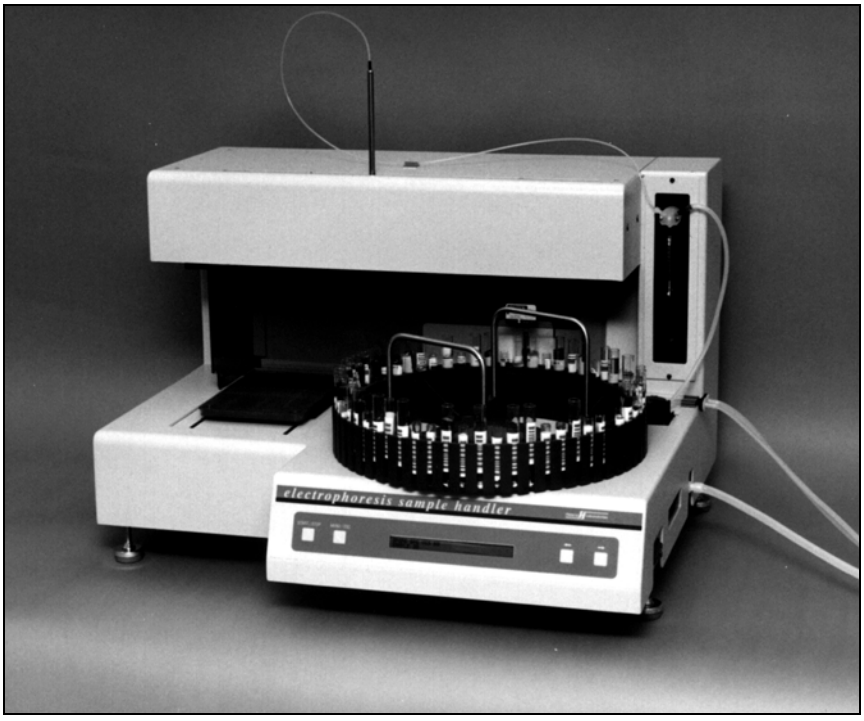
Helena Laboratories

Electrophoresis Sample Handler

(Automatic Sample Handler for Electrophoresis)



Operator's Manual

Catalog Number 1341: 120/240 Vac

Electrophoresis Sample Handler

(Automatic Sample Handler for Electrophoresis)

Operator’s Manual

WARNING!

DO NOT ATTEMPT TO MOVE, INSTALL, OR OPERATE THIS INSTRUMENT BEFORE READING AND UNDERSTANDING THE CONTENTS OF THIS MANUAL, PARTICULARLY THE PRECAUTIONS, LIMITATIONS AND HAZARDS IN SECTIONS THREE AND FOUR.

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Helena Laboratories
1530 Lindbergh Dr./P.O. Box 752
Beaumont, Texas 77704 USA
Telephone (409) 842-3714

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Section 1 - Instrument Use and Function

Helena's Electrophoresis Sample Handler (Figure 1-1) is used to automatically load sample onto sample cups and sample trays for Helena Laboratories SPIFE 2000 and SPIFE 3000 instruments. The Electrophoresis Sample Handler is intended for in-vitro diagnostic use only, and is for use in a laboratory or similar environment.

The Electrophoresis Sample Handler contains preprogrammed test parameters for Lipoproteins, Cholesterol, Serum IFEs, and Proteins. IFEs are available with five different dilution schemes. Proteins are available as standard SPE and as Split Beta. If you wish to change the program parameters for any test, you must contact Helena Laboratories for assistance.

Refer to the procedure supplied with the reagents for information on the following areas:

- Summary
- Principle
- Reagents
- Instruments
- Specimen Collection and Handling
- Reagent Preparation
- Sample Application
- Test Procedure
- Performance Characteristics
- Stability of End Product
- Expected results
- References
- Evaluation of the Bands
- Interpretation of Results
- Bibliography

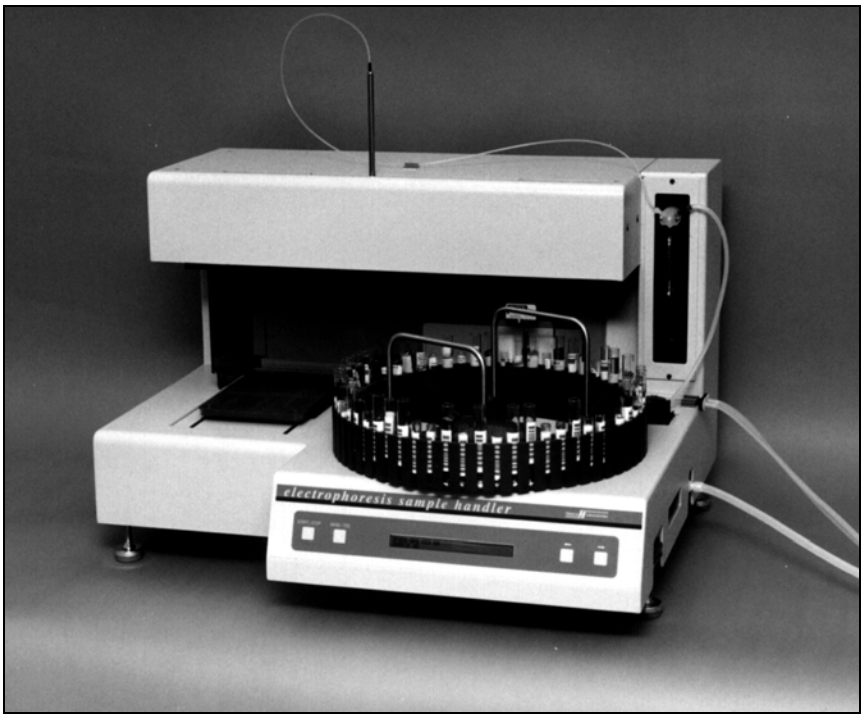

Figure 1-1. Electrophoresis Sample Handler

Section 2 - Principles of Operation

The functional units of the Electrophoresis Sample Handler are shown in Figure 2-1. Operation is controlled by a microprocessor and its programmed memory, and by four push buttons.

The Sample Handler contains a sample arm assembly (controlling sample delivery and transport), two independent motor control modules (controlling movement of the sample arm), a bar code reader, and a 3½" disk drive. RS232 outputs are provided for data transfer to and from a Laboratory Information System (LIS) and/or a Helena Electrophoresis system.

Software updates are provided via standard, high-density 3½" diskettes using the disk drive. A disk containing a setup utility for bar code parameters and test parameters also interfaces via the disk drive.

Using the four pushbuttons, the user may select the type of test, start or stop the automatic sequence of operations, wash the applicator and pump tubing, select test parameters, and change displayed menus. Patient data, control values, and other data are manually entered into the associated electrophoresis instrument worklist by the instrument's keyboard, or automatically entered by reading a bar code and using the LIS interface.

When automatic operation is started using one of the pushbuttons, the instrument can perform the following operations. Test identification, verification that the correct sample tray is installed for the test selected, sample identification by reading a bar code label (if used) on the sample tube, obtain patient demographics from the LIS (if used), dilute each sample (if required), transfer a predetermined amount of sample from sample tubes to the sample tray, and transfer patient demographics to the electrophoresis instrument.

The computer runs a self-test at power on to detect error conditions or potential problems. If an error is detected, the computer responds by displaying an error message (see Section 10.2, Troubleshooting).

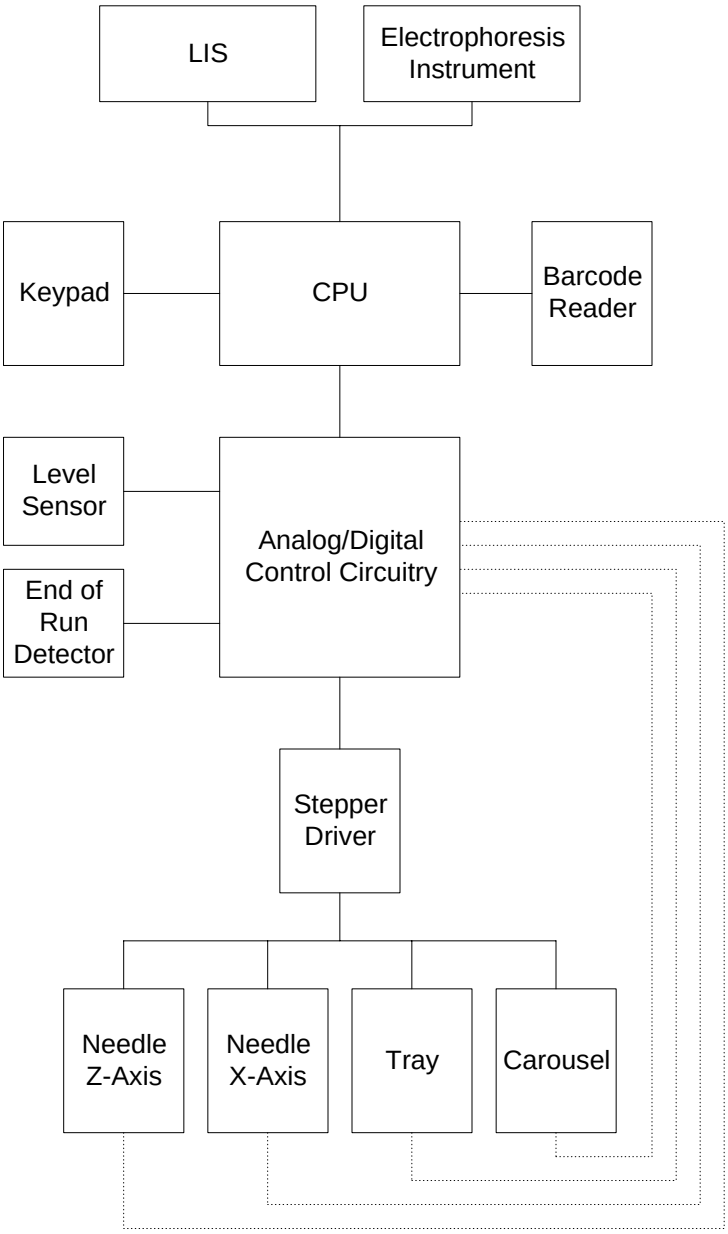

Figure 2-1. Block Diagram

Section 3 - Precautions and Limitations

3.1. The entire operator's manual should be read and understood before attempting instrument operation.

3.2. Refer to the procedure supplied with the gels and reagents for proper diluent preparation and handling and other information.

3.3. Provide adequate room at the sides and back of the instrument for good air circulation.

3.4. Should an instrument be contaminated by blood or blood derivative, spray any contaminated surface with a commercial virucidal and germicidal agent. Observe where the specimens are used inside the instrument and confine cleaning to that area. Wipe up the residue. These materials contain alcohol and alcohol is a corrosive to metal surfaces.

No harsh cleansers, acids, or bases should be used or spilled on inner or outer surfaces. Do not immerse the unit. **ALWAYS UNPLUG THE MAIN POWER CORD BEFORE CLEANING.**

3.5. Do not expose the instrument to drafts or to direct sunlight. Do not operate at temperatures above 81° F (27° C) or below 59° F (15° C), or allow prolonged exposure to high humidity.

3.6. Use only diluent made specifically for use with the Helena procedure in use.

3.7. Do not place the instrument near a strong source of electromagnetic interference, such as a centrifuge, x-ray machine, etc.

3.8. For emergency shut down, disconnect the Electrophoresis Sample Handler power cord.

3.9. Keep hands and clothing away from the applicator arm when in operation.

3.10. Do not expose the sample trays to temperatures above 158° F (70° C), or severe warping of the trays may result, making them unusable.

3.11. Installation is to be performed by the operator.

3.12. This instrument should **not** be connected to any other devices or instruments in any way not described in this manual.

3.13. Instructions for the "responsible body*" (*Under IEC 61010-2-101:2002 -- the person(s) responsible for the use and maintenance of equipment and for ensuring that operators are adequately trained for eliminating and reducing hazards involved in removal from use, transportation, or disposal.)

