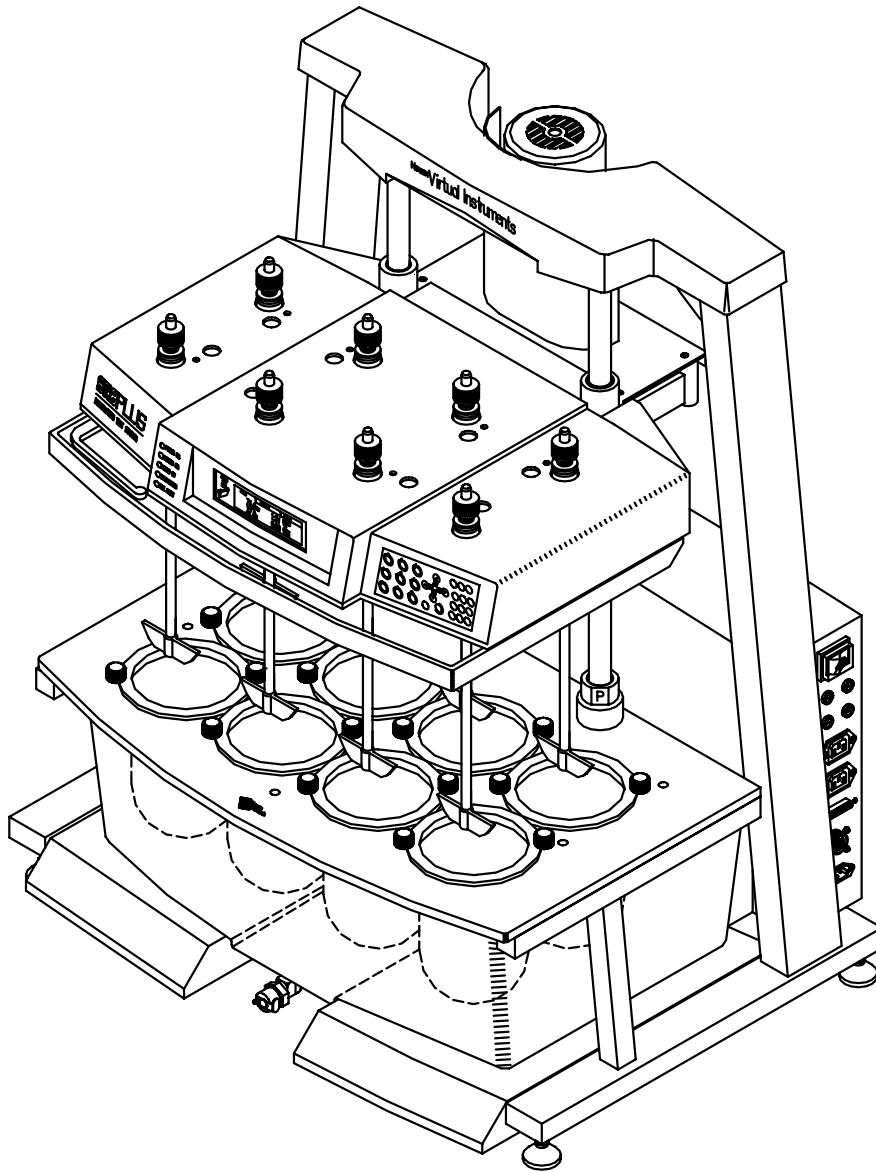


SR8-Plus

Operation Manual

73-100-810

Rev. I, 05JUL2005
ECO 1747



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What's New

Revision I

- Circulating Water Pump (P/N 64-710-410/411) replaces Circulating Air Pump (64-705-058/059) throughout operation manual.
- *Section 6—Service Parts* updated.
- *Section 8—Maintenance and Calibration:* Temperature Probe (8.7) and Bath Temperature Calibration (8.8) updated.







1 Safety Considerations

1.1 General

1. The installation category (overvoltage category) for this instrument is Level II. The Level II category pertains to equipment that receives its electrical power from a local level, such as an electrical wall outlet.
2. This instrument must be connected to a grounded electrical outlet.
3. Never work on the electrical components in the system while there is power to the unit.
Disconnect power before servicing the instrument.
4. Review all safety and environmental precautions pertaining to any chemicals that are to be used in conjunction with this equipment.

