics. The buttons along the bottom of the screen allow the user to perform various service related operations.

History

Device History screen

The history screen provides historical information regarding the programs run on a specific date. Up to 8500 days of data can be searched and viewed. The scroll arrows on either side of the month allow the user to move forward or backward through the calendar by month. Dates highlighted in yellow contain saved data.

Service User Password

The Service User password allows qualified technicians to update or service the unit. This password must be entered in order to perform service tasks, add new programs, and update or change user information and passwords. The factory preset Service User password is 46060. Changing the Service User password after the initial login is recommended. Ensure new password is recorded for future use.

Notes

- This process requires an authorized user.
- If accessing the unit for the first time, use factory created Service User password 46060.

Change Service User Password

1. From the Start screen, touch the login button .
2. Enter a Service User password and select the green check mark to confirm.
3. Select the Settings button . The System Settings screen appears.
4. Select the Key button at the bottom of the screen. The Edit Password screen appears.
5. Follow the on screen prompts to create a new password.
6. Select the green check mark to save.
7. Use the red arrow to return to the home screen.

4 Maintenance

Maintenance tasks should be completed according to the following schedule.

Note

These are recommended minimum requirements. Regulations for your organization or physical conditions at your organization may require maintenance items to be performed more frequently, or only by designated service personnel.

Preventive Maintenance Schedule

Task	Frequency				
	Daily	Weekly	Monthly	Annually	4 years
Inspect tubing and drain and clear obstructions if necessary.	✓				
Inspect tubing connections and secure if necessary.	✓				
Clean and dry interior after normal usage to prevent corrosion and contamination.	✓(1)				
Flush system with distilled water.	✓(1)				
Flush system with cleaning solution.		✓			
Clean fill ports on the rotor.		✓			
Check the saline volume setting and calibrate it if necessary. Frequency varies by length of service.			✓		
Check rotor speed and ensure within tolerance.				✓	
Inspect rotor for wear, corrosion, and damage. Replace rotor if these conditions exist.			✓		
Replace rotor					✓
Inspect tube holders for wear and damage. Replace tube holders if worn or damaged, or after they have been in use for two years.			✓		
Clean exterior.			✓		
Replace supply and drain tubing.				✓	
Replace tube holder inserts for 10 mm x 75 mm tubes.				✓	

(1) Perform daily or if unit has been idle for 4 hours or more.

4.1 Imbalance Adjustment

The imbalance sensor senses whether the rotor is balanced during operation. If the rotor is not balanced, an imbalance error results. The weight at which the imbalance error occurs is the imbalance value.

At the factory, the imbalance sensor is positioned to allow an imbalance value between 5 g and 10 g when the rotor is spinning at 800 RPMs for 2 minutes.

Note

Continual operation of the cell washer when the imbalance value of greater than or equal to 10 g may damage the cell washer. An imbalance value of less than or equal to 5 g is overly sensitive to the normal variations in weight that occur during normal operation.

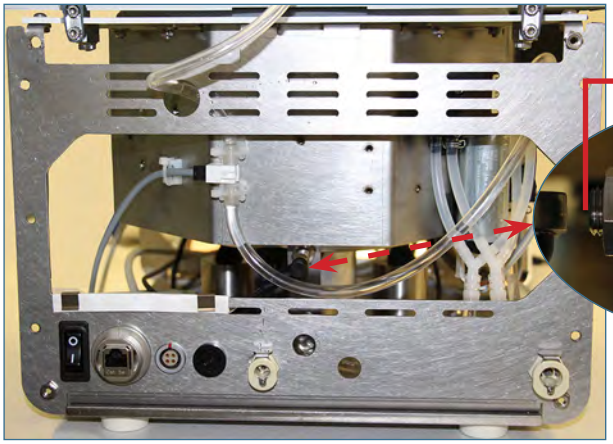
Verify Imbalance Value is Within Upper Limit

1. Install tubes in all available position in the rotor.
2. With all tubes empty, add 10 g of weight to one tube to test whether the imbalance value is below the upper limit.
3. Install the rotor.
4. From the Program Menu screen, select and run a Spin program at 800 RPMs for 2 minutes. If an imbalance error does not occur, then the value is out of range and must be adjusted.

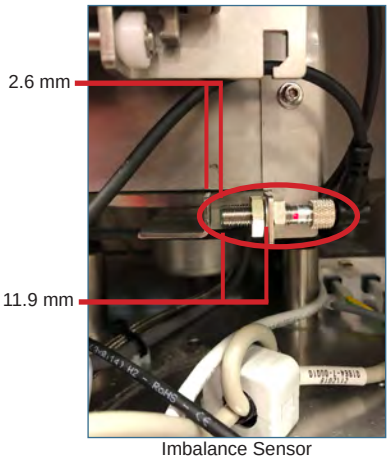
Verify Imbalance Value is Within Lower Limit

1. Install tubes in all available position in the rotor.
2. With all tubes empty, add 5 g of weight to one tube to test whether the imbalance value is above the lower limit.
3. Install the rotor.
4. From the Program Menu screen, select and run a Spin program at 800 RPMs for 2 minutes. If an imbalance error does not occur, then the value is out of range and must be adjusted.

Adjust Imbalance Sensor



Imbalance Sensor
(SN 826 and under)



Imbalance Sensor
(SN 827 and greater)

Note

Refer to Section 5.1 for instructions on removing and replacing access panels.

NOTICE

Cell washer power must be off, and AC power disconnected prior to performing maintenance.

	UltraCW II ***(units with serial number 826 and under)***	**UltraCW II** ***(units with serial number 827 and greater)***
1	Remove the front, rear and side access panels.	Remove the front, rear and side access panels.
2	Using an adjustable wrench, loosen or tighten the nuts to attain approximately 6.2 mm (0.244 inches) distance between the end of the sensor and the nut as shown above.	Using an adjustable wrench, loosen or tighten the nut to attain approximately 11.9 mm (0.468 inches) distance between the end of the sensor and the nut, and a 2.6 mm (0.103 inches) distance between the end of the sensor and the actuator as shown above.
	(This distance can be altered slightly - in or out - to ensure imbalance value is within range.)	
3	Replace side, front and rear panels.	Replace side, front and rear panels.

4.2 Calibration

To calibrate the saline volume dispensed, the amount of dispensed saline must be measured and compared to the target value displayed. If the measured value varies more than ±5% from the target value, the saline volume must be calibrated.

Notes

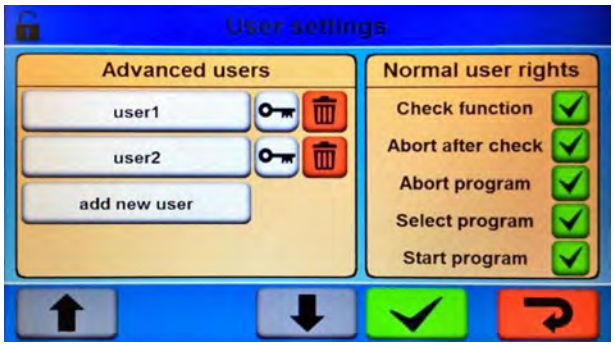
- The cell washer lid must be open to perform the calibration.
- Ensure air bubbles are purged from saline tubes prior to calibration using the Fill program or fill button .
- This process requires an authorized user.
- If accessing the unit for the first time, use factory created Service User password 46060.

Calibrate Saline Volume

1. From the Start screen, touch the Login button .
2. Enter a Service User password and select the green check mark to confirm.
3. Select the Settings button .
4. On the System Settings screen, select the Tools button to open the Service Menu.
5. On the Service Menu screen, select the Ruler icon to open the Calibration screen.
6. Touch the target calibration volume (36 ml or 72 ml).
7. Hold a clean, dry graduated cylinder below the spout on the lid and press the Start button . Wait until liquid has stopped flowing from spout.
8. Measure the liquid collected in the graduated cylinder.
9. Use the “+”, “++”, “-”, and “--” on the right side of the screen to adjust the number as needed.
10. Select the green check mark to finish calibration.
11. Use the red arrow to return to the Home screen.

4.3 Update User Settings

User passwords and information can be added, deleted or modified from the User Settings screen.