3.14. Action(s) to be taken in case of malfunction: See section 3.8 and 10.2.

3.15. Requirements for handling biohazards: Due to potential biohazard risk from human based components (blood, CSF [Cerebrospinal Fluid], urine, plasma, blood cells, ect.), guidelines pertaining to Universal Precautions shall be adhered to when handling the samples and operating this instrument. This includes the use of protective gloves and any other protective equipment as warranted for safe handling and disposal of test tubes, reagents, applicators, or other items containing or contaminated by biohazards and use, transportation and disposal of this device. For information on minimizing biohazard risk, see to section 3.4.

3.16. Storage and transport environmental requirements:
Operating Temperature range: 15° – 27° C.
Storage and shipping temperatures: -20° – 45° C.

3.17. The Helena Agent shall provide a power cord or adapter of the proper configuration for the country in which the instrument is to be installed. The power cord or adapter will comply with IEC 60227, IEC 60245, or be certified as rated for the power specified in section 9 of this manual.

Section 4 - Hazards

4.1. If the instrument is used in a manner not specified by this manual, the protection provided by equipment design may be impaired.

4.2. This device contains very high voltages, which can be extremely dangerous. Safeguards are built into the instrument to prevent user contact with high voltage; however, **ALWAYS TURN OFF THE POWER, DISCONNECT THE MAIN POWER CORDS, AND USE EXTREME CARE** when attempting disassembly for cleaning, repair, or adjustments. **Do not operate any instrument with the cover removed.**

4.3. Do not attempt to operate the instrument without plugging the power cord into an easily accessible, grounded AC wall outlet of the proper voltage and frequency. This information is contained on the serial number plate located on the back of the instrument.

4.4. Caution: Do not place fingers under the sample probe when the instrument is in use.

4.5. Do not lubricate the instrument.

4.6. Use only diluent specified by the Helena procedure in use. Damage to the instrument may result from introducing some types of solutions into the instrument.

4.7. Follow safe handling and disposal procedures for diluent used with this instrument.

4.8. In case of power loss or brown out (low voltage) during operation, clean the sample tray as described in section seven and repeat the run.

4.9. WARNING: The bar code reader on this instrument is equipped with a CLASS II LASER. Its output is <1 milliwatt; however, permanent eye damage could occur if it is stared into.

4.10. WARNING: External equipment (barcode reader, keyboard, computer, etc.) that is connected to the instrument must have no live parts that are accessible.

Section 5 - Installation Instructions

WARNING: Read Section Three (Precautions and Limitations) and Section Four (Hazards) before attempting installation or operation.

5.1. Unpacking and Inspection

1. Check all shipping containers for signs of damage. If damage is found, immediately notify the shipping carrier.

2. Carefully unpack the instrument and accessories and remove them from the shipping cartons. The packing material should be removed undamaged, if possible, should repacking be necessary.

CAUTION: The instrument and its components are heavy. Lift only from the bottom surface of the instrument. Use approved lifting techniques when moving the instrument.

3. Remove plastic wrappings from the instrument and accessories. If scissors or a knife are used to cut the plastic or binding tape, take care not to scratch the instrument.

4. Inspect the instrument for any obvious signs of damage. If damage is found, notify the shipping carrier and Helena Laboratories.

5. Inventory all items: If any parts are missing, recheck the packing materials before notifying Helena Laboratories.

Table 5-1. Inventory

1 Electrophoresis Sample Handler
1 Carousel
3 Lengths of Tubing
1 Screwdriver
1 Level
1 Diluent Bottle and Cap
1 DI water Bottle and Cap
1 Saline Bottle and Cap
1 Waste Bottle and Cap
2 Fuses
1 End of Run Marker (8JM37033)
1 Power Cord
1 Calibration Template (86370009)
1 Needle Cleaning Wire (8JM20111)
1 Operator's Manual
1 Installation Report
1 Program Disk (recovery media for backup or archival purpose only) with adhesive sleeve
1 Syringe Seal and O-ring Replacement Kit (8JM81043)

5.2. Installation

NOTE: The Electrophoresis Sample Handler is a "Category II" device under EN 61010-1 and is for use in a laboratory or similar environment.

6. Select an environment free of drafts, direct sunlight, excessive humidity and dust, and large temperature fluctuations. Ambient temperature should be between 59° to 81° F (15° to 27° C).

7. Place the unit on a level, flat surface (Figure 5-1).

8. To install the carousel in the instrument, line up the slot in the carousel with the pin on the hub (Figure 5-2) and press down.

9. Place the bubble level (provided) in the center of the sample tray holder and adjust the two feet on the lower right side to level the instrument. The sample tray holder should be level both from side-to-side and from front-to-back.

10. If interfacing to an LIS, plug the LIS interface cable into the receptacle on the back panel marked LIS (Figure 5-3).

11. If interfacing to an electrophoresis instrument, plug the interface cable into the receptacle on the back panel marked REP (Figure 5-3). Refer to the electrophoresis instrument Operator's Manual for further information on interfacing the instrument.

12. Remove the shipping bracket before powering up. Remove the screw securing the bracket on the left side. Rotate the bracket clockwise. Disengage the plastic lock from the slot and remove the bracket. Replace the screw. Retain the shipping bracket for use when shipping the instrument.

13. Plug the power cord into the receptacle provided at the back of the instrument. Plug the other end into a grounded wall outlet of the proper voltage and frequency. Because the power cord is the mains disconnect device, the wall outlet used should be easily accessible. This information can be found on

the serial number plate located on the back of the instrument.

The wall outlet should not be on the same circuit as any large load device such as a refrigerator, compressor, centrifuge, etc. The instrument's circuitry contains filters to reduce the effect of line voltage fluctuations; however, they should still be avoided. If the operator experiences difficulty, it may be necessary to install an isolation transformer.

14. The instrument has two black pumps located on the right side of the instrument, behind and to the right of the carousel (Figure 5-4). Each pump is connected to a check valve by about 3" of tubing (Figure 5-4). One of the pumps is also connected to another check valve and the wash station (Figure 5-1). The other pump is also connected to the syringe (Figure 5-1). The pumps may be shipped without their pump heads installed. The pump heads are reinstalled by aligning the hole in the bottom of the pump head with the appropriate post protruding from the pumps. Install the pump head connected to the wash station to the post coming from the pump located farthest back and left (Figure 5-4). Install the pump head connected to the syringe to the post coming from the pump located farthest forward and right (Figure 5-4). With the pump heads installed, remove the caps from each of the check valves (Figure 5-4).

NOTE: Do not remove the check valves; if they are removed, they must be replaced in the same orientation, or water/saline will not be drawn into the instrument.

15. Confirm the two pieces of small diameter tubing are "V" cut on one end (cut if necessary). The end of the tubing entering the vat must be "V" cut to ensure proper operation. (For an illustration of the "V" cut, see the instruction card included with one of the three pieces of tubing.) Attach the ends of the small diameter tubing not "V" cut to the check valves.

16. Fill the DI water bottle with deionized water and the Saline bottle with saline. Place each bottle next to the instrument or on the floor on the right side (Figure 5-5).

17. Run the ends of the tubing attached to the check valves through the appropriate bottle lid until the tubes touch the bottom of the bottles: Connect the DI water bottle to the check valve connected to the tubing that leads to the Syringe. Connect the Saline bottle to the check valve that leads to the pump labeled "Saline" which then leads to the Wash Station (Figure 5-1). Confirm tubes are connected to the correct bottle, as reversing the order will cause the instrument to malfunction.

18. Attach the piece of large diameter tubing to the Hazardous Waste outlet located on the lower right side of the instrument (Figure 5-5). Put the Hazardous Waste bottle on the floor to the right of the instrument (Figure 5-5). Run the end of the tubing through the bottle lid, extending only slightly into the bottle. If necessary, cut off excess tubing about ½ inch under the lid. Screw on the cap.

CAUTION: Do not allow the end of the waste tube to be submerged, and never put the waste bottle above the outlet. Note that the waste tubing should always go to an unrestricted waste drain or bottle.

All bottles connected to the instrument must be vented to the atmosphere. The waste bottle must be placed below the instrument.

19. Turn on the power. The instrument performs a brief self-test, the displays should briefly show the following menu. If an error message appears instead, refer to the section 10.2, Troubleshooting.

```
EP SAMPLE HANDLER  VER xx.xx/xx
COPYRIGHT (c) xxxx HELENA LABORATORIES
```

(with the xs representing the current version and copyright date)

20. After the self-test, a Status menu like one of the following will appear:

```
TEST?
READY
```

```
SPIFE VIS CHOLESTEROL 100
READY
```

21. Prior to use, the instrument must be primed. See section 10.1.2 for instructions.

5.3. Programming Alarm Volume

1. From the Status menu, press **MENU/ESC**. The Setup menu appears:

```
[TEST] WASH ALARM INTERFACE MORE
SELECT TEST FOR SAMPLE LOADING.
```

2. Use the **arrow keys** to bracket *Alarm* and then press **START/STOP**. The following menu appears:

```
ALARM VOLUME
OFF  1  2  3  4 [5] 6  7  8  9  10
```

3. Use the **arrow keys** to bracket a setting. Press **START/STOP**. The menu will return to the Setup menu and the alarm will sound.

4. Repeat steps 2 and 3 until the volume is appropriate.

5.4. Programming Interfaces

The instrument may be programmed with parameters for the LIS and electrophoresis instrument interfaces.

1. From the Setup menu, press the **arrow keys** until *INTERFACE* is in brackets.

```
TEST  WASH  ALARM [INTERFACE] MORE.
SETUP  RS-232  INTERFACE.
```

2. Press **START/STOP**. The following menu appears:

```
IS THIS UNIT INTERFACED TO AN EXTERNAL
COMPUTER SYSTEM (LIS)?          [NO]  YES
```

3. If interfacing with an LIS, use the **arrow keys** to bracket *YES* and then press **START/STOP**.

If not interfacing with an LIS, use the **arrow keys** to bracket *NO* and then press **START/STOP**.

The following menu will appear:

```
ELECTROPHORESIS INSTRUMENT:
NONE  REP-2  REP-3  CS-3  QS-2000
```

4. If interfacing with an electrophoresis instrument, use the **arrow keys** to bracket the name of the appropriate instrument and then press **START/STOP**.

If not interfacing with an electrophoresis instrument, use the **arrow keys** to bracket *NONE* and then press **START/STOP**.

5. If an LIS and/or electrophoresis instrument is selected the following menus will display to allow for the appropriate interface parameters to be selected. The LIS and/or electrophoresis instrument in the interface determines the appropriate interface parameters. For each of the menus, use the **arrow keys** to bracket the appropriate parameter and then press **START/STOP**.

```
BAUD RATE
1200  2400  4800  9600  14400
```

```
DATA BITS
7  8
```

```
STOP BITS
1  2
```

```
PARITY
NONE  ODD  EVEN
```

```
PROTOCOL
NONE  XON-XOFF  ASTM
```

```
NUMBER OF PATIENT DEMOGRAPHIC FIELDS
1 2 3 4 5 6 7 8 9 10
```

```
POSITIVE SAMPLE IDENTIFICATION:
NO  YES
```

6. After selecting the last parameter, to return to the Status menu, press **MENU/ESC**.

5.5. Programming Bar Codes

1. From the Setup menu below, use the **arrow keys** to bracket *MORE*:

```
TEST  WASH  ALARM  INTERFACE [MORE]
GO TO NEXT MENU.
```

2. Press **START/STOP**. The following menu appears:

[BAR_CODE] BACKUP RESTORE UPDATE SELECT BAR CODE(S) TO BE USED.

3. Confirm that *BAR_CODE* is bracketed (if not use the **arrow keys** to bracket). Press **START/STOP**.

4. Select *YES* for all the bar code types needed. Select *NO* for all the bar code types not needed. Note that the quantity of bar codes selected can slow down the bar code reader. Use the **arrow keys** to bracket the appropriate response, *YES* or *NO*, and then press **START/STOP** for each of the following menus:

CODE 39 NO [YES]

CODABAR NO [YES]

INTERLEAVED 2/5 NO [YES]

UPC NO [YES]

EAN NO [YES]

CODE 128 NO [YES]

5. After the final bar code type is reviewed, to return to the Status menu, press **MENU/ESC**.

Note: Other selections are discussed in section 7.