1.2 Safety Markings

For your own safety, you must observe the following safety warning markings. The safety warning markings indicate a possible source of danger. At the same time they contain information on how correct action can avert danger. You will always find safety warning markings attached to points of possible danger.

Sign	Location	Safety Warning
	Control	Danger! Supply voltage and supply frequency must be of the value specified for the control unit on the serial number tag located on the rear panel of the SR8-Plus control. All electrical outlets must be properly grounded.
 	Control Printer Motor Heater	Caution: No operator accessible parts inside. Refer servicing to qualified personnel only. Risk of electrical shock. Do not open. Achtung: Es gibt keine vorn Benutzer zu wanenden Teile. Oberlassen Sie Reparaturen dem qualifizierten Servicefachmann. Hochspannung. Nicht öffnen. Attention: Aucune pièce remplaçable par l'utilisateur. Toute réparation doit être effectuée par un technicien qualifié. Risque d' electrocution. Ne pas ouvrir. Precaución: No lo abra. Peligro de alto voltaje. El servicio debe ser implementado por personal calificado.
	Control	Caution! Turn unit off and remove power cord before replacing fuses. Fuses must be replaced with the same current rating and type described next to the fuse holder.



Sign	Location	Safety Warning
	Motor	Caution! Motor armature is hot; do not touch.
	Drive Head	Caution! Pinch point on both ends of bearing housing (both guide rods). Keep hands clear when raising or lowering drive head.
	Control	Caution! Communication ports must not be connected to a telephone line.
	Control	Note! Line and Neutral fused separately.
	Control	Note! Chassis terminal. Cable assembly must be properly grounded to this location.
	Inside Control	Note! Protective conductor terminal.

1.3 Canadian Emissions Notice

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set forth in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans les règlements sur le brouillage radioélectrique édictés par le Ministère des Communications du Canada.



2 Introduction

2.1 General

The Hanson SR8-Plus™ Dissolution Test Station provides an entirely new approach to dissolution testing by incorporating a user interface with built-in virtual instrument technologies. These technologies provide a "smart" system that anticipates and reacts to the needs of dissolution testing. The SR8-Plus incorporates the Hanson SR "Sustained Release" precision drive system and a high-performance maintenance free SR motor.

The system can be configured with 6 or 8 vessels and can use both paddles and baskets. Many accessories are available for special sampling conditions, including small volume testing with 150mL vessels, Transdermal Sandwich™ testing and ointment cells. Electronic sample probes (E-Probes™) may be added to automate sample probe movement, and E-Probes may be connected to many types of autosamplers.

By adding Hanson's new digital temperature probes, the SR8-Plus can also monitor vessel temperature by allowing automatic vessel temperature readings at programmed intervals. The digital temperature probes connect to the sampling probe and if accompanied by the E-Probe will move in and out of the vessel media and gather temperature data. (This data is printable on the Hanson validation printer.)

The SR8-Plus control panel includes Easy-Icon™ program controls and a LCD display with pop-up menus and convenient help screens. The control panel also provides five status lights, quickly providing the user with instrument status information.

To simplify dissolution testing and instill confidence that the test is performed correctly, the SR8-Plus allows the user to store 25 test protocols. These protocols contain test parameters including but not limited to the speed, temperature, sampling intervals, drug name, and dosage of the dissolution test. During testing, the SR8-Plus sends information to the optional printer (recommended). The subsequent printout includes a header with specific information about the operator, lab, sample, and a status report which provides a record of the motor speed and waterbath temperature at designated intervals, as well as the high, low, and average at the end of the test. The SR8-Plus also includes programs for calibration, validation and diagnostics.

The SR8-Plus has a built-in system of alerts and alarms, which are signaled by a soft chime, a pop-up window on the display, and status lights. These are programmed by the user and have several functions: they can be used to remind the user to take a sample or change the pH; they alert the user to any error condition; and they remind the user to perform maintenance, such as changing the bath water, and calibration.

Understanding that many labs work a single shift, the SR8-Plus can be programmed to turn off the heater when the last test for the day is complete, then "wake-up" the next morning and turn the heater back on so that the waterbath is ready for the first test of the day. The SR8-Plus can also be controlled by an external computer. For a list of external commands, contact your local distributor or Hanson Research Corporation directly.