Notes

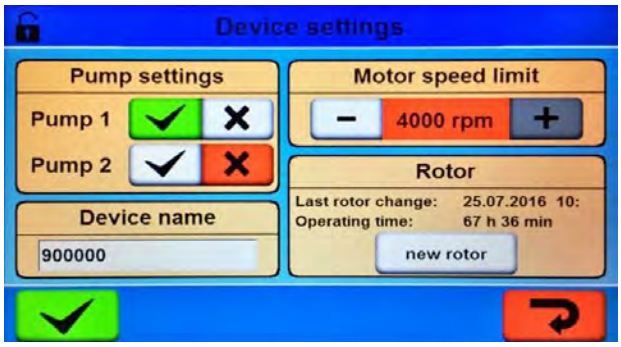
- This process requires an authorized user.
- If accessing the unit for the first time, use factory created Service User password 46060.

Add New User

1. From the Start screen, touch the Login button .
2. Enter a Service User password and select the green check mark to confirm.
3. Select the Settings button .
4. On the System Settings screen, select the Tools button to open the Service Menu.
5. On the Service Menu screen, select the User Settings button to open the User Settings screen.
6. Select “add new user”. An alphanumeric keyboard appears.
7. Enter the new user name and select the green check mark to save.
8. Select the Key button directly beside the name entered. An alphanumeric keyboard appears.
9. Enter the new password and confirm, then select the green check mark to save.
10. Use the red arrow to return to the home screen.

4.4 Update Device Settings

The Device Settings screen allows the user to view, change or update Pump Settings, Motor Speed Limit, Device Name, and Rotor information.



Device Settings screen

4.5 Cleaning the Cell Washer

NOTICE

- Do not use an autoclave to clean any components of the cell washer.
- Only use cleansers and disinfectants with pH of 5 to 8.

Exterior

Clean exterior surfaces with a soft cotton cloth and non-abrasive liquid cleaner. Dry the exterior with a dry cloth.

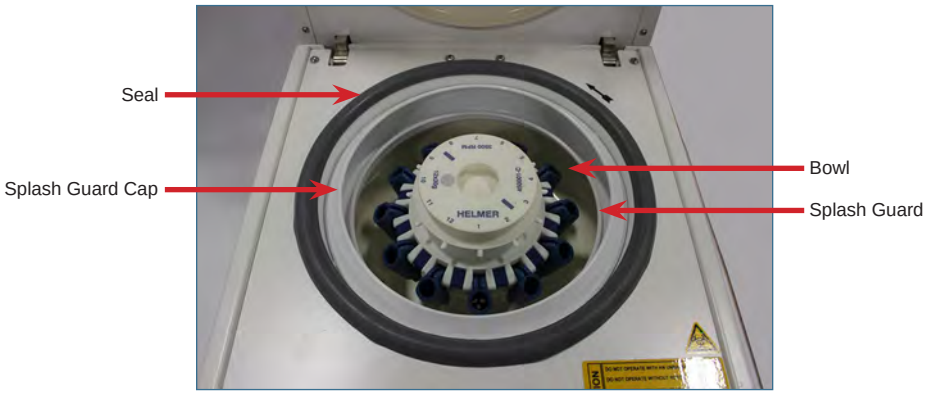
Interior

To prevent blockages and maintain rotor balance, ensure the bowl is clean and free of debris, which may include salt crystals or broken glass. To prevent condensation that may lead to corrosion, dry the interior thoroughly after normal daily usage.

Using a damp cloth or sponge, wipe the bowl, removing all debris. It is not necessary to remove the bowl or to clean under the bowl.

Using a dry cloth or sponge, wipe the entire inside of the lid, including the drainage system and painted surfaces.

Use the following procedures to remove and install the splash guard.

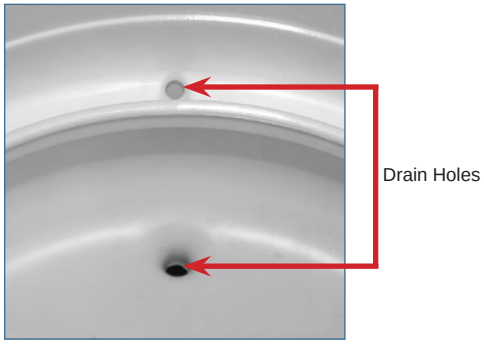


Cell Washer Interior

Remove Splash Guard

1. Remove the splash guard cap by pulling upward.
2. Remove the splash guard by folding back the seal to expose the edge of the splash guard, then gently lift the splash guard. Do this a section at a time until the entire splash guard is clear of the gasket then lift from the bowl.

Install Splash Guard



1. Place the splash guard in the bowl so the drain hole in the guard is directly above the drain in the bowl.
2. Working one section at a time around the bowl, fold back the gasket and press the splash guard downward so the edge of the guard rests on the lip of the bowl. The edge of the splash guard should slightly overlap the lip of the bowl.
3. With the labeled side up, place the splash guard cap into the bowl on top of the splash guard.

Fill Ports

Clean the fill ports on the rotor regularly to remove any debris that was not removed when the system was flushed. Debris can clog the fill ports, preventing saline solution from entering the tubes.

If the rotor is allowed to dry after washing or suspension processes, debris may accumulate in the fill ports more quickly. If this is the case, the rotor may need to be cleaned more frequently than is recommended in the preventive maintenance schedule. Adjust the cleaning frequency based on usage patterns.

NOTICE

Cleaning the fill ports using any method not described in this manual may damage the fill ports and negatively impact the performance of the cell washer, and may void the warranty.

Clean Fill Ports

1. Soak the rotor in clean, warm water or run warm water directly into the top of the rotor for several minutes. Ensure water is flowing freely out of all the fill ports.
2. If a port is blocked, gently slide the lid release tool into the fill port from the outside toward the center of the rotor. Gently slide the lid release tool in and out several times to clean the port.
3. If the rotor will not be used immediately, ensure it is dry before returning it to the cell washer and closing the lid.
   OR
   If the rotor will be used immediately, ensure all fresh water has been purged from the system and replaced by saline solution before running a program.

Flush the System

To clean and disinfect the cell washer, as well as remove blockages due to salt crystallization, use the **flush 1** program to flush the system with cleaning solution and with distilled water.

Flushing the System with Distilled Water

1. Load the rotor with tubes, leaving every other position on the rotor empty.
2. Prepare a container of deionized or distilled water (approximately 1 L).
3. Disconnect the Saline-tube, solution 1, from the saline solution container and place it into the container with deionized or distilled water.
4. Select and run the “flush 1” program.
5. Remove the Saline-tube from the deionized or distilled water container and place it in the saline solution container.
6. Select and run the “flush 1” program.

Flushing the System with Cleaning Solution

1. Load the rotor with tubes, leaving every other position on the rotor empty.
2. Install the rotor and close the lid.
3. Prepare a container with 400 ml of 0.5% sodium hypochlorite (bleach) cleaning solution (1:9 ratio of bleach to water).
4. Prepare a container of deionized or distilled water (approximately 1 L).
5. Disconnect the Saline-tube, solution 1, from the saline solution container and place it into the container with the bleach cleaning solution.
6. Select and run the “flush 1” program and wait 5 minutes.
7. Take the Saline-tube from the container and place it in the container with deionized or distilled water.
8. Select and run the “flush 1” program.
9. Open the lid and dry the centrifuging area.
10. Remove the Saline-tube from the deionized or distilled water container and place it in the saline solution container.
11. Select and run the “flush 1” program.
12. Remove the Saline-tube from the saline solution container and place it in the container with deionized or distilled water.
13. Select and run the “flush 1” program.

Note

Ensure distilled water has been purged with saline prior to use.

5 Service

5.1 Remove / Replace Access Panels

Several serviceable parts are located behind the front, rear and side panels.

NOTICE

Cell washer power must be off and AC power disconnected prior to performing all service procedures.