5.6. Program and Backup Disks

1. Attach the adhesive backed sleeve containing the Program disk onto the side of the instrument.

2. Create and store a backup disk using the instructions in section 7.8.

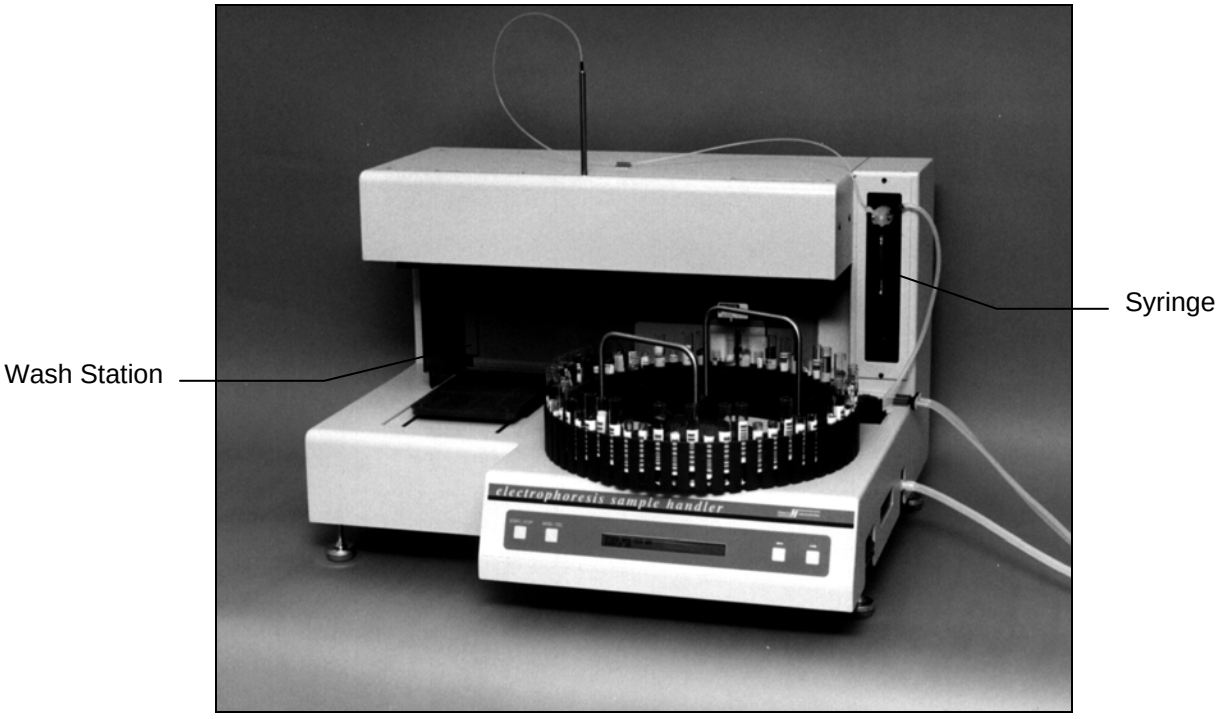

Figure 5-1. Instrument Setup

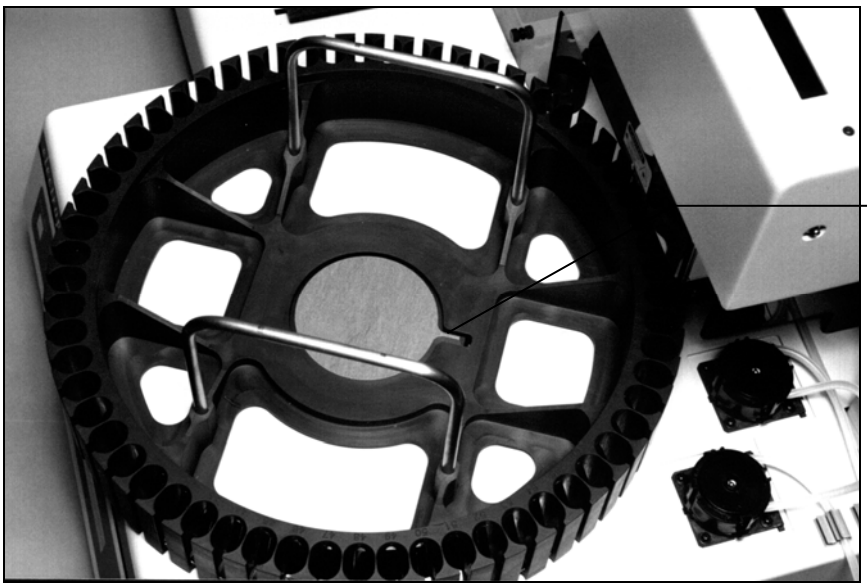

Figure 5-2. Carousel Installation

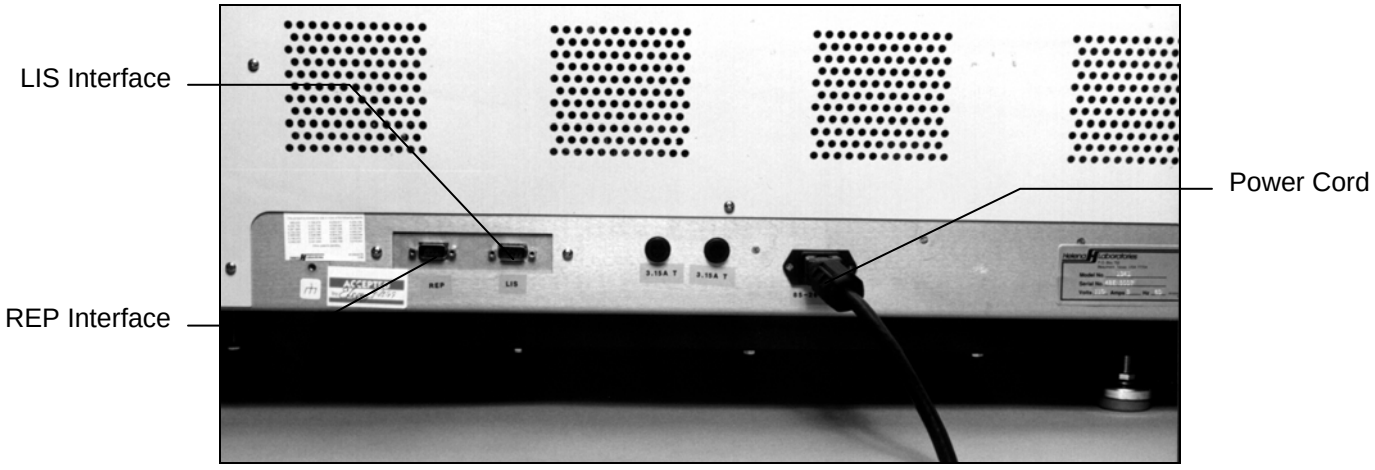

Figure 5-3. Back Panel

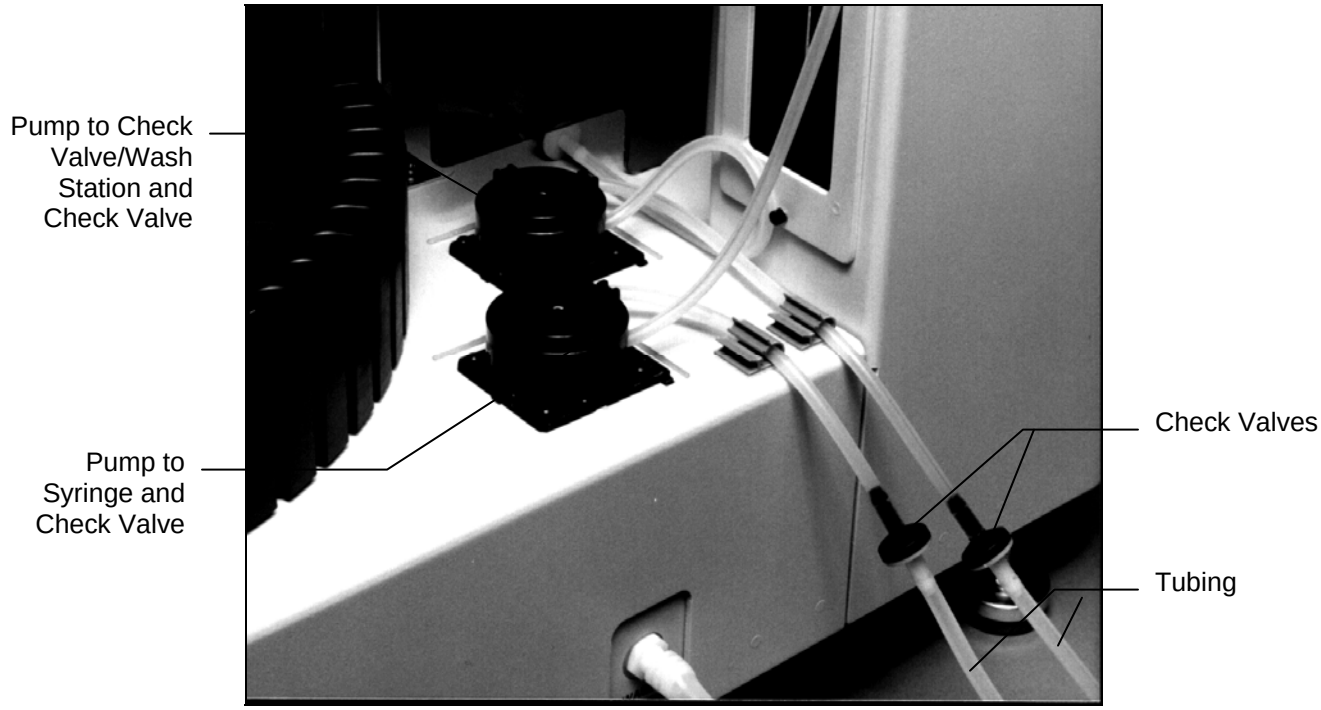

Figure 5-4. Pumps and Tubing

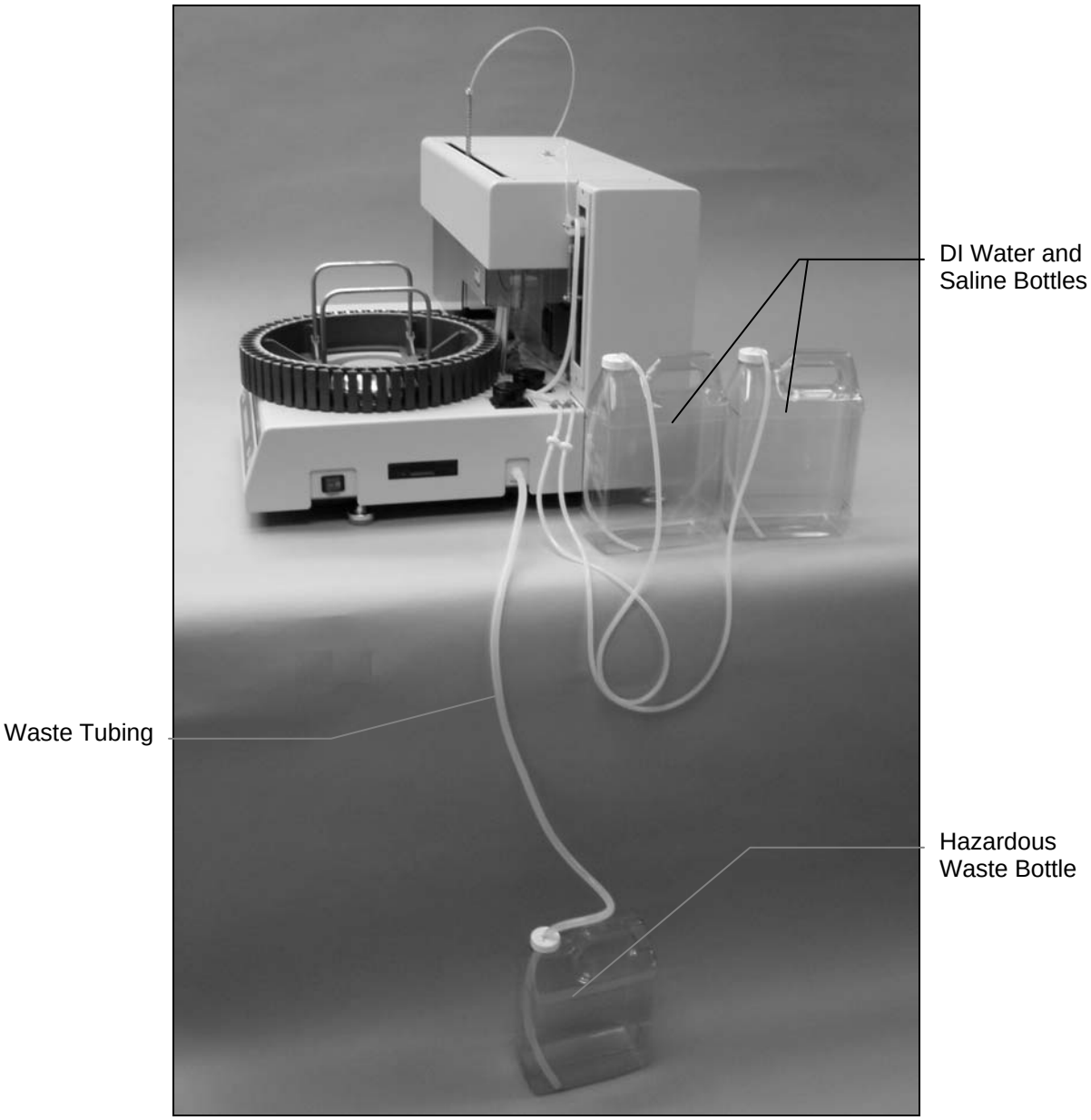

Figure 5-5. DI Water, Saline, and Hazardous Waste Bottles

Section 6 - Controls and Displays

The following descriptions refer to Figure 6-1 and Figure 6-2.

1. Display: One 40-character by 2-line liquid crystal display is provided. The display shows test type, test parameters, and prompts or messages throughout operation.

2. START/STOP Button: Starts or stops operation of instrument or selects a test type or test parameters, etc.

3. MENU/ESC Button: Press to display Setup menu; press to “escape” back to a previous menu without storing changes.

4. Left Arrow Button: Moves bracket to the left on the display to allow selection of a desired parameter or action. Also moves carousel counter-clockwise.

5. Right Arrow Button: Moves bracket to the right on the display to allow selection of a desired parameter or action. Also moves carousel clockwise.

6. Power Switch: A red switch on right side of Electrophoresis Sample Handler, which controls power to the instrument.

7. Disk Drive Button: Press to eject a disk from the disk drive.

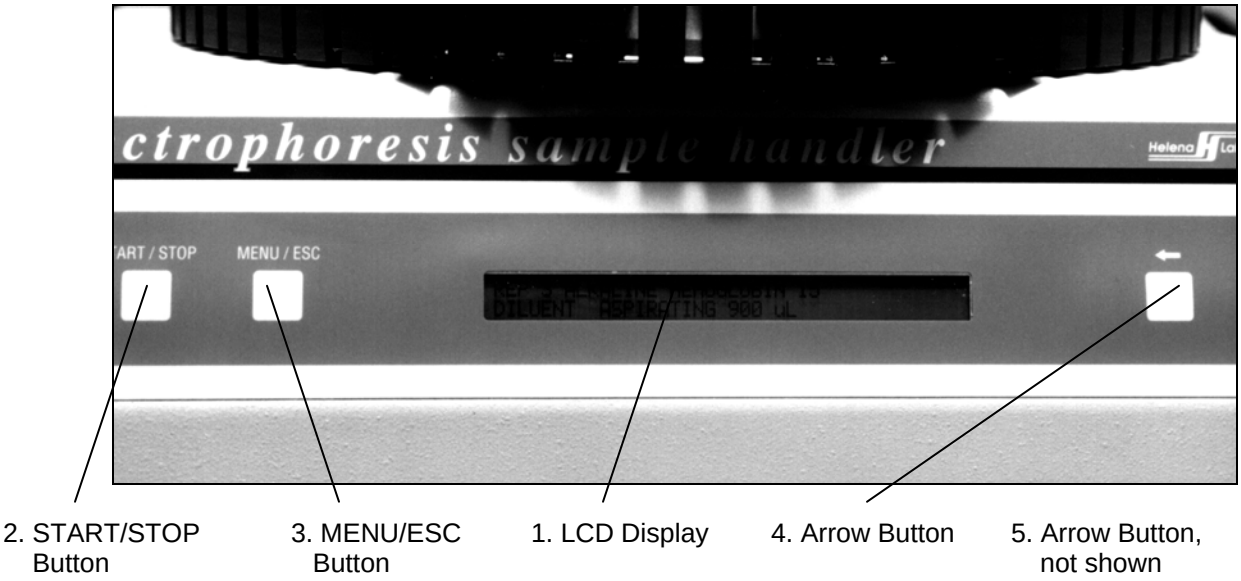

Figure 6-1. Control Panel

Figure 6-2. Power Switch and Disc Drive Button

Section 7 - Operating Instructions

CAUTION: Do not attempt to operate this instrument until you have read and understood this manual, particularly section three, Precautions and Limitations and section four, Hazards.

If the system has not been run previously, go through all of section five before proceeding.

If the instrument does not perform as described in this manual, refer to Troubleshooting, section 10.2 or contact Helena Laboratories.

7.1. Enter Patient Information

The sample handler can use bar codes to identify test type and sample tubes. If you are interfaced with an LIS, you can transfer this data to the electrophoresis instrument. Load the samples as described below. Patient information will be automatically transferred from the LIS to the sample handler and from the sample handler to the patient worklist in the electrophoresis instrument, when requests to do so have been received from the electrophoresis system. For instructions, refer to the electrophoresis instrument's Operator's Manual.

If you are not using an LIS, patient information must be manually entered in the worklist of the electrophoresis instrument you are using. Refer to the instrument's Operator's Manual for instructions.

7.2. Preparation

1. Turn on the power switch, located on the right side of the instrument. A self-test takes place and the following menu is briefly displayed:

```
EP SAMPLE HANDLER  VER xx.xx/xx
COPYRIGHT (c) xxxx HELENA LABORATORIES
```

(with the xs representing the current version and copyright date)

2. When a Status menu displaying a test type appears, the instrument is ready for operation. No warm up time is necessary. The following is an example of a Status menu:

```
SPIFE VIS CHOLESTEROL 100
READY
```

3. Fill the DI water and Saline bottles and empty the Hazardous Waste bottle.

4. Daily, prior to first use, prime the instrument. See section 10.1.2 for instructions.

5. For instructions on specimen collection and handling, reagent preparation, and preparation of patient samples and controls, refer to the appropriate sections in the procedure supplied with the reagents.

NOTE: For SPIFE VIS SPE - 20, 40, and 60, to compensate for evaporation during sample dispensing, a difference exists between the quantity of sample dispensed and the quantity of sample indicated in the procedures supplied with the reagents. The instrument dispenses 19 µL; however, the procedure specifies 17 µL

6. Position the correct sample tray on the holder as shown in Figure 7-1 and Figure 7-2, matching the 3 pins on the holder with the holes on the tray. **Make sure that the tray rests with the bar code identification label facing down.** If the test procedure requires it, load the sample tray with sample cups.

7. If performing IFE tests, fill the Diluent Bottle with 0.85% Saline and place the bottle in the Diluent Bottle Holder. The holder is located between the wash station and the bar code reader (Figure 7-3).

8. If desired, the entire carousel can be removed from the instrument for loading or cleaning on a work bench. Simply hold the carousel on either side and lift up firmly. To replace, line up the slot in the carousel with the pin on the hub (Figure 5-2) and press down.