2.2 Firmware Revisions

Hanson Research Corporation is constantly working to improve our products and to help our customers comply with regulatory requirements. The information below is a history of software (firmware) changes for the SR8-Plus Dissolution Test Station.

Version 3.10

- **Digital Temperature Probes**— Incorporates updated operational menus to support use and control of the new Digital Temperature Probes that are now available for the SR8-Plus. These probes are designed to take temperatures in each vessel (up to 8), ensuring temperatures are and remain within the required USP tolerances.
- **Sample Interval Printing**— Printing intervals may be set to correspond to the sampling interval.
- **Programmable Infinity Speed**— The infinity speed now may be programmed to a different speed than 250. This feature allows for special 2-speed tests, such as one run for 4 hours at 50RPM and then 2 hours at 75RPM.
- **Improved Analog Probe Calibration**— Probe offset calibration has been modified to make the process easier, with each probe having its own revision information.

Version 3.00

- **Security**— This feature allows up to 25 names to be added to a list which contains users with Manager or Operator privileges. Managers can change system parameters and protocols. Operators can only view the system parameters and view/run the protocols.
- **Password Protection**— When password protection is enabled from the security menu, the system requires that a valid user log into the system, and that the correct password associated with that user be entered before any system function is allowed. Password protection helps the user comply with the 21CFR regulations.
- **System Setup Traceability**— Whenever any of the system setup parameters are changed or a maintenance routine is performed, the action is stamped with the date, time, and username.
- **Protocol Traceability**— When protocols are created or edited, they are stamped with the date, time, and username.
- **Inactivity Log Out**— The system will automatically log out the current user after a period of inactivity. This period is programmable.
- **Print Last Test Feature**— Everything that is sent to the printer during the test is now stored in memory. It may be reprinted if a printer problem occurs (paper, ribbon, mechanical). This feature is accessible until the next test is run.
- **Configurable Header Titles**— Titles printed at the beginning of a report have been expanded to 8 and can be edited by the system manager.
- **Configurable Protocol Titles**— Information items in protocols can now be edited by the system manager to customize protocols.
- **International Date Formats**— The system allows the manager to select one of four date formats for printing, displaying, and stamping dates.
- **Screen Icons**— New screen icons graphically show password protection status, printing options, availability of revision logs, and multiple screens.
- **Protocol Navigation Improved**— The number of screens required to view/edit a protocol has been reduced for easier navigation.
- **Improved Diagnostics**— Diagnostics has been improved so that readiness of all peripherals connected to the system is assured.
- **Improved Help**— The help system has been revised so that virtually every screen has a help window associated with it.
- Added Zymark MultiDose G3 interface.



Version 2.10

- Added E-Probe operation for Waters Transfer Module.

Version 2.00

- Increased protocols from 10 to 25.
- Added high/low/average printout at end of test.
- Added E-Probe operation for AutoPlus.

Version 0.98

- Added alarm recurrence.
- Added temperature probe offset adjustment.

Version 0.65

- Added serial commands.



3 Specifications

Weight: (complete system, dry) 68 kg (150 lbs.) - 115V
 70 kg (155 lbs.) - 230V
Weight: (complete system filled with water) 106 kg (233 lbs.) - 115V
 108 kg (238 lbs.) - 230V

Size:

Height: 100 cm (39 in.)
 Width: 76 cm (30 in.)
 Depth: 59 cm (23 in.)

Electrical:

Voltage: 115V \pm 10% or 230V \pm 10%
 Frequency: 50/60 Hz
 Current: 12 amps (115V) or 6 amps (230V), 1700 W

4 Fuses (TT Type):

115 VAC Units	230 VAC Units
One 2 Amp, 250 VAC, One 5 Amp, 250 VAC, Two 15 Amp.	One 2 Amp, 250 VAC, One 5 Amp, 250 VAC, Two 8 Amp, 250 VAC.