Remove Access Panels

Figure 1

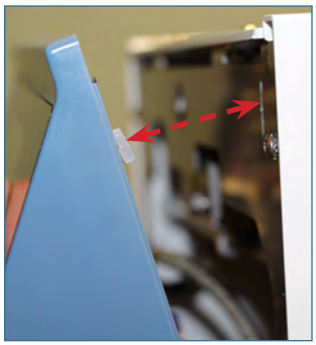


Figure 2

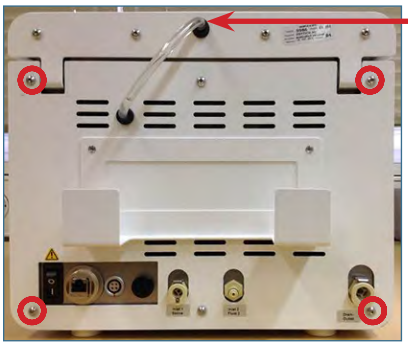


Figure 3

1. Disconnect and remove the power supply from the back of the cell washer.
2. Insert the Emergency Release Pin into the Emergency Release hole on the side of the unit to open the lid.
3. Using a 2.5 mm Allen wrench, remove the two (2) screws and washers on the bottom front of the unit *(Figure 1)*.
4. Carefully slide the front display panel upward to disengage the brackets *(Figure 2)* then pull away from the unit to remove. Gently place the display panel in front of the unit taking care not to disconnect the wiring from the circuit board.
5. On the back of the cell washer, disconnect the saline tube from the back side of the lid *(Figure 3)*.
6. Using a 2.5 mm Allen wrench, remove the four (4) screws on the rear panel and remove the panel *(Figure 3)*.

Figure 4

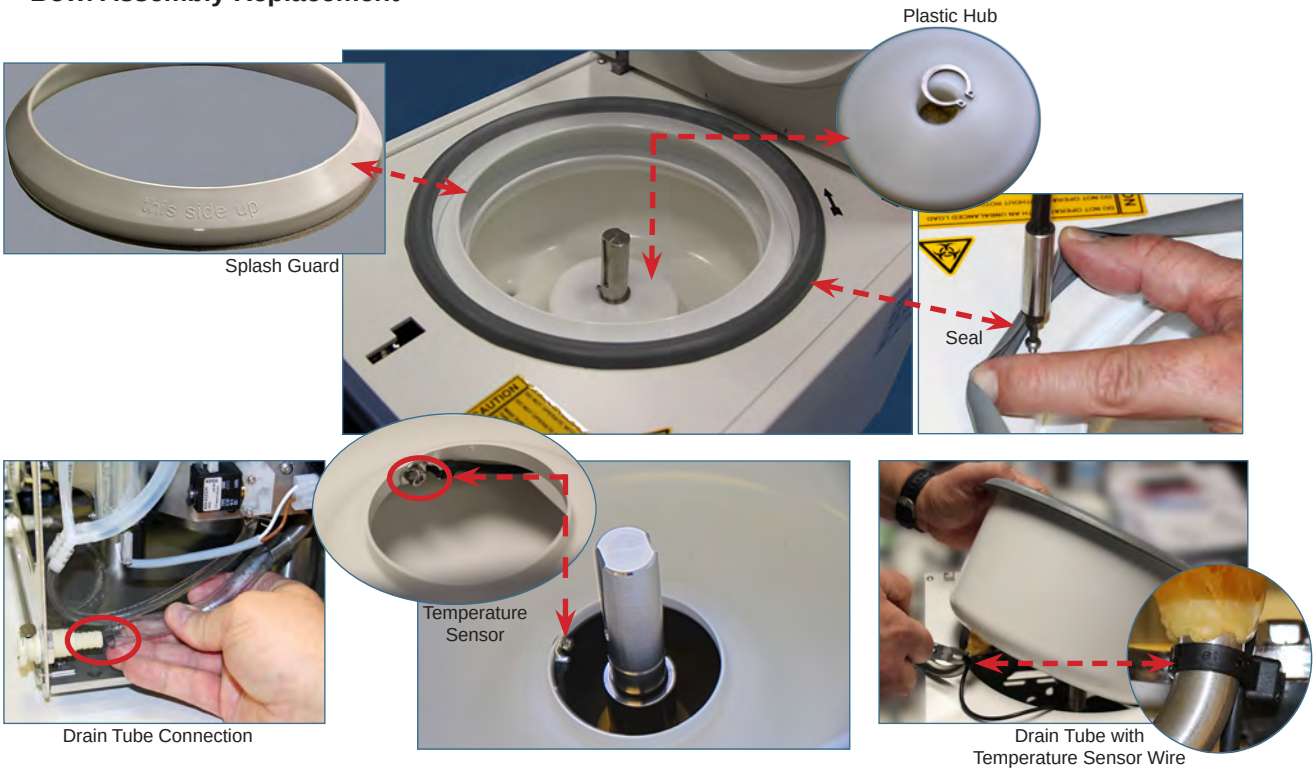
Figure 5

7. Using a 2.5 mm Allen wrench, remove the three (3) screws securing the side panel to the rear of the unit *(Figure 4)*.
8. Using a 2.5 mm Allen wrench, remove the three (3) screws with lock washers securing the side panel to the front side of the unit *(Figure 5)*. Remove side panel.

Install Access Panels

1. Reinstall the side panel and secure to the front of the unit with three (3) screws and lock washers *(Figure 4)*. Tighten using a 2.5 mm Allen wrench.
2. Secure the side panel to the rear of the unit with the three (3) screws *(Figure 3)*. Tighten using a 2.5 mm Allen wrench.
3. Reinstall the back panel and secure with the four (4) screws *(Figure 2)*. Tighten using a 2.5 mm Allen wrench.
4. Attach the saline tube to the lid *(Figure 2)*.
5. Align brackets on the front panel with the slots on the face plate and slide the panel downward.
6. Position the cell washer to allow access to the bottom front.
7. Reinstall the two (2) screws to secure the front panel *(Figure 1)* and tighten using a 2.5 mm Allen wrench.
8. Reconnect power supply to back of cell washer.

5.2 Bowl Assembly Replacement



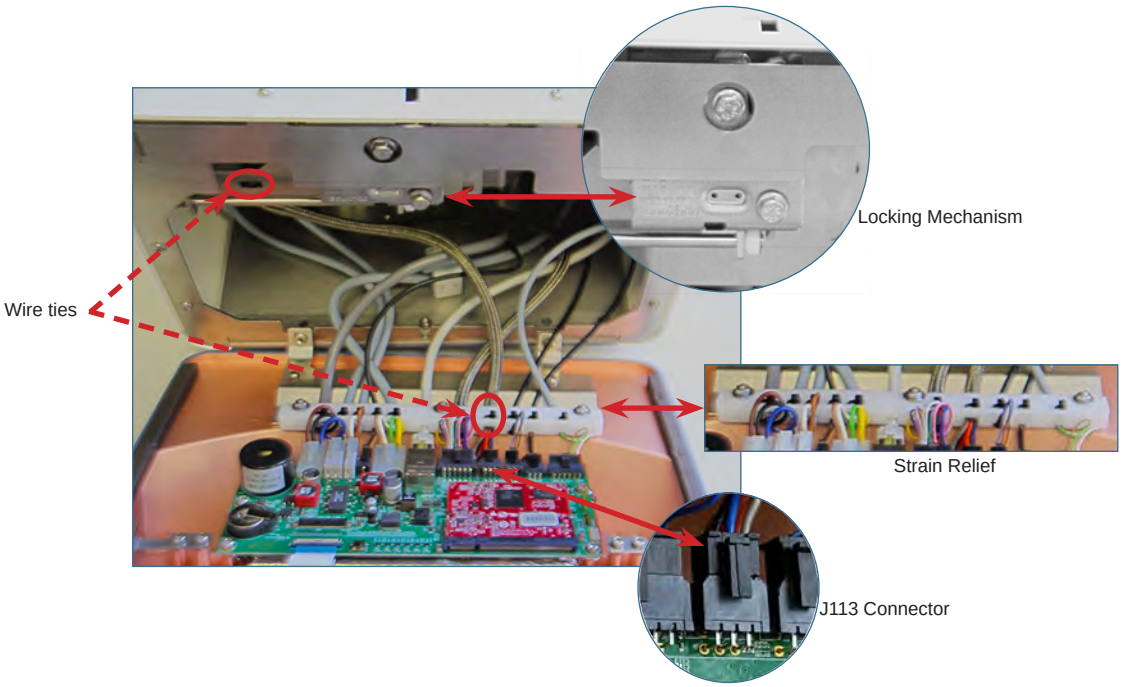
Remove Bowl Assembly

1. Remove the front, rear and left side access panels.
2. Lift and remove the splash guard from the top of the bowl.
3. Loosen and remove the snap ring around the rotor shaft using snap ring pliers.
4. Slide the plastic hub over the rotor shaft and remove to reveal the temperature sensor.
5. Use your fingers to fold back the seal around the edge of the bowl and uncover the screws securing the bowl to the housing. Remove the eight (8) screws around the edge of the bowl using a 2 mm Allen wrench.
6. Through the left side of the cell washer disconnect the drain tube from the drain outlet.
7. From the top of the unit, carefully lift the bowl from the housing and rest on top.
8. Using a 2 mm Allen wrench, detach the temperature sensor from the inner rim of the bowl.
9. Locate and cut the wire tie securing the temperature sensor wire to the drain tube. Take care not to cut the temperature sensor wire.
10. Remove the old bowl assembly tilting the bowl so the drain tube clears the housing.