9. Place an empty sample tube in the "x" position of the carousel. The tube should be bar code labeled with the test type to be run, and positioned with the label facing straight

back toward the bar code reader. If desired, the test can be manually selected (see section 7.3).

NOTE: When using bar codes, position the test tubes in the carousel so that the bar code label is positioned facing out in the vertical slot on the circumference of the carousel (Figure 7-4). Ensure that the entire bar code label is visible in the vertical slot.

10. Load the samples in the carousel in the same order as listed on the densitometer's worklist (see section 7.1), **beginning at position 1.** It is best to load consecutively without skipping positions. If a position is skipped in the carousel, the corresponding position on the worklist will be skipped. If less than the maximum number of samples for the selected test are to be loaded, place the End of Run Marker (8JM37033) in the carousel immediately following the last tube. If the selected test uses a sample tray that holds more than 60 samples, the maximum the carousel can hold, the instrument will prompt to replace the carousel when the first 60 samples have been loaded. At that point, either remove the current carousel and replace it with another carousel containing the remaining samples to be loaded or remove the tubes from the current carousel and replace them with the remaining sample tubes to be loaded. With the carousel replaced, press **START/STOP** to continue loading.

7.3. Select Test

1. If the test displayed on the Status menu is not correct or no test is displayed, press **MENU/ESC**. The Setup menu appears:

```
[TEST] WASH ALARM INTERFACE MORE
SELECT TEST FOR SAMPLE LOADING.
```

2. If the brackets are not around *TEST*, use the **arrow keys** to bracket *TEST*.

3. Press **START/STOP** and use the **arrow keys** to scroll through the list of tests to the desired test type.

4. Press **START/STOP** and then press **MENU/ESC**. The Status menu will appear with the desired test displayed.

7.4. Automatic Operation

1. With the correct test type displayed, simply press **START/STOP** to begin operation. All further operation is automatic.

2. When a run is complete, an alarm will sound. Transfer the loaded sample tray to the appropriate electrophoresis instrument. Refer to the instrument's Operator's Manual and to the test procedure for further instructions.

NOTE: If you want to change operating parameters for any test, call Helena Laboratories for assistance.

7.5. To Abort Operation

Press **START/STOP** to abort operation at any time. When operation is interrupted for any reason, perform a *WASH*. Clean and dry the sample tray and replace it in the instrument. See section 7.6 for these procedures.

7.6. End of Day Cleanup

1. When finished for the day, soak the sample trays in REP Wash for approximately 15 minutes, rinse thoroughly with water, and then rinse in deionized water.

2. Drain the tray and dry with compressed air.

3. Dispose of the sample tubes in a biohazard container.

4. From the Status menu, press **MENU/ESC**. Use the **arrow keys** to bracket *WASH* and then press **START/STOP**. Once the *WASH* is complete, to return to the Status menu, press **MENU/ESC**.

7.7. Results

Refer to the following sections of the procedure supplied with the reagents for a complete discussion of results and their interpretation: Instruments, Evaluation of Bands, Stability of End Product, Results, Expected Values, Performance Characteristics, and Interpretation of Results.

7.8. Backup

Bar code and test parameters can be backed up on a 3½" disk for storage outside the sample handler.

1. To back up data, begin from a Status menu similar to the following:

```
SPIFE VIS CHOLESTEROL 100
READY
```

2. Press **MENU/ESC**. The Setup menu appears:

```
[TEST] WASH ALARM INTERFACE MORE
SELECT TEST FOR SAMPLE LOADING.
```

3. Use the **arrow keys** to bracket *MORE*, and then press **START/STOP**. The following menu appears:

```
[BAR_CODE] BACKUP RESTORE UPDATE
SELECT BAR CODE(S) TO BE USED.
```

4. Use the **arrow keys** to bracket *BACKUP* and press **START/STOP**. The following menu appears:

```
INSERT A BLANK, FORMATTED FLOPPY DISK.
PRESS START WHEN READY.
```

5. Insert a blank, formatted disk or the disk previously used for backup into the disk drive, label side up and toward you, and press until it snaps into place.

6. Press **START/STOP**. The Sample Handler transfers setup and calibration data to the backup disk.

7. When the transfer of data is complete, press **MENU/ESC** to return to the Status menu.

8. Press the disk drive button to remove the disk. Label the disk with the instrument's serial number and 'Backup'. Store the disk in the bag/ sleeve containing the instrument's software disk.