Ambient Temperature Range: \geq 5°C below operating temperature

Humidity: < 85%

Spindle Speed:

Range: 25 to 250 RPM
 Accuracy: \pm 1 RPM
 Displayed To: 0.1 RPM

Vessel Temperature:

Programmable Temperature Range: 30.0 to 40.0°C
 Accuracy: \pm 0.5°C

Temperature Probes T1 & T2 (analog):

Range: 20.0 to 40.0°C
 Accuracy: \pm 0.1°C from 30-40°C
 Displayed Resolution: 0.1°C
 Minimum Submersion Depth: 45mm
 Response Time: < 45 seconds
 Maximum Number of Probes: 2

Digital Temperature Probes:

Range: 10 to 60°C
 Accuracy: \pm 0.1°C from 30-40°C
 Displayed Resolution: 0.01°C
 Minimum Submersion Depth: 25mm
 Response Time: < 45 seconds (normally 30 sec.)
 Maximum Number of Probes: 8

Bath Capacity:

Without vessels: 38 liters (10 gallons)
 With 6 to 8 vessels: 30 liters (8 gallons)



4 Installation

4.1 Location

Environmental Requirements

The waterbath temperature must exceed ambient temperature by at least 5°C for maximum performance of the waterbath control system. Therefore, for the best results the ambient temperature should not be allowed to exceed 31°C (88°F) for the 37°C tests, or 26°C (79°F) for 32°C tests.

A stable ambient room temperature is required. The system should not be placed close to an open window, an uninsulated window, or a heating radiator, which would cause temperature fluctuations of more than 2°C per hour. Relative humidity should be 85% or less.

Easy access to a water source and waste disposal for filling and emptying the waterbath is convenient, although not necessary.

Dissolution rates are profoundly affected by vibration. Therefore, the system should not be placed near a centrifuge, fan, compressor or any other source of vibration. The room should not be subject to vibration from adjacent production equipment, such as single head tablet machines.

Space Requirements

The SR8-Plus Dissolution Test Station is designed to be placed on a standard laboratory bench that is at least 60cm (24 inches) deep. The system is 76cm (30 inches) wide and requires access to the back on both sides. The laboratory bench should be level and flat, although the system has adjustments for self-leveling. The laboratory bench must also be capable of supporting the weight of the Dissolution Test Station, including the water in the waterbath and media in the vessels. This weight is 108kg (238lbs).

Electrical Requirements

The SR8-Plus Dissolution Test Station requires a single, grounded electrical outlet, within 2.5 meters (8 feet) of the location of the system. The system has two outlets on its side panel, providing a power source for the circulating water pump and the optional printer.

The system is available in two configurations, 115V and 230V. The voltages are set at the factory and cannot be changed (see model number label on back of control to determine voltage requirements for that unit).



4.2 Unpacking and Inspection

The SR8-Plus Dissolution Test Station is shipped in two boxes. The larger box, which is held together with two straps, holds the basic system assembly. The smaller box contains a number of components that must be installed on the basic system assembly, spare parts, and optional accessories.

NOTE: Shortages or damages must be reported immediately to the freight carrier and to Hanson Research. Notify Hanson Research Customer Service by telephone (800) 821-8165 or by FAX (818) 882-9470.

To unpack the system:

1. Place the larger box on the floor. Remove the waterbath and packing materials. The packing materials can be discarded. Save the packing materials only if the system will be shipped to another location in the future.
2. Locate the locking hardware and hold down the collar on the back of the system, as shown in Figure 4-1. Remove the locking hardware on the left and right sides. Also remove the hold down collar on each guide rod using the hex wrench supplied in the supply kit. Save the locking hardware and the hold down collars only if the system will be shipped to another location in the future.