Install Bowl Assembly

1. Carefully rest the new bowl on top of the unit and attach the temperature sensor to the inner rim of the bowl using a 2 mm Allen wrench.
2. Install the new bowl in the housing with the drain tube pointing toward the left rear corner of the unit, and align the screw holes around the edge of the bowl with the holes in the housing.
3. While folding back the seal to access the screw holes on the rim of the bowl, use a 2 mm Allen wrench to install and tighten the eight (8) screws.
4. Install the plastic hub over the rotor shaft.
5. Using snap ring pliers, install the snap ring over the plastic hub to secure.
6. Place the splash guard on top of the bowl so the words *This Side Up* are visible.
7. Connect the drain tube to the drain outlet.
8. Attach the temperature sensor wire to the drain tube using a wire tie.
9. Cut excess length from wire ties with wire cutters.
10. Install the left side, front and rear access panels.

5.3 Locking Mechanism Replacement



Remove Locking Mechanism

1. With the front panel removed, loosen the three (3) nuts securing the strain relief using a 7 mm socket wrench.
2. Disconnect the connector on the control board at J113.
3. Using wire cutters, remove the wire ties on the strain relief and the retaining plate.
4. Using a 10 mm socket wrench, remove the two (2) screws on the locking mechanism and slide the locking mechanism out to the right.

Install Locking Mechanism

1. Install the new locking mechanism from the right. Align the holes in the top and bottom of the locking mechanism with the holes in the retaining plate, and route the cable behind the retaining plate and toward the display panel.
2. Secure the new locking mechanism to the retaining plate with the two (2) screws and tighten using a 10 mm socket wrench.
3. Route the cable through the notched opening in the strain relief and attach the connector at J113 on the control board.
4. Secure the cable to the retaining plate and strain relief using wire ties.
5. Secure the strain relief with the three (3) nuts using a 7 mm socket wrench.
6. Cut excess length from wire ties with wire cutters.
7. Replace the front panel.

5.4 Motor Replacement

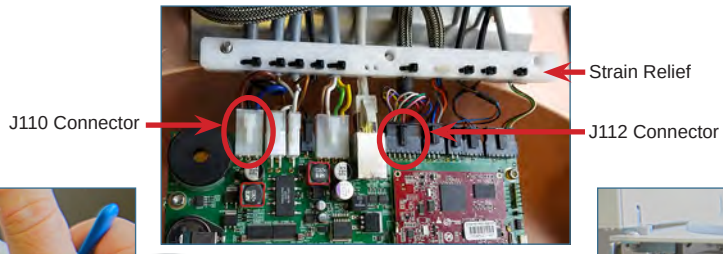


Figure 1

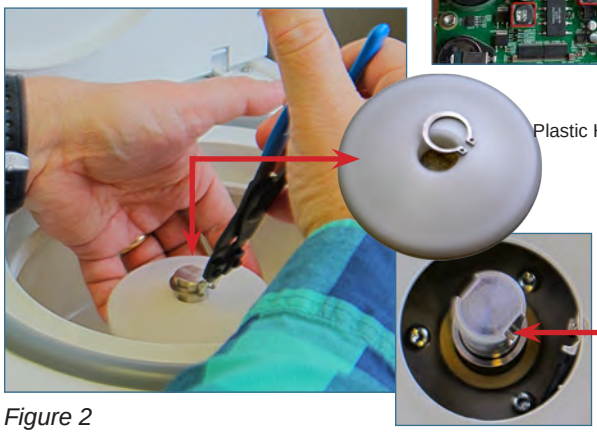


Figure 2

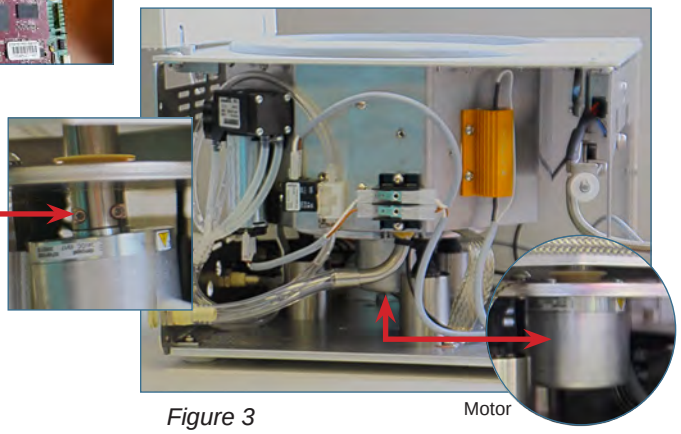


Figure 3

Remove Motor

1. Remove the front, rear and left side access panels to gain access to the motor.
2. Loosen the three (3) nuts securing the strain relief using a 7 mm socket wrench *(Figure 1)*.
3. Disconnect the connectors from the control board at J110 and J112 locations *(Figure 1)*.
4. Using wire cutters, remove the wire ties from the strain relief.
5. Using the emergency release pin, open the lid and remove the rotor.
6. Loosen and remove the snap ring around the rotor shaft using snap ring pliers *(Figure 2)*.
7. Slide the plastic hub over the rotor shaft and remove to reveal the mounting plate.
8. Using a T20 Torx screwdriver, remove the three (3) screws which surround the rotor shaft and secure the motor to the mounting plate.
9. Using a 2.5 mm Allen wrench, loosen (do not remove) the screws on the coupling around the rotor shaft. Remove the motor making note of the orientation of the motor prior to removal *(Figure 3)*.

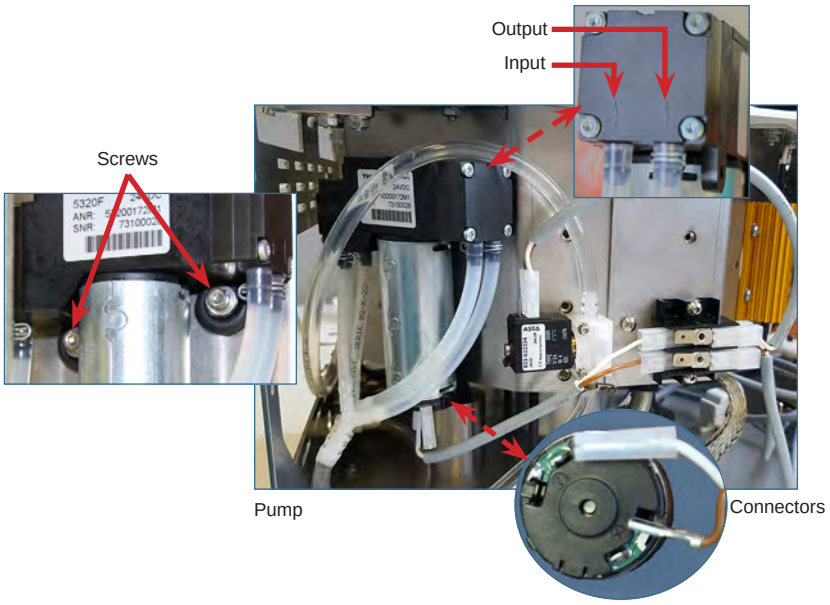
Install Motor

1. Install the new motor in the same orientation as the one removed (the tachometer on the motor should be facing the right rear corner of the unit) and secure by tightening the screws on the coupling using a 2.5 mm Allen wrench.
2. Using a T20 Torx screwdriver, secure the motor to the mounting plate with the three (3) screws.
3. Slide the plastic hub over the rotor shaft.
4. Using snap ring pliers, install the snap ring over the plastic hub to secure.
5. From the front of the unit, thread the cables through the notched openings in the strain relief and attach the connectors to the control board at J110 and J112.
6. Secure the cables to the strain relief using wire ties.
7. Secure the strain relief with the three (3) nuts using a 7 mm socket wrench.
8. Cut excess length from wire ties with wire cutters.
9. Replace the left side, front and rear access panels.