7.9. Restore

1. To restore backed up data, begin from a Status menu similar to the following:

```
SPIFE VIS CHOLESTEROL 100
READY
```

2. Press **MENU/ESC**. The Setup menu appears:

```
[TEST] WASH ALARM INTERFACE MORE
SELECT TEST FOR SAMPLE LOADING.
```

3. Use the **arrow keys** to bracket *MORE* and then press **START/STOP**. The following menu appears:

```
[BAR_CODE] BACKUP RESTORE UPDATE
SELECT BAR CODE(S) TO BE USED.
```

4. Use the **arrow keys** to bracket *RESTORE* and then press **START/STOP**. The following message appears:

```
INSERT FLOPPY WITH SETUP / CALIBRATION
DATA, PRESS START WHEN READY.
```

5. Insert the backup disk in the disk drive, label up and facing you, and press it in until it snaps in place.

6. Press **START/STOP**. Setup and calibration data is transferred from the backup disk to the Sample Handler.

7. When the transfer of data is complete, press **MENU/ESC** to return to the Status menu.

8. Press the disk drive button to remove the disk and store the disk appropriately.

9. Turn the power off, wait 5 seconds, and turn it on.

7.10. Update Software

1. To load a software upgrade disk, begin from a Status menu similar to the following:

```
SPIFE VIS CHOLESTEROL 100
READY
```

2. Press **MENU/ESC**. The Setup menu appears:

```
[TEST] WASH ALARM INTERFACE MORE
SELECT TEST FOR SAMPLE LOADING.
```

3. Use the **arrow keys** to bracket *MORE* and then press **START/STOP**. The following menu appears:

```
[BAR_CODE] BACKUP  RESTORE  UPDATE
SELECT BAR CODE(S) TO BE USED.
```

4. Use the **arrow keys** to bracket *UPDATE* and then press **START/STOP**. The following message appears:

```
INSERT SOFTWARE UPDATE DISK.
PRESS START TO BEGIN UPDATE.
```

5. Insert the software upgrade disk in the disk drive, label up and facing you, and press it in until it snaps in place.

6. Press **START/STOP**. The software is updated automatically.

7. When the update is complete, the following message appears:

```
SOFTWARE INSTALLATION COMPLETED.
REMOVE THE FLOPPY, PRESS ESC.
```

8. Press the disk drive button to remove the disk and store the disk appropriately.

9. Press **MENU/ESC** and the following message appears:

```
TO RESTART WITH NEW SOFTWARE, TURN POWER OFF.
WAIT 5 SECONDS. TURN POWER ON.
```

10. Turn the power off, wait 5 seconds, and turn it on. The new software should be in effect. A self-test takes place and the following menu is briefly displayed:

```
EP SAMPLE HANDLER  VER xx.xx/xx
COPYRIGHT (c) xxxx HELENA LABORATORIES
```

(with the xs representing the current version and copyright date)

11. Note the version number on the display during self-test and check it against the version on the upgrade disk to confirm the upgrade was successful.

12. If an error message appears or the correct menu does not appear, the software should be reloaded. Turn the power off, reinsert the software disk, and turn the power on. Repeat steps 7 through 11. If again the software does not load correctly, call Helena Laboratories for assistance.