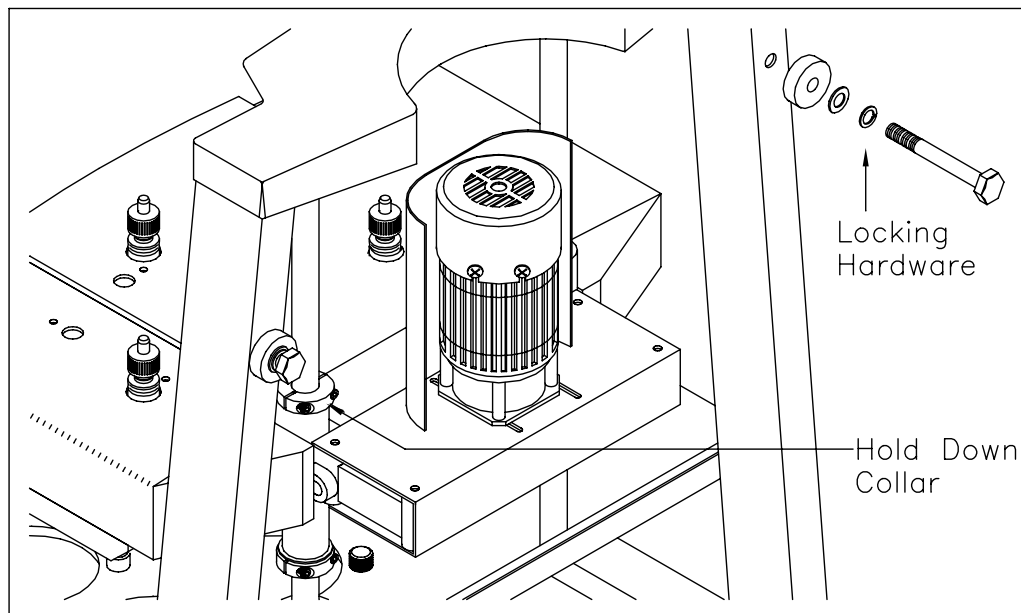


Figure 4-1: Removing the Locking Hardware and Holding Collar

3. Place the basic system assembly on the lab bench.

Open the smaller box. The smaller box contains (1) unassembled parts, (2) supply kit, and (3) accessories. Unpack and identify each of these parts.



4.3 Identification

1. Bath Support
2. SR8-Plus Controller
3. Circulating Water Pump
4. Power Cord
5. Waterbath
6. Vessel Centering Rings
7. Vessels
8. Drain Hose
9. SR8-Plus Easi-Lift™ Frame

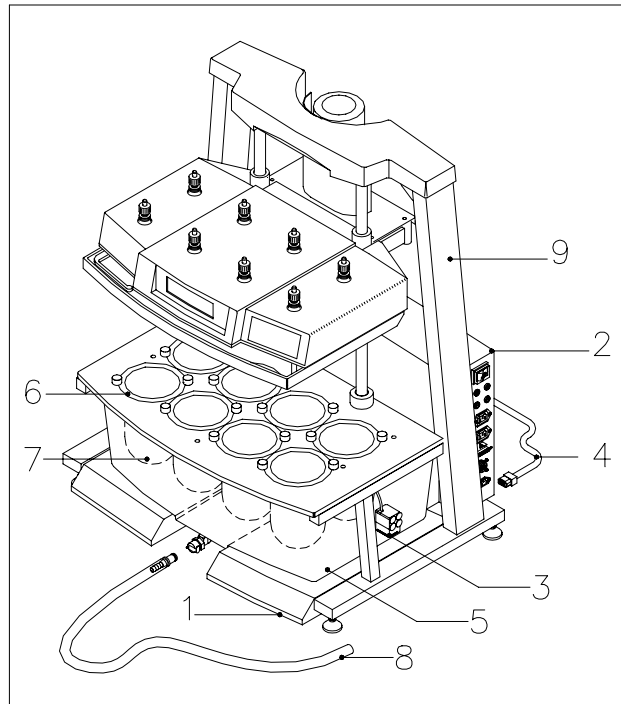


Figure 4-2: System Parts

Open End Wrench

Hex Wrench

Paddle Spacer
(with Paddle order)

Basket Spacer
(with Basket order)