Calibrate Motor

Contact Helmer Technical Service at 800-743-5637 or techservice@helmerinc.com for calibration instruction.

5.5 Pump Replacement



Note

Liquid may escape when disconnecting saline tubes.

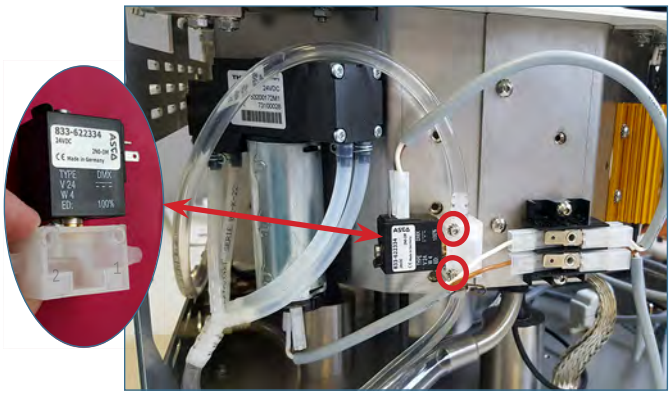
Remove Pump

1. Remove the front, rear and left side access panels to gain access to the pump.
2. Using a 2.5 mm Allen wrench, remove the two (2) screws securing the pump to the bowl housing along with the two (2) rubber grommets.
3. Carefully disconnect the two electrical connectors from the bottom of the pump noting the polarity.
4. Detach the tubing leading from the pump to the solenoid valve (output) and the tubing leading from the pump to the saline supply (input). Make note of where each tube is connected.
5. Remove the pump.

Install Pump

1. Attach tubing to the new pump in the same location as removed. Arrows are provided to show flow input from the saline supply and output to solenoid valve.
2. Attach the electrical connectors to the bottom of the pump in the same locations as removed *(Brown to positive and White to negative)*.
3. Insert the two (2) screws through the holes in the pump mounting plate then install the rubber grommets over each screw.
4. Align the screws with the threaded holes in the bowl housing and tighten using a 2.5 mm Allen wrench. Take care not to overtighten.
5. Replace the left side, front and rear access panels.

5.6 Flow Valve Replacement



Flow Valve

Note

Liquid may escape when disconnecting saline tubes.

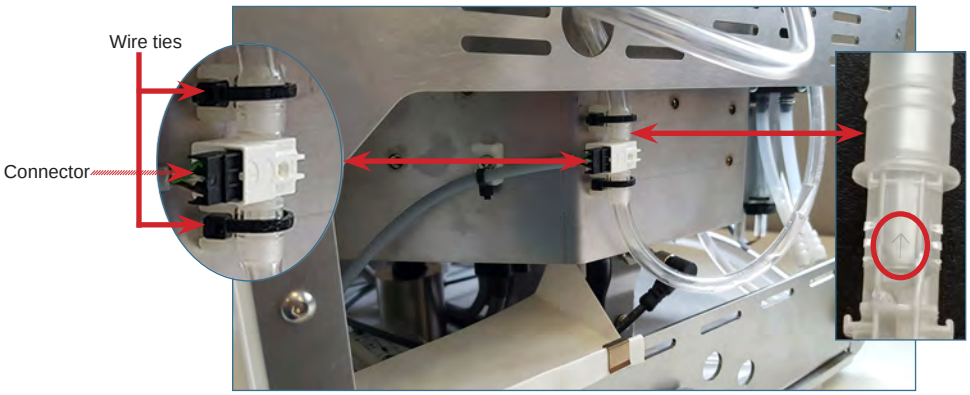
Remove Flow Valve

1. Remove the front, rear and left side access panels to gain access to the valve.
2. Using a 2 mm Allen wrench, remove the two (2) screws securing the flow valve to the bowl housing.
3. Disconnect the electrical connectors from the top of the valve making sure to note the location of each wire.
4. Detach the two tubes attached to the flow valve noting the location of each tube.

Install Flow Valve

1. Attach the two tubes to the new flow valve in the same location as previously noted *(Input = 2; Output = 1)*.
2. Connect the electrical connectors to the new flow valve in the same locations as previously noted *(the brown wire is closest to the bowl housing)*.
3. Align the screw holes in the valve with the corresponding holes in the bowl housing and hand-thread screws.
4. Tighten screws using a 2 mm Allen wrench making sure not to overtighten.
5. Replace the left side, front and rear access panels.

5.7 Flow Sensor Replacement



Flow Sensor

Note

Liquid may escape when disconnecting saline tubes.

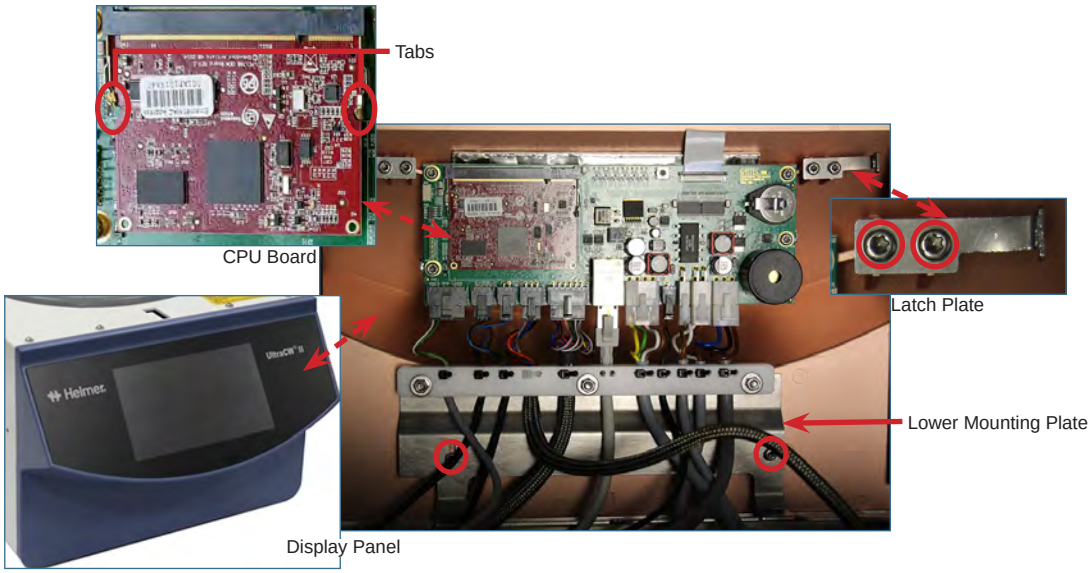
Remove Flow Sensor

1. Remove the rear access panel to gain access to the flow sensor.
2. Using wire cutters, cut the two wire ties above and below the flow sensor.
3. Disconnect the connector to the flow sensor taking care not to break the wires.
4. Disconnect the tubes at the top and bottom of the flow sensor, and remove.

Install Flow Sensor

1. Attach the tubes to the new flow sensor ensuring the directional arrow on the side of the sensor is pointing upward.
2. Connect the connector to the new flow sensor.
3. Align the sensor in the plastic brackets on the bowl housing and secure with wire ties.
4. Clip excess length from wire ties using wire cutters.
5. Replace the rear access panel.
6. Calibrate the saline volume.

5.8 Display Panel Replacement



⚠ CAUTION

Use proper ESD precautions when handling the CPU board.