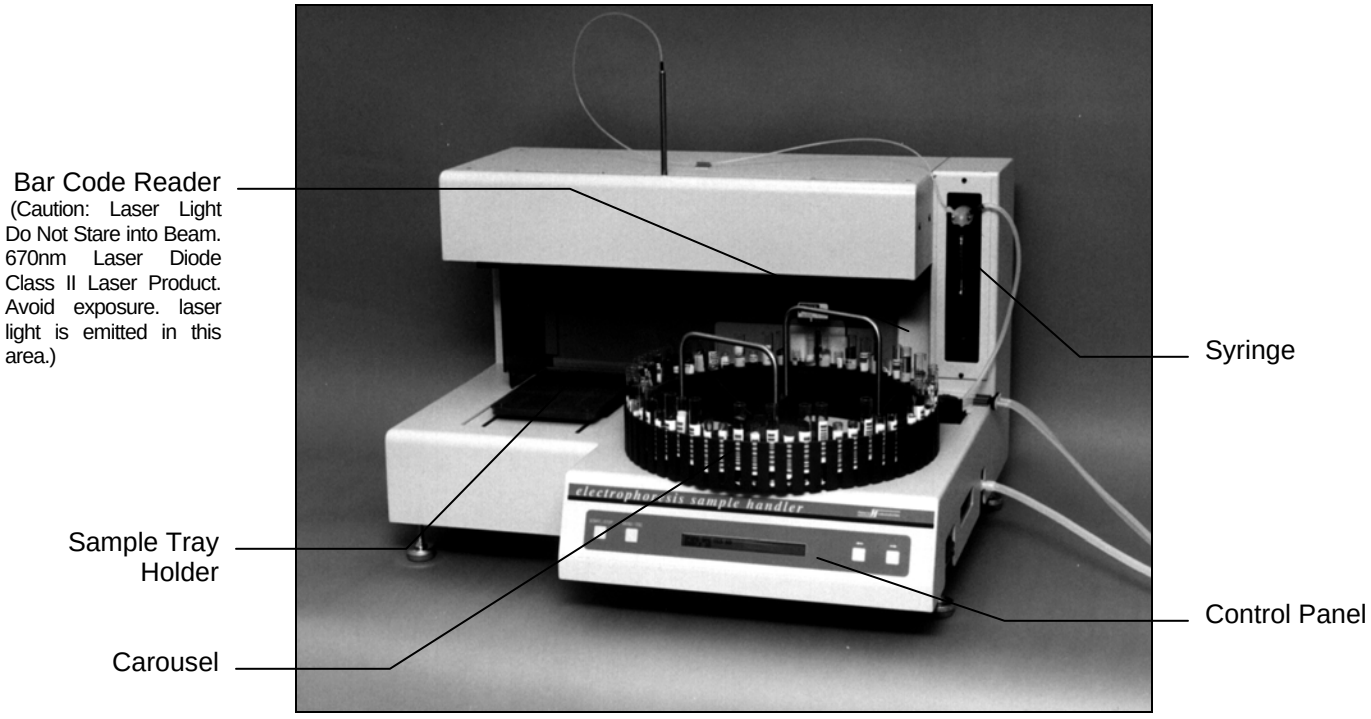

Figure 7-1. Parts of the Instrument

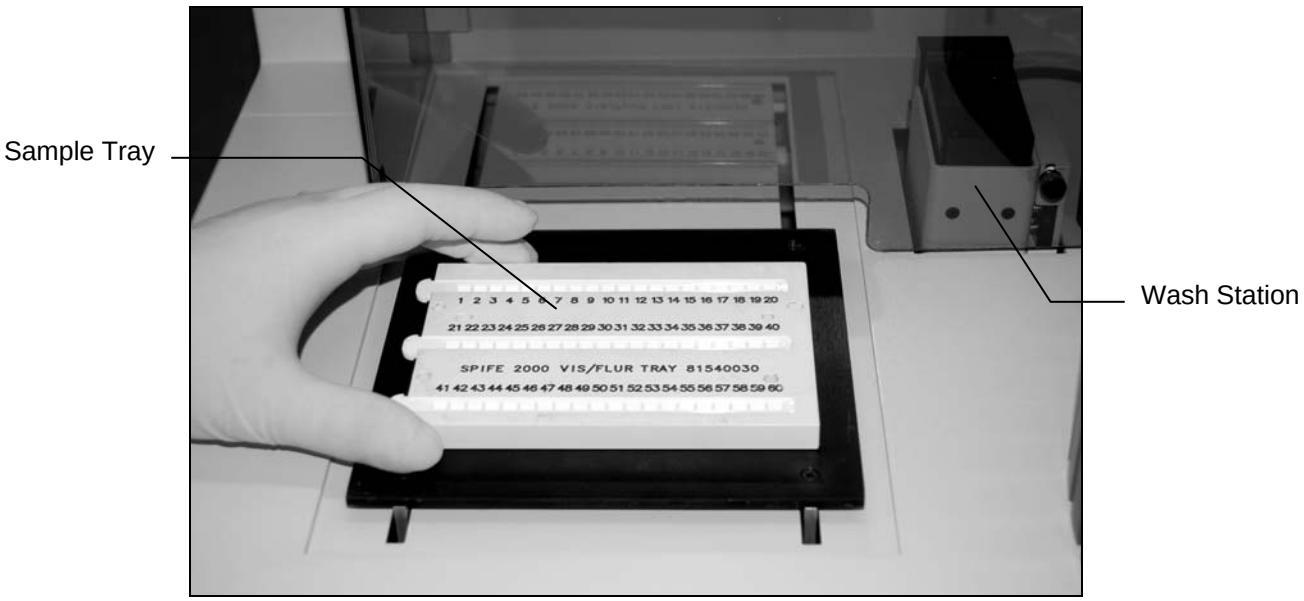

Figure 7-2. Position the Sample Tray on the Holder

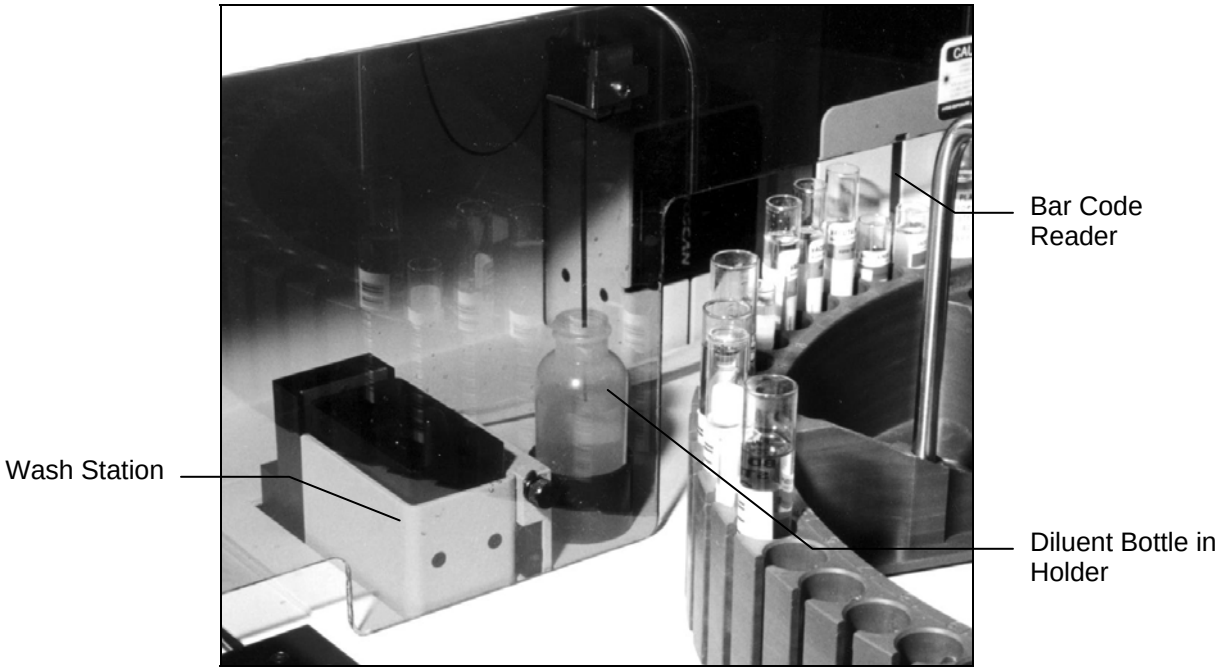

Figure 7-3. Diluent Bottle Holder and Wash Station

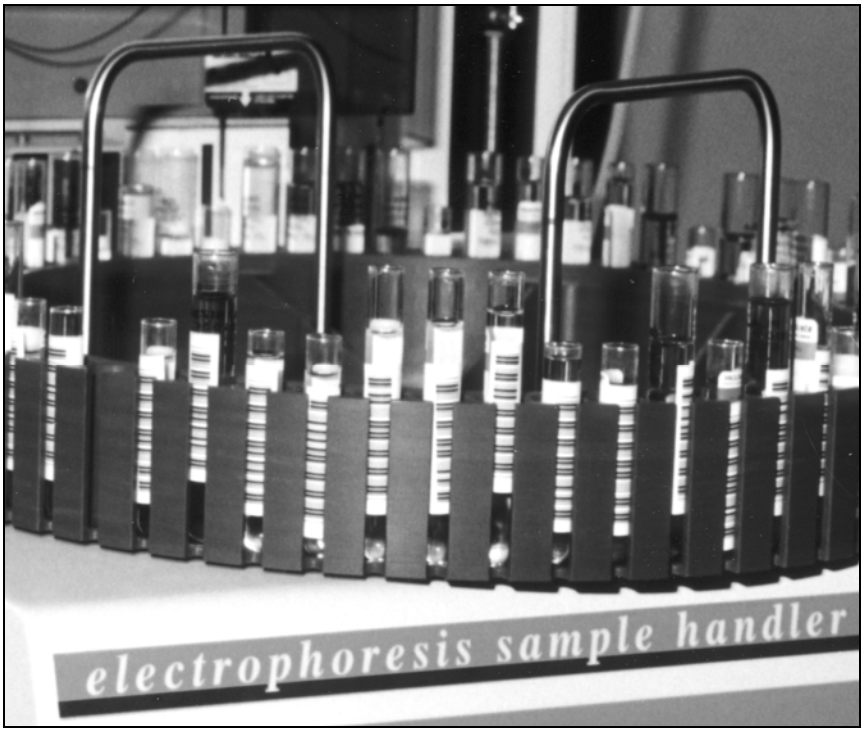

Figure 7-4. Bar Codes Facing Out

Section 8 - Test Functions and Quality Control

The instrument automatically performs a self-test any time the power is turned on. Should an error message appear on the display, see section 10.2, Troubleshooting.

Section 9 - Performance Specifications

Electrophoresis Instruments: SPIFE 2000 and SPIFE 3000.

Densitometer Instruments: QuickScan 2000, REP 2, REP 3, and CliniScan 3.

Sample Added to Sample Wells: Varies with test type

Minimum Sample Volume: 500µL

Displays: 2x40 character liquid crystal display

Input Power: Cat. No. 1341: 120/240 Vac (85-264 Vac), 50/60 Hz

Fuses: F1, F2: 3.0A T/250V

Dimensions: 19 in. (46 cm) High
30 in. (76 cm) Wide
26 in. (66 cm) Deep

Weight: 100 lb. (45 kg)

Operating Environment: 15° to 27° C (59° to 81°F)

Pump System: 2 peristaltic pumps, 1 syringe pump

Computer System: Integral AT compatible computer with one 3½" disk drive

Test Tubes: 13-16 mm diameter, 75-100 mm height

Bar Codes:

Type	**Character Density** Minimum Bar Width	**Ratio** Thin to Thick	**Maximum Characters** Bar Width
Code 3 of 6 (Code 9) (alphanumeric)	0.0075	3:1	10
Codabar (numeric)	0.0098	n/a	10
Interleaved 2 of 5 (numeric)	0.0075	3:1	20
UPC - 12 (numeric)	0.014	n/a	13
EAN, L reduced (numeric)	0.014	n/a	13
CODE 128 (alphanumeric)	0.0075	3:1	25

Electrophoresis Instrument and LIS Interfacing:

Ports: 3-wire RS232, no hardware handshaking

Electrophoresis Instrument Download Request	ASCII text string "<EPSH"
Programmable Baud Rate:	1200, 2400, 4800, 9600, 14400
Programmable Data Bits:	7, 8
Programmable Stop Bits:	1, 2
Programmable Parity:	None, Odd, Even
Programmable Protocol:	None, XON-XOFF, ASTM

Section 10 - Maintenance, Troubleshooting, Warranty

This section describes routine operator maintenance procedures. For instrument calibration or for maintenance not described in this manual, call Helena Laboratories for assistance.

10.1. Maintenance

WARNING: The Electrophoresis Sample Handler is factory lubricated. Do NOT lubricate the instrument.

Table 10-1. Preventative Maintenance Schedule

Daily, if used
Inspect/Clean Needle
Wash/Prime Electrophoresis Sample Handler
Clean Sample Trays
Weekly
Clean Needle
Clean/Bleach DI Water and Saline Bottles
Monthly
Bleach Electrophoresis Sample Handler
As Needed
Replace Tubing/Pump
Replace Fuses
Replace/Calibrate Needle
Backup Parameters
Replace Syringe Seal and O-ring

Daily, if used

10.1.1. Inspect/Clean Needle

After every run, inspect for sample adhering to the sides of the needle. If this occurs, or if sample will not apply, clean the needle with an alcohol swab and allow the needle to dry.

10.1.2. Wash/Prime Electrophoresis Sample Handler

1. Every day, confirm the bottles are full of deionized water and saline, and the waste bottle is empty.

2. From the Status menu, press **MENU/ESC**. Use the **arrow keys** to bracket *WASH* and then press **START/STOP**. The wash operation will ensure that no bubbles are in the lines.

3. Repeat step 2 if needed to ensure the tubing is primed and there are no air bubbles in the lines.

4. Once the *WASH* is complete, return to the Status menu by pressing **MENU/ESC** and, if necessary, empty the waste bottle and/or refill the bottles.

10.1.3. Clean Sample Trays

1. Soak non-disposable sample trays in REP Wash for approximately 15 minutes, rinse thoroughly with water, and then rinse in deionized water.

2. Drain the tray and dry with compressed air.

3. Dispose of the sample tubes in a biohazard container.

Weekly

10.1.4. Clean Needle

Run the Needle Cleaning Wire (8JM20111) up through the end of the needle to clear any debris.

10.1.5. Clean/Bleach DI Water and Saline Bottles

1. Once a week, empty the DI water bottle and the Saline bottle, located on the right side of the instrument.

2. Clean out the bottles with a 10% bleach solution to prevent bacterial or fungal contamination.

3. Rinse the bottles thoroughly with DI water to remove the bleach solution.

4. Refill and replace the DI water and Saline bottles.

5. Insert the tubing into the appropriate bottle and run the ends of the tubing through the lids until the tubes touch the bottom of the bottles: Connect the DI water bottle to the check valve connected to the tubing that leads to the Syringe. Connect the Saline bottle to the check valve that leads to the pump labeled

"Saline" which then leads to the Wash Station (Figure 5-1). Confirm tubes are connected to the correct bottle, as reversing the order will cause the instrument to malfunction.

6. From the Status menu, press **MENU/ESC**. Use the **arrow keys** to bracket *WASH* and then press **START/STOP**. The wash operation will ensure that no bubbles are in the lines.

7. Repeat step 6 if needed to ensure the tubing is primed and there are no air bubbles in the lines.

Monthly

10.1.6. Bleach Electrophoresis Sample Handler

1. Once a month, prepare approximately 100 mL of a 10% bleach solution.

2. Remove the tubing from the bottles located on the right hand side of the instrument and place in bleach solution.

3. Press **MENU/ESC**, use the **arrow keys** to bracket *WASH* and press **START/STOP**. Repeat until approximately 60 mL of bleach solution has been pumped through the tubing and needle.

4. Allow the solution to sit in the tubing for 15 minutes.

5. Remove the tubing from the bleach solution and rinse the outer surface of the tubing with DI water.

6. Insert the tubing into 200 mL of clean DI water.

7. Press **MENU/ESC**, use the **arrow keys** to bracket *WASH* and press **START/STOP**. Repeat until all 200 mL of DI water is pumped through the system.

NOTE: It is important to thoroughly rinse the system with DI water after bleaching. Failure to do so could cause erroneous results.

8. Refill and replace the DI water and Saline bottles.

9. Insert the tubing into the appropriate bottle and run the ends of the tubing through the lids until the tubes touch the bottom of the bottles: Connect the DI water bottle to the check valve connected to the tubing that leads to the Syringe. Connect the Saline bottle to the check valve that leads to the pump labeled "Saline" which then leads to the Wash Station (Figure 5-1). Confirm tubes are connected to the correct bottle, as reversing the order will cause the instrument to malfunction.

10. Repeat step 7 if needed to ensure the tubing is primed and there are no air bubbles in the lines.

As Needed

10.1.7. Replace Tubing/Pump(s)

1. To allow for easier access, remove the carousel by holding it on either side and firmly lifting up.

2. For the pump being replaced (Saline or Syringe), disconnect the tubing (see Figure 10-4 for connection locations).

3. To remove the pump, press the two levers on either side of the pump and pull up, completely removing the pump and tubing assembly.

4. If replacing the Syringe pump, hold the new pump (8JM37040) with the tubes exiting to the right and the lettering facing up. Grab the tube closest and firmly pull it through the pump head until the other end of the tubing is approximately half the length of the side lengthened.

5. To install either pump, with the tubing toward the back of the instrument, place the pump at the appropriate location and press down until the pump snaps into place.

6. For the Syringe pump, to complete installation, attach the longer tubing, exiting the right side of the pump, to the syringe. Attach the shorter tubing, exiting the left side of the pump, to the check valve.

7. For the Saline pump, to complete installation, attach the tubing exiting the right side of the pump to the check valve to the left of the pump. Attach the tube exiting the left side of the pump to the check valve to the right of the pump.

8. Confirm the tubes are connected to the correct bottle (if separate bottles for Saline and DI water are in use), as reversing the order will cause the instrument to malfunction.

9. The tubing leading to the bottles should be placed in the clamps (Figure 10-4).

10. Replace the carousel by lining up the slot in the carousel with the pin on the hub and press down.

10.1.8. Fuse Replacement

1. Turn off the power and unplug the power cord.

2. Using a screwdriver, which matches the slot in the fuse holder, press inward and turn the fuse holder counterclockwise to remove the holder (Figure 10-1).

3. Remove a blown fuse and replace it with one of the same type and rating.

4. Push the fuse holder in and turn clockwise with a screwdriver to reseat the fuse.

5. Repeat for the other fuses as necessary.

6. Plug in the power cord and turn on the power. If the fuse blows again immediately, call Helena Laboratories for assistance.

10.1.9. Needle Replacement

The following refers to Figure 10-2 and Figure 10-3.

1. The tools needed are a #1 Phillips Head Screwdriver and a 1/4" open-ended wrench.

2. Turn the instrument off and remove the carousel.

3. Remove the splash shield by removing the securing screw located near the wash station.

4. Use the top of the needle assembly to lower the needle assembly. Lower the assembly until the nose block is accessible.

5. Using the Phillips head screwdriver, remove the screw located on the front of the nose block.

6. Remove the "L" shaped metal piece located on the nose block by sliding the piece forward until it is free of the instrument.

7. The needle tubing is secured to the instrument by a plastic hose clamp. Remove the tubing from the clamp.

8. Enclosed with the replacement needle is a small piece of emory cloth. Obtain the cloth and cut it into two pieces.

9. Grasp the top of the needle assembly and, using a piece of the cloth, grasp the old needle. Pull down on the old needle unit it comes free of the assembly. If there is not enough clearance underneath the needle, pull the entire needle assembly up (the nose block would no longer be visible) and then pull the needle free of the nose block.

10. Feed the needle tubing through the assembly to allow slack in the needle's connection to the assembly.

11. Using the two pieces of emory cloth, grasp both the tubing, just above the needle, and the needle. Pull the needle free of the tubing.

12. Obtain the replacement needle, and using the two pieces of emory cloth, grasp both the tubing, just above where the needle will be inserted, and the replacement needle. (Use caution not to slide the emory cloth over the surface of the replacement needle.)

13. The needle has a silver end and in approximately the center of this end is an indent. Insert the replacement needle into the tubing up to the indent.

14. With the needle inserted into the tubing, use the emory cloth to grasp the needle and push it up into the nose block. Do not bend the needle. When the needle is properly

placed, only it is visible through the opening in the nose block visible from the side.

15. Replace the "L" shaped metal piece by sliding it into place on the front of the nose block. If excessive resistance is felt, the needle may not be far enough up into the nose block.