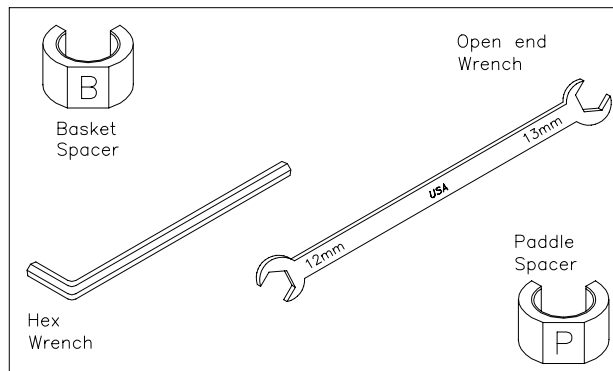


Figure 4-3: Supply Kit



Paddle

Printer

Basket & Basket Shaft

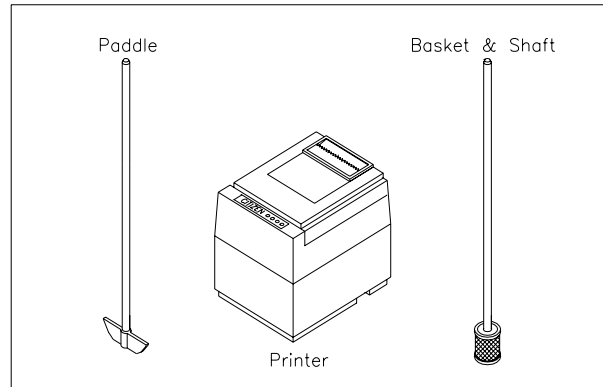


Figure 4-4: Accessories

4.4 Installation Steps



Caution: Unit should not be plugged in until installed as per instructions below.

Achtung: Das Gerät darf nicht an das Netz angeschlossen werden, bevor es nicht nach den untenstehenden Instruktionen installiert worden ist.

Attention: Ne pas brancher l'appareil avant installation complète comme démontré ci-dessous.

Precaución: La unidad no debe ser conectada al toma corriente hasta que sea instalada de acuerdo a las instrucciones descritas abajo.

1. Raise the drive head by holding in the lever with the left hand, while pushing up on the handle. (see Figure 4-5)

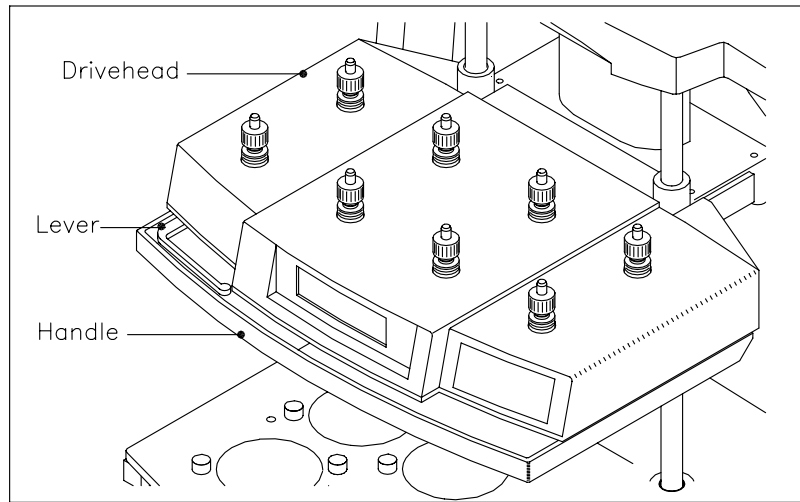


Figure 4-5: Raising the Drive Head

2. Lower and raise the drive head to verify that it moves smoothly over the full range of motion. Position the drive head at its highest location. Release lever to activate the brake.
3. Position the SR8-Plus Controller on the back rail of the basic system assembly. (see Figure 4-6)