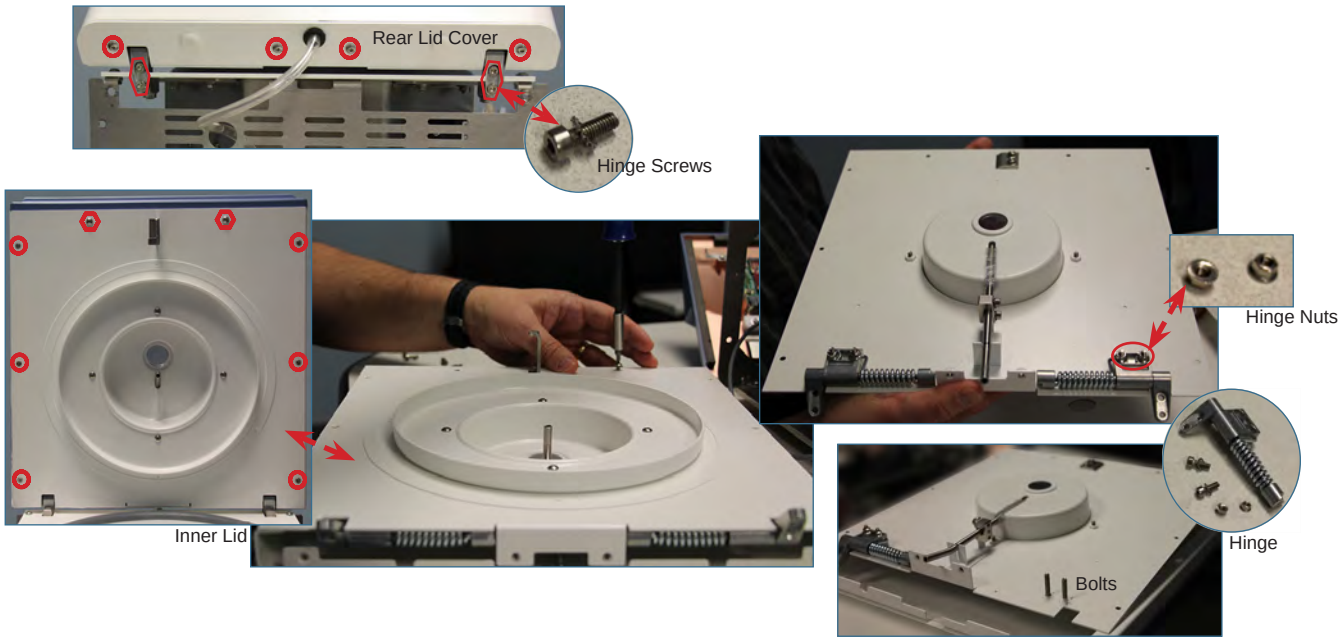
Remove Display Panel

1. With the front panel removed, using a T20 Torx screwdriver, remove the four (4) screws securing the latch plates at the top display panel. Set the plates and screws aside.
2. Disconnect all connectors from the circuit board.
3. Using the T20 Torx screwdriver, remove the two (2) screws securing the lower mounting plate.
4. Press the tabs on either side of the CPU board outward. The CPU board will flip up. Carefully remove and set aside.
5. Discard old display panel.

Install Display Panel

1. Install latch plates on new display panel and secure with four (4) screws. Tighten screws using a T20 screwdriver.
2. Secure the lower mounting plate to the display panel with the two (2) screws. Tighten screws using a T20 screwdriver.
3. Connect all connectors to the circuit board.
4. Insert the CPU board into the circuit board and snap into place ensuring the tabs are holding it securely.
5. Replace the front panel.

5.9 Hinge Replacement



Remove Hinges

1. Disconnect the saline tube from the back side of the lid.
2. Remove the four (4) screws securing the rear lid cover using 2.5 mm Allen wrench.
3. Using the lid release tool, release the lid of the cell washer but do not open.
4. Using a 3 mm Allen wrench, remove the four (4) screws with lock washers attaching the hinges to the cell washer.
5. Remove the lid and carefully place on flat, stable surface with the inside of the lid facing upward.
6. Remove the six (6) screws along the right and left sides of the inner lid using a 2 mm Allen wrench.
7. Remove the two (2) screws on the top edge of the inner lid using a 2.5 mm Allen wrench. Set the screws aside.
8. Remove the inner lid from the lid housing and place on flat surface with the hinged side facing upward.
9. Using a 7 mm open-end or adjustable wrench, remove the two (2) nuts on the right and/or left hinge securing the hinge to the inner lid.
10. Lift old hinge(s) up off of the bolts to remove and discard.

Install Hinges

1. Aligning the holes in the new hinge bracket with the bolts in the inner lid, place the new hinge over the bolts.
2. Install the nuts over the bolts to secure the hinge to the inner lid. Tighten nuts using a 7 mm open-end or adjustable wrench.
3. Place the inner lid on the lid housing with the hinge side down and aligning the screw holes on either side of the inner lid with the corresponding screw holes in the lid housing.
4. Install the six (6) screws along the left and right sides of the inner lid, and secure using a 2 mm Allen wrench.
5. Install the and two (2) screws at the top edge of the inner lid using a 2.5 mm Allen wrench to secure.
6. Carefully place the lid on top of the cell washer and secure hinges to the unit with the four (4) screws using a 3 mm Allen wrench.
7. Attach the rear lid cover with the four (4) screws. Tighten using a 2.5 mm Allen wrench.
8. Reconnect the saline tube to the back side of the lid.

6 Troubleshooting

⚠ CAUTION

Review all safety instructions prior to troubleshooting. Refer to Section 1.1.