16. Replace the screw in the front of the nose block.

17. Re-clamp the needle tubing in the hose clamp on the top of the instrument.

18. Replace the splash shield by slipping the bent ends of the plastic shield into the metal slots on either side of the front of the instrument and then replace the securing screw.

19. Complete section 10.1.10, Needle Calibration.

10.1.10. Needle Calibration

1. Turn the instrument off. Press and hold **START/STOP** and simultaneously turn the instrument on.

2. Release **START/STOP** once the instrument displays:

```
EP SAMPLE HANDLER  VER xx.xx/xx
COPYRIGHT (c) xxxx HELENA LABORATORIES
```

3. The instrument then displays:

```
[TEST]  CALIBRATE  CYCLE  ERROR_LOG
PERFORM DRIVE AND SENSOR TESTING.
```

4. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
[CAROUSEL]  NEEDLE  TRAY
CALIBRATE CAROUSEL DRIVE SYSTEM
```

5. Use the **arrow keys** to bracket *NEEDLE* and press **START/STOP**. The instrument then displays:

```
PLEASE REMOVE ANY TUBES FROM CAROUSEL,
PRESS START TO BEGIN CALIBRATION.
```

6. Remove any sample tubes from the carousel and press **START/STOP**. The instrument then displays:

```
PLACE THE CALIBRATION TEMPLATE ON THE
TRAY PLATFORM. PRESS START TO CONTINUE.
```

7. Place the calibration template (86370009) with the oblong circle on the right post of the tray platform and press **START/STOP**.

8. The instrument then displays:

```
NEEDLE X-TO-CAROUSEL ALIGNMENT  XXXX
[CALIBRATE]  SKIP  ABORT
```

(with the xs representing the current needle location)

9. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
NEEDLE: X-TO-CAROUSEL ALIGNMENT  XXXX
START: REPOSITION  ESC: FINISHED
```

(with the xs representing the current needle location)

10. Place an empty, labeled sample tube in the “x” position of the carousel. Use the left and right **arrow keys** as needed to reposition the needle so that it is centered over the opening of the tube (note the needle will not move at this time). Press **START/STOP**. The needle will move left or right as instructed.

11. Repeat until the needle is centered over the opening of the tube. Once the needle is centered, press **MENU/ESC**. The instrument then displays:

```
CAROUSEL NEEDLE Z  XXXX
[CALIBRATE]  SKIP  ABORT
```

(with the xs representing the current needle location)

12. Remove the test tube from the carousel. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
MOVE NEEDLE DOWN BY HAND UNTIL IT
BOTTOMS OUT, PRESS START WHEN DONE.
```

13. Lower the needle, so that is just touches the carousel, by slowly pushing down on the top of the needle assembly. Once the needle is positioned, press **START/STOP**.

14. The instrument then displays:

```
NEEDLE X-TO-DILUENT ALIGNMENT  XXXX
[CALIBRATE]  SKIP  ABORT
```

(with the xs representing the current needle location)

15. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
NEEDLE X-TO-DILUENT ALIGNMENT   XXXX
START: REPOSITION   ESC: FINISHED
```
(with the xs representing the current needle location)

16. Place the Diluent Bottle in the Diluent Bottle Holder. Use the left and right **arrow keys** as needed to reposition the needle so that it is centered over the opening of the bottle (note the needle will not move at this time). Press **START/STOP**. The needle will move left or right as instructed.

17. Repeat until the needle is centered over the opening of the bottle. Once the needle is centered, press **MENU/ESC**. The instrument then displays:

```
DILUENT NEEDLE Z   XXXX
[CALIBRATE]   SKIP   ABORT
```
(with the xs representing the current needle location)

18. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
MOVE NEEDLE DOWN BY HAND UNTIL IT
BOTTOMS OUT, PRESS START WHEN DONE.
```

19. Lower the needle onto the bottom of the bottle by slowly pushing down on the top of the needle assembly. Once the needle is positioned, press **START/STOP**.

20. The instrument then displays:

```
NEEDLE X-TO-WASH ALIGNMENT   XXXX
[CALIBRATE]   SKIP   ABORT
```
(with the xs representing the current needle location)

21. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
NEEDLE X-TO-WASH ALIGNMENT
START: REPOSITION   ESC: FINISHED
```

22. Use the left and right **arrow keys** as needed to reposition the needle so that it is centered over the opening of the Wash Station (note the needle will not move at this time). Press **START/STOP**. The needle will move left or right as instructed.

23. Repeat until the needle is centered over the opening of the Wash Station. Once the needle is centered, press **MENU/ESC**.

24. The instrument then displays:

```
TRAY NEEDLE Z   XXXX
[CALIBRATE]   SKIP   ABORT
```
(with the xs representing the current needle location)

25. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
PRESS RIGHT ARROW UNTIL NEEDLE TOUCHES
TRAY PLATFORM, THEN PRESS START.
```

26. Press the **right arrow** until the needle touches the tray platform, then press the **left arrow** three times, and then press **START/STOP**. The instrument then displays:

```
NEEDLE X-TO-TRAY ALIGNMENT, LEFT   XXXX
[CALIBRATE]   SKIP   ABORT
```
(with the xs representing the current needle location)

27. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
NEEDLE X-TO-TRAY ALIGNMENT, LEFT
START: REPOSITION   ESC: FINISHED
```

28. Use the left and right **arrow keys** as needed to reposition the needle so that it is centered over the left slit in the template (note the needle will not move at this time). Press **START/STOP**. The needle will move left or right as instructed.

29. Repeat until the needle is centered over the slit on the left side of the template. Once the needle is centered, press MENU/ESC. The instrument then displays:

```
NEEDLE X-TO-TRAY ALIGNMENT, RIGHT   XXXX
[CALIBRATE]   SKIP   ABORT
```
(with the xs representing the current needle location)

30. Use the **arrow keys** to bracket *CALIBRATE* and press **START/STOP**. The instrument then displays:

```
NEEDLE X-TO-TRAY ALIGNMENT, RIGHT   XXXX
START: REPOSITION   ESC: FINISHED
```
(with the xs representing the current needle location)

31. Use the left and right **arrow keys** as needed to reposition the needle so that it is centered over the right slit in the template (note the needle will not move at this time). Press **START/STOP**. The needle will move left or right as instructed.

32. Repeat until the needle is centered over the slit on the right side of the template. Once the needle is centered, press **MENU/ESC**. The instrument then displays:

CAROUSEL [NEEDLE] TRAY CALIBRATE NEEDLE X AND Z DRIVE SYSTEMS.

33. To restart the instrument for normal use, turn the instrument off, wait 5 seconds, and turn the instrument on.

34. If a display includes *SKIP*, it can be used to skip the displayed function and proceed to the next function. If a display includes *ABORT*, it can be used to stop the entire calibration sequence. To select either, use the **arrow keys** to bracket the desired selection and press **START/STOP**. The instrument will proceed as selected by either continuing to the next function or returning to the display allowing for carousel, needle, or tray calibration to be selected. (Note that the *SKIP* option will not appear until the calibration function is accessed for the second time.)

10.1.11. Backup Parameters

Each time the instrument's interface parameters (section 5.4) are altered and/or the needle is re-calibrated (section 10.1.10), the instrument's parameters should be backed up (section 7.8).

10.1.12. Cleaning Spills

TURN OFF THE POWER AND UNPLUG THE POWER CORD BEFORE PROCEEDING. Should an instrument be contaminated by blood or blood derivative, spray any contaminated surface with a commercial virucidal and germicidal agent. Observe where the specimens are used inside the instrument and confine cleaning to that area. Wipe up the residue. These materials contain alcohol and alcohol is a corrosive to metal surfaces.

Clean spills with a soft cloth or sponge. Do not use corrosive or abrasive cleansers. Dry the unit before plugging the power cord in.

10.1.13. Syringe Seal and O'Ring Replacement

The following refers to Figure 10-4.

1. Pull the tubing in the Saline and DI water bottles out of the liquid. Insure the tubing is still in each bottle so that no liquid is spilt during the following steps.

2. If the instrument is not on, turn it on and allow it to initialize.

3. From the Status menu, press **MENU/ESC**. Use the **arrow keys** to bracket *WASH* and then press **START/STOP**. The wash operation will purge the lines of any liquid. Repeat as needed to removal all the liquid from the tubing.

4. Turn off the power.

5. Press and hold **START/STOP** and simultaneously turn on the power. Once the display initializes, release **START/STOP**.

6. Confirm *TEST* is in brackets and press **START/STOP**.

7. Use the **arrow keys** to bracket *PUMPS* and then press **START/STOP**.

8. Confirm *SYRINGE* is in brackets and press **START/STOP**.

9. Use the **arrow keys** to bracket *PLUNGER* and then press **START/STOP**.

10. Simultaneously, press and hold **START/STOP** and the **right arrow key** to change the *NEW PLUNGER POSITION* to *3000*.

11. Press **START/STOP** and the syringe will be driven down.

12. Unscrew the thumbscrew at the base of the syringe shaft.

13. Gentle pull the bottom of the shaft forward and down to remove it from the glass.

14. Using any type of pliers (such as needle nose or hem specs), pull the white tip off of the syringe shaft. If the black o-ring does not come off with the tip, remove it also.

15. Slide the new o-ring and tip on the syringe shaft (8JM81043).

16. Reinstall the shaft in the glass and replace the thumbscrew.

17. Turn the instrument off.

18. Place the tubing back into the Saline and DI water.

19. Turn the instrument on and allow it to initialize.

20. From the Status menu, press **MENU/ESC**. Use the **arrow keys** to bracket *WASH* and then press **START/STOP**.

21. Repeat if needed to ensure the tubing is primed and there are no air bubbles in the lines.

22. Once the *WASH* is complete, return to the Status menu by pressing **MENU/ESC** and, if necessary, empty the waste bottle and/or refill the bottles.