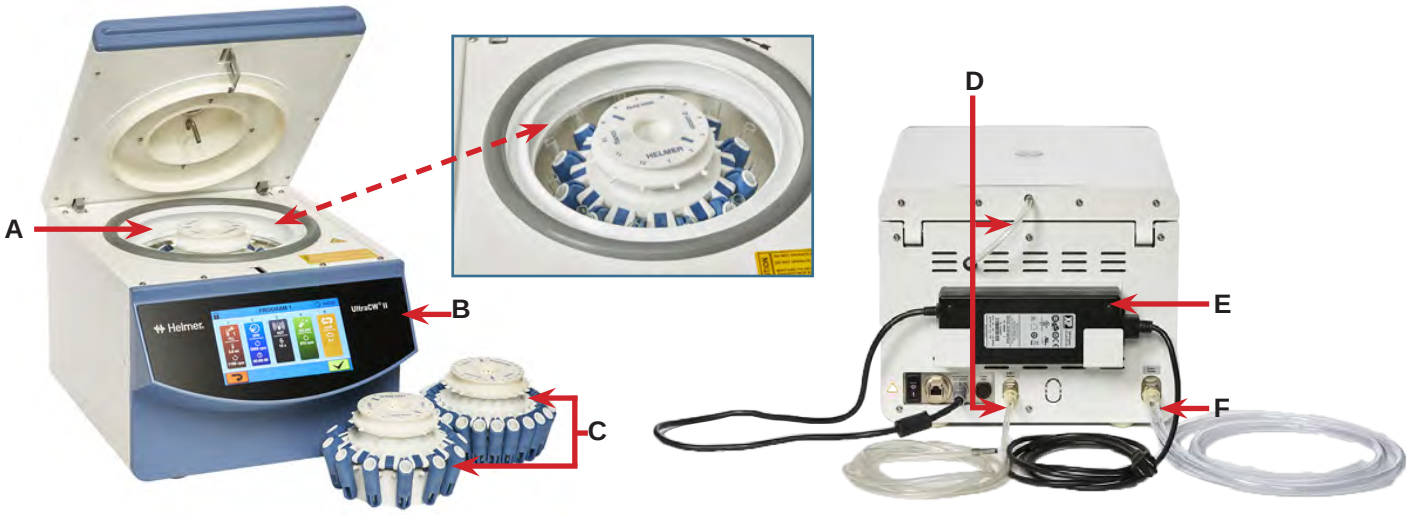
6.1 Error Messages

Error Code/Error Name	Possible Causes	Action
Motor Errors		
10 Motor Startup Error	• Motor is blocked • Motor cable connection problem • Motor power supply problem	• inspect rotor and adapter • check motor cable connection • exchange motor
11 Motor Acceleration Error	• Wrong rotor type selected • Too much mechanical friction	• select correct rotor type • exchange motor
12 Motor Acceleration Error	• Wrong rotor type selected	• select correct rotor type
13 Motor Speed Error	• Wrong rotor type selected • Maximum motor speed limit too high (not able to maintain 4000 RPM) • Motor speed control does not work properly • Motor speed reading failure	• select correct rotor type • exchange motor
14 Motor Speed Error	• Motor speed control does not work properly • Motor speed reading failure	• exchange motor
15 Motor Break Error	• Wrong rotor type selected	• select correct rotor type
16 Motor Internal Error	• Motor blocked • Motor overheated • Motor power supply error	• inspect rotor and adapter • wait for cool down / exchange motor • exchange motor
17 Motor Power Supply	• Lid detected open	• open and close lid, start again
Liquid Injection System Errors		
20 Pump Error	• Tube blocked • Pump not working • Flow sensor not working	• check tube and liquid container • inspect pump / exchange pump • inspect flow sensor / exchange flow sensor
21 Liquid Container Empty	• Liquid container empty • Air in the tube • Flow sensor problem	• check tube and liquid container • run flush-program • inspect flow sensor / exchange flow sensor
Lid Errors		
30 Lid Blocked	• Lid mechanically blocked	• check for blockage in the lid lock mechanism
31 Unlocking Failed	• Motor was still rotating when unlocking command was received • Problem with the lock	• open the lid and ensure it is working properly • exchange the lid lock
32 Unexpected Unlocking	• Emergency unlocking was used	• close the lid and start the program again
33 Lid Detection Failure	• Wrong lid detection of the lid sensor • Wrong lock detection of the lock sensor	• inspect lid and lock sensor for proper functionality
System Errors		
40 Program Reading Error	• Program file is corrupted • Not enough heap memory was available	• check program and start the program again • power off the device, wait 10 seconds and power on the device, select the program and start it again
42 Eeprom Error	• Eeprom not initialized (Service User login needed) • Communication failure	• login with a service password and accept the error • power off the device, wait 10 seconds and power on
Miscellaneous		
50 Unknown	• Unexpected behavior	• ---

Error Code/Error Name	Possible Causes	Action
51 Program Interrupted	• Power interrupted during a running program	• ensure power cord is properly plugged into power receptacle and power supply • ensure power supply is properly connected to the cell washer on back of unit • exchange power-cord and or power-supply – start the program again
52 Program Aborted by User	• User has aborted the program	• ---
53 Imbalance	• Rotor was not loaded symmetrically • Positioning of the imbalance sensor not correct	• load rotor correctly and start the program again • check the imbalance sensor for correct working

7 Parts

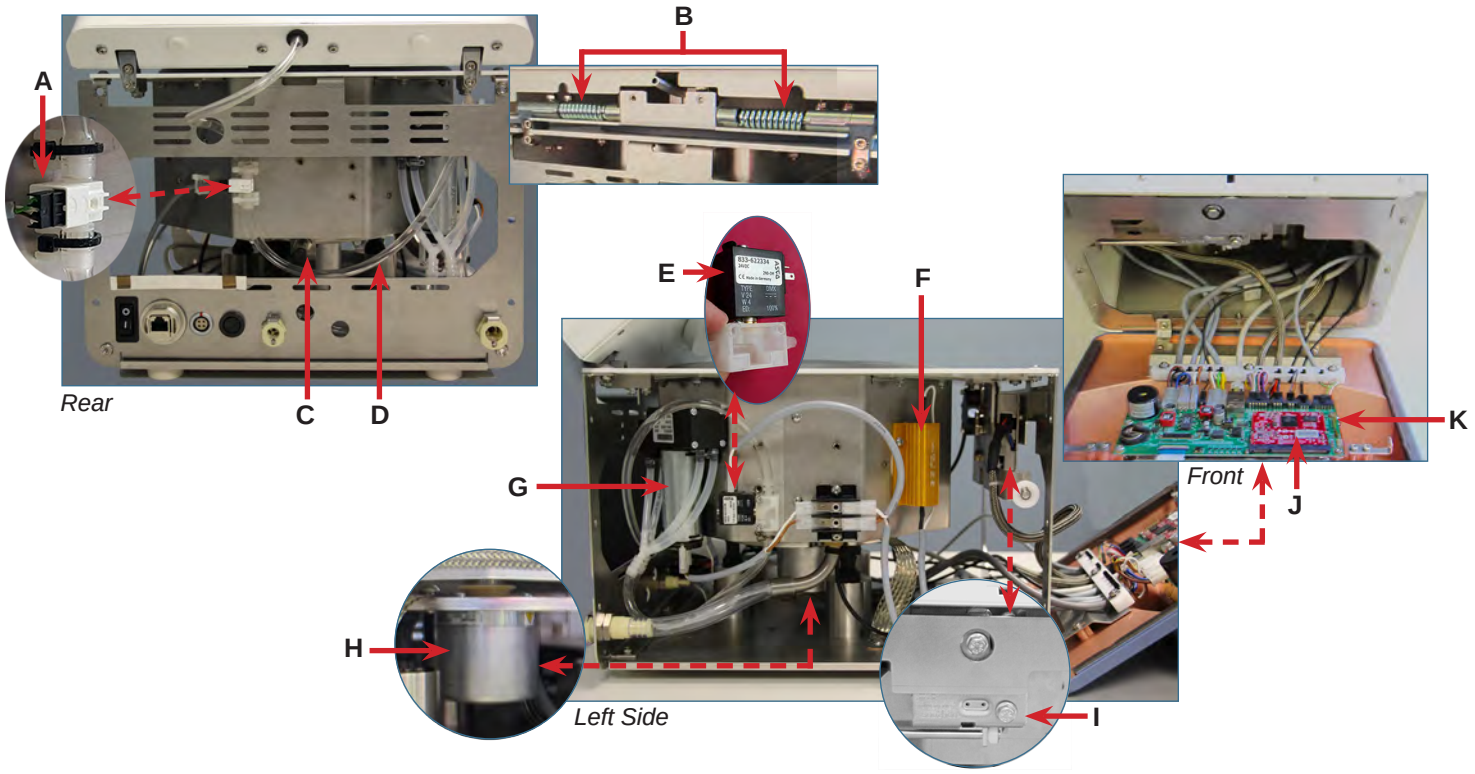
7.1 Front, Rear and Bowl



Letter	Description	Part Number
A	Bowl	800958-1
B	Display Panel	800957-1
C	Rotor (12-place)	CW1012-A
	Rotor (24-place)	CW1024-A

Letter	Description	Part Number
D	Saline Tube (external)	800945-1
E	Power Supply	UC.E705
F	Drain Tube	800944-1

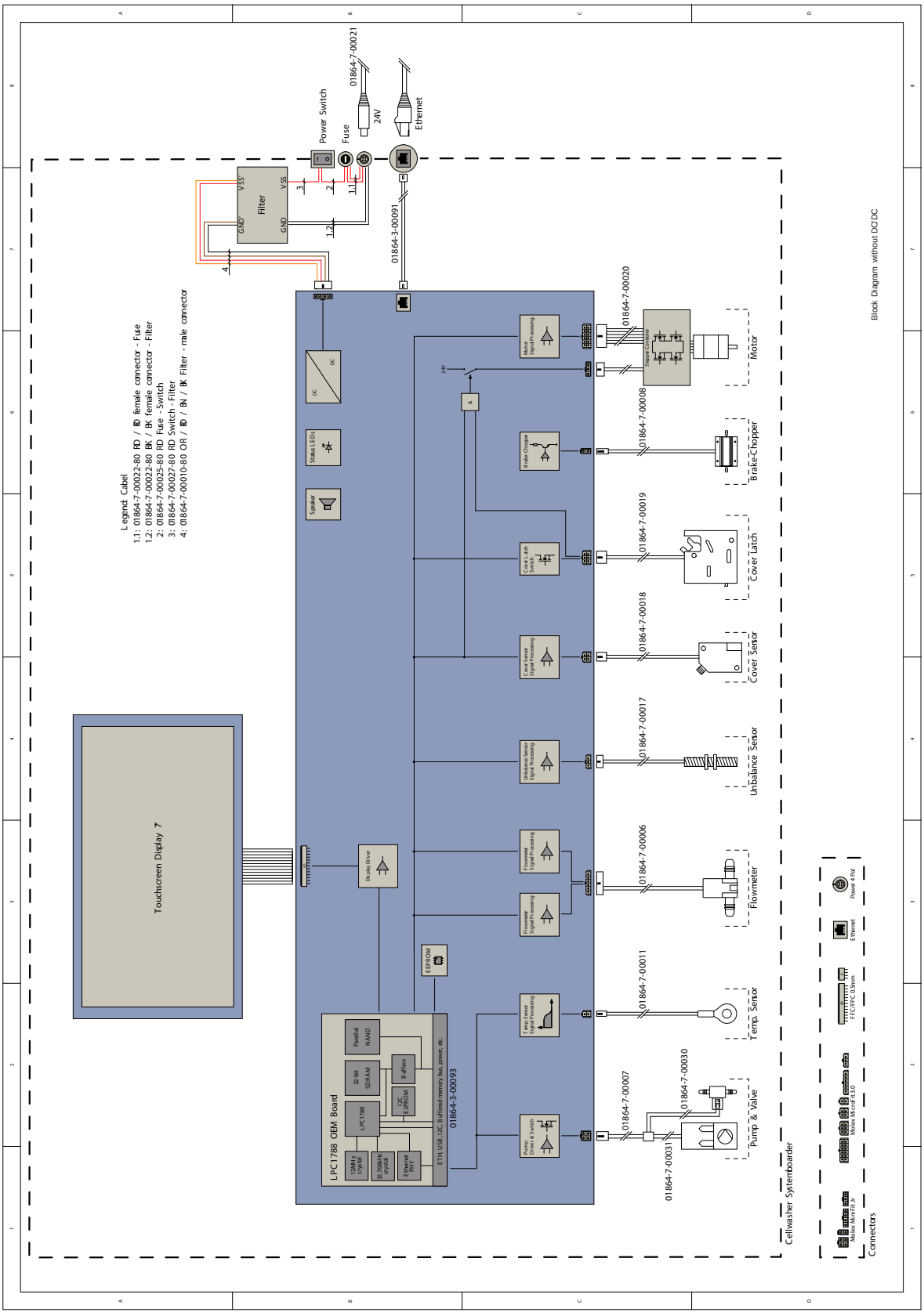
7.2 Interior

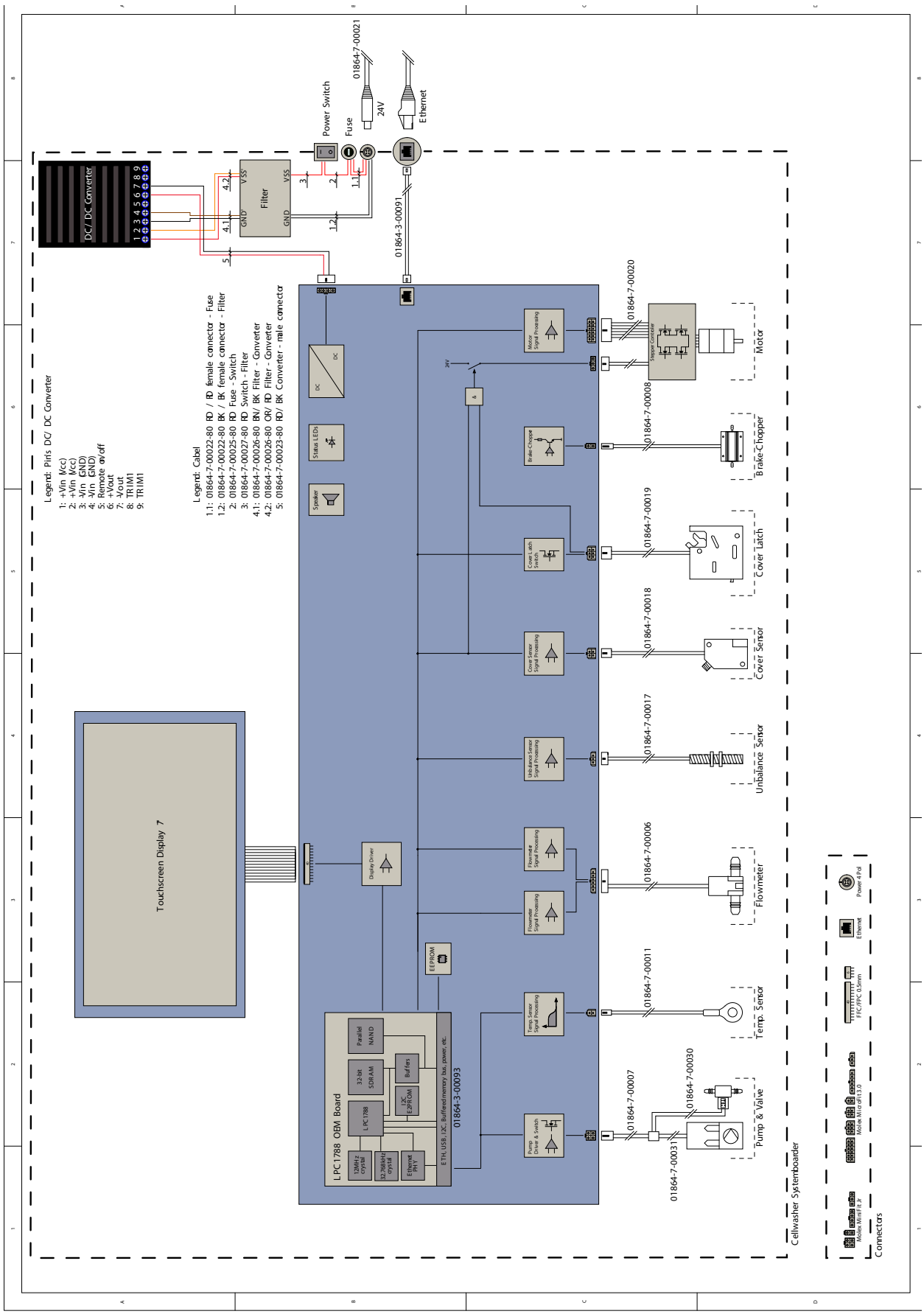


Letter	Description	Part Number
A	Flow Sensor	800939-1
B	Hinge (right)	800955-1
	Hinge (left)	800956-1
C	Imbalance Sensor	UC.E109
D	Saline Tubing (internal)	800940-1
E	Flow Valve (solenoid valve)	800942-1

Letter	Description	Part Number
F	Motor Brake	800949-1
G	Saline Pump	800941-1
H	Motor	800943-1
I	Lid Latch	800948-1
J	CPU Board	800947-1
K	Control Board	800946-1

8 Schematics




Legend: Pin's DC/ DC Converter
1: +Vin (Vcc)
2: +Vin (Vcc)
3: -Vin GND)
4: -Vin GND)
5: Remote on/off
6: +Vout
7: -Vout
8: TRIM1
9: TRIM1
Legend: Cabel
1.1: 01864-7-00022-80 RD / RD female connector - Fuse
1.2: 01864-7-00022-80 BK / BK female connector - Filter
2: 01864-7-00025-80 RD Fuse - Switch
3: 01864-7-00027-80 RD Switch - Filter
4.1: 01864-7-00026-80 BN/ BK Filter - Converter
4.2: 01864-7-00026-80 OR/ RD Filter - Converter
5: 01864-7-00023-80 RD/ BK Converter - male connector
DC/ DC Converter
Filter
Power Switch
Fuse
24V
Ethernet
01864-7-00021
01864-3-00091
Touchscreen Display 7
LPC1788 OEM Board
01864-3-00093
Motor
Brake-Chopper
Cover Latch
Cover Sensor
Unbalance Sensor
Flowmeter
Temp. Sensor
Pump & Valve
Cellwasher Systemboarder
Connectors

Appendix A - Compliance

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.

Sound level (dependent on rotor): ≤ 49 dB(A)

WEEE Compliance

The WEEE symbol (right) indicates this product falls under the scope of the WEEE (Waste Electrical and Electronic Equipment) directive.

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.

Appendix B - Warranty

USA and Canada

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

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.

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. Expendable items include specimen tubes, saline supply tubing, drain tubing, internal saline supply tubing, pump tubing, and saline supply fittings.

Defective parts must be returned, prepaid, with previous return authorization. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

Labor

For a period of one (1) year Helmer will cover repair labor costs, provided the product is returned to Helmer for warranty service. Alternatively, your service 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.

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.

Additional warranty information

The time periods set forth above begin two (2) 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.

Outside of USA and Canada

Consult your local distributor for warranty information.

Helmer Scientific
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