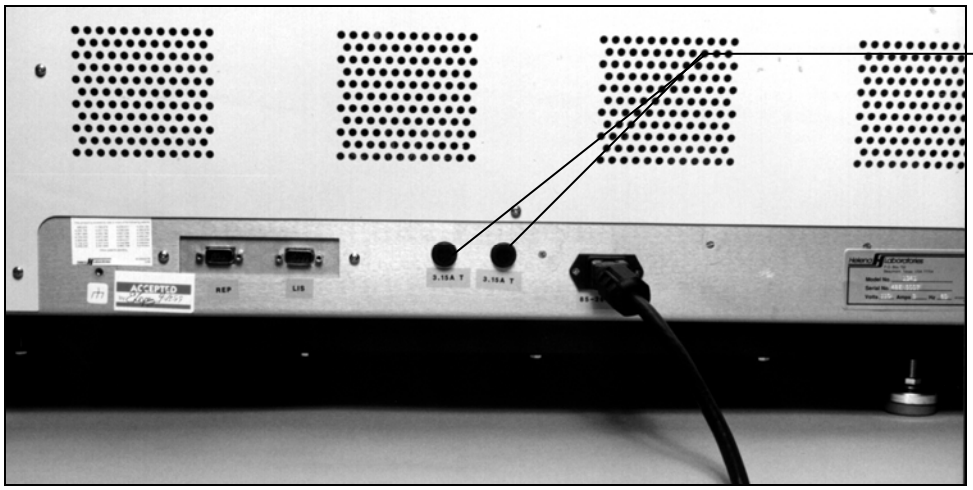

Figure 10-1. Fuses

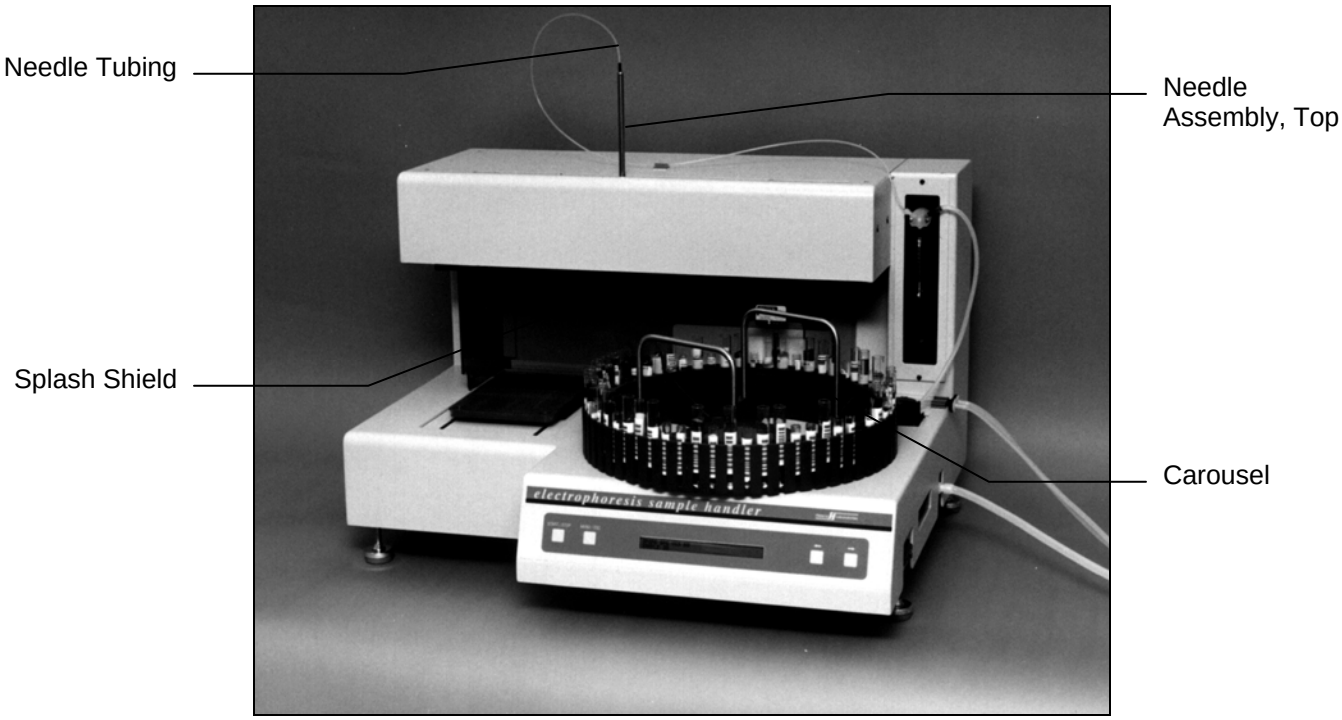

Figure 10-2. Needle Replacement

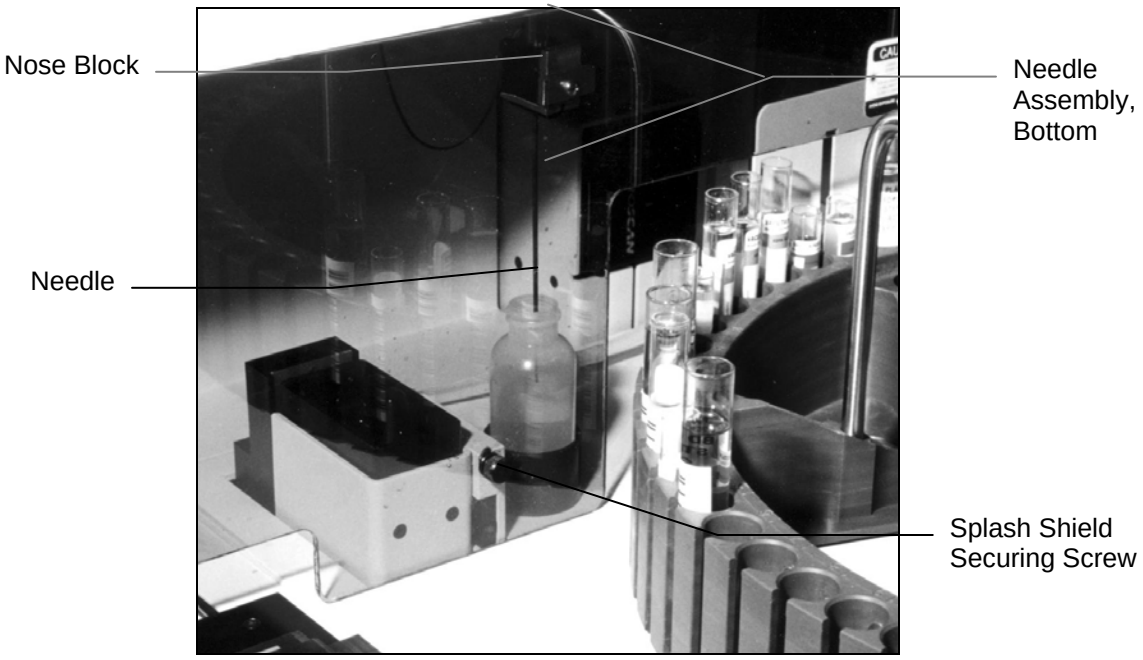

Figure 10-3. Needle Replacement

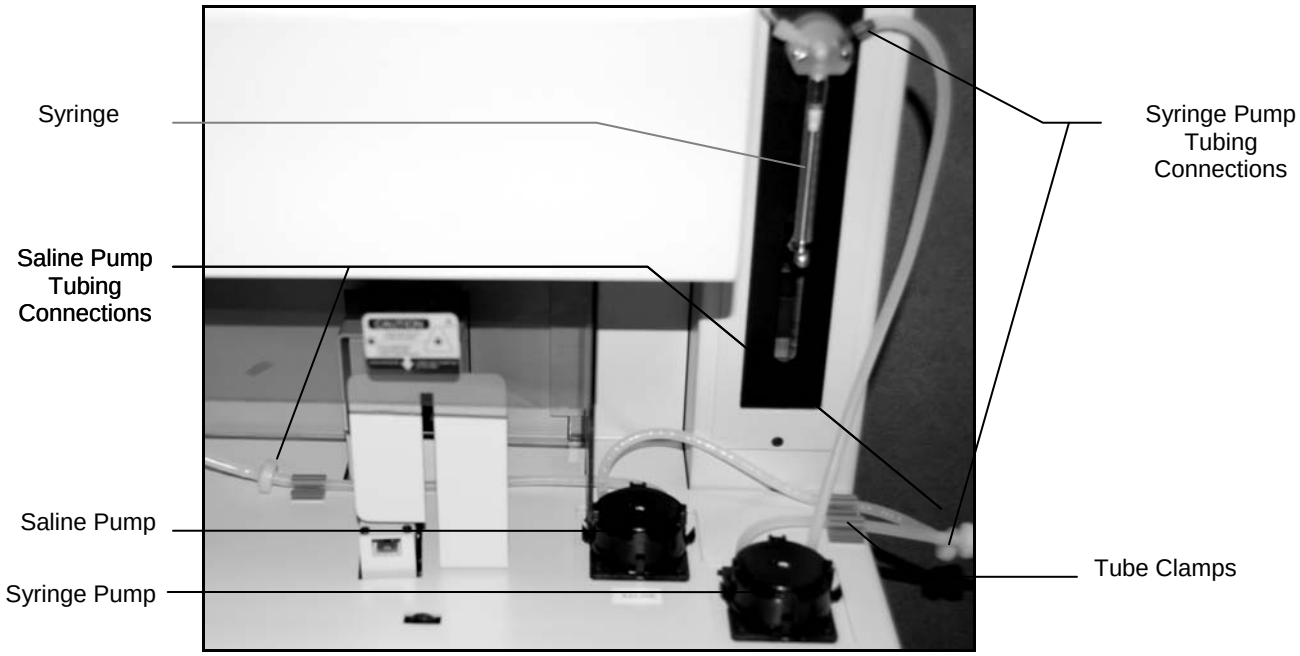

Figure 10-4. Tubing and Pump Replacement

10.2. Troubleshooting

If the recommended solutions should fail to solve a problem, call Helena Laboratories for assistance.

Table 10-2. Troubleshooting

Problem	Possible Cause	Solution
No power to instrument	Power cords unplugged	Plug cords into proper wall outlet.
	Blown fuse	Replace fuse.
Error message is displayed (for example Error 346 during initialization)	Saline and DI Water bottles/ tubing reversed	Check and correct bottles/tubing. Turn power off and on again. If message clears, perform instrument and needle cleaning (see section 10.1.2 and 10.1.4). If message returns, call Helena Laboratories.
	Error found during self-test or operation	Turn power off and on again. If the message returns, call Helena Laboratories.
Cycle will not begin when START/STOP pressed	Incorrect sample tray	Insert correct sample tray.
	Blown fuse	Check fuses on back of unit, replace if required.
	Electrical problem	Call Helena Laboratories.
No sample dispensing into sample tray	Empty DI water bottle	Refill DI Water bottle.
	Clogged needle	Clean needle (see section 10.1.4).
	No sample in carousel	Load carousel (see section 7.2).
	Air bubbles in DI water tubing	Prime instrument (see section 10.1.2).
	Tubing/Pump failure	Replace pump head (see section 10.1.7 and call Helena Laboratories.)

Month/Year:_____ Serial Number:_____

Electrophoresis Sample Handler Preventive Maintenance Schedule

For more information on correct procedures, read the product inserts contained in every box of gels.

Daily Items, If Used	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Inspect/Clean needle																															
Prime Electrophoresis Sample Handler																															
Soak sample trays in REP Wash																															
Wash Electrophoresis Sample Handler																															
Weekly Items																															
Clean needle																															
Clean/Bleach DI water & Saline bottles																															
Monthly Items																															
Bleach Electrophoresis Sample Handler																															
As Needed																															
Replace tubing/pumps																															
Replace fuse																															
Replace/Calibrate needle																															
Backup parameters																															
Replace syringe seal/o-ring																															

Note: Duplicate this page for maintenance copies. Initial each item as required. Refer to section ten, Maintenance, of the Operator's Manual for details. If you are uncertain about how to perform any step, please contact Helena Laboratories Electronic Customer Service Dept. (1-800-231-5663) for more information.

Figure 10-5. Preventive Maintenance Schedule Checklist

10.3. Warranty

Helena Laboratories warrants its products to meet Helena's published specifications and to be free from defects in materials and workmanship. Helena's liability under this contract or otherwise shall be limited to replacement or refund of any amount not to exceed the purchase price attributable to the goods as to which such claim is made. These alternatives shall be the buyer's exclusive remedies.

In no case will Helena Laboratories be liable for consequential damages even if Helena has been advised as to the possibility of such damages.

The foregoing warranties are in lieu of all warranties expressed or implied, including, but not limited to, the implied warranties or merchantability and fitness for a particular purpose.

The software disk provided for use with this instrument must be retained and be accessible for the warranty to be valid.

Section 11 - Symbology

NOTE: The following symbols may be used in this manual, or on the instrument, to provide information necessary to the user, if applicable.

	Caution, electric shock hazard, high voltages capable of causing personal injury - shut down the instrument and unplug the power cord before touching - do not operate with the cover(s) removed
	Caution, heat hazard - allow heated components to cool before handling
	Caution, general hazard - see Precautions and Hazards (Sections 3 and 4) of Operator's Manual before proceeding
	Direct current
	Alternating current
	Both direct and alternating current
	Ground (earth) terminal
	Protective conductor terminal (grounded conductors)
	Frame or chassis terminal
	Equipotentiality (conductor with all parts at a single potential)
	On (power switch)
	Off (power switch)
	Equipment protected throughout by double insulation or reinforced insulation (equivalent to Class II of IEC 536)
	Consult instructions
	European authorized representative
	Manufacturer
	Indicates "do not place in trash" in countries or regions requiring recycling and other specific handling, such as in Europe, under the WEEE (Waste Electrical and Electronic Equipment) Directive, 2002/96/EC

CE

Electrophoresis Sample Handler

Operator's Manual

For additional information, call Helena Laboratories at 800-231-5663, toll free.

Helena Laboratories
P.O. Box 752
Beaumont, Texas 77704-0752
USA

EC REP
Helena Laboratories UK, Ltd
Colima Avenue
Sunderland Enterprise Park
Sunderland SR5 3XB
England

D6500082H
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