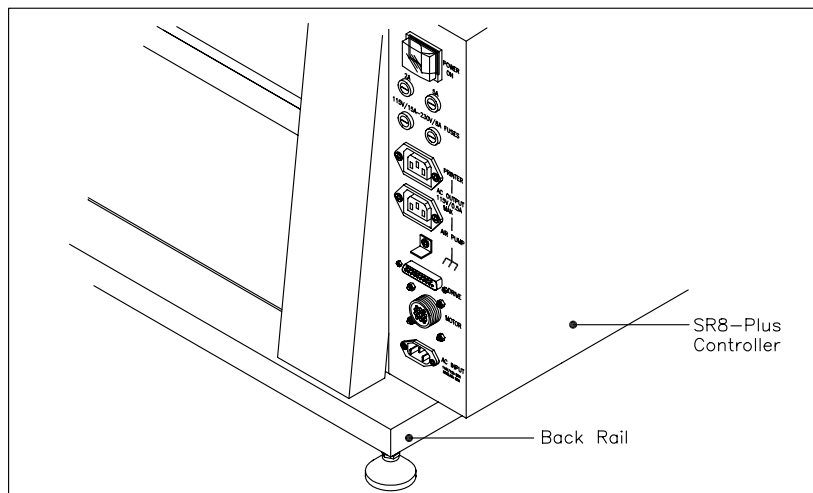


Figure 4-6: Positioning the Controller



4. Notice that there are a series of connectors on the right-hand side of the SR8-Plus controller. (see Figure 4-6)
 - a) Connect ground strap to ground connector.
 - b) Plug the motor cable into the connector labeled “MOTOR”. Make sure to line up the keyways in the plug with the slot in the socket, push plug in and then turn the ring on the plug to secure.
 - c) Plug the user interface cable into the connector labeled “DRIVE”. Evenly tighten the screws that secure the plug to the controller.
- NOTE:** If the E-Probe has been supplied with the system, the E-Probe power cord is the smaller of the two power cords supplied. Do not switch these two power cords; always use the heavier main power cord for the control.
- d) Connect the power cord into the connector labeled “AC-INPUT”.
5. Secure the SR8-Plus Controller to the Easi-Lift Frame by pulling the “S-Hook” and inserting it into the metal loop in the frame. (see Figure 4-7)

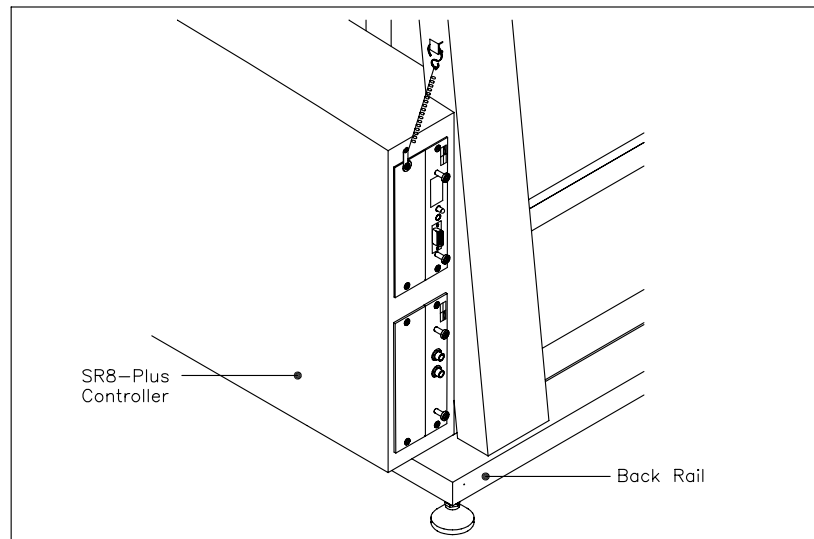


Figure 4-7: Securing the SR8-Plus Controller



4.5 Start Up



Caution: The voltage indicated on the SR8-Plus Dissolution Test Station must be the same as the power source. If the incorrect voltage is indicated, do not plug in the instrument. Contact Hanson Research.

Achtung: Die angezeigte Spannung am SR8-Plus Dissolutionstester muß die gleiche sein, wie die Netzspannung. Wird nicht die korrekte Netzspannung angezeigt, darf das Gerät nicht an das Netz angeschlossen werden, Wenden Sie sich bitte diesbezüglich sofort an die Firma Hanson Research.

Attention: Le voltage indiqué sur le Système de Dissolution SR8-Plus doit être identique à celui de la source de courant. Si le voltage diffère, ne pas brancher l'appareil avant de consulter Hanson Research.

Precaución: El Voltaje indicado en la Unidad de Disolución SR8-Plus debe ser el mismo voltaje del toma corriente. Por lo tanto si el voltaje es diferente, no conecte la unidad y notifique a Hanson Research.

1. Verify that the voltage indicated on the back of the controller is the same as the power source.
2. Plug the other end of the power cord into the grounded three-prong power outlet.

NOTE: Power cord plug may need to be replaced for some countries' power outlet configurations. Ensure replacement plug is approved and properly rated for voltage and amperage.

3. Turn on the power switch, located on the right hand side of the SR8-Plus Controller.
4. The "Power On" status light on the front panel should illuminate. A title screen appears for 5 seconds and then the main screen is displayed.
5. Turn the power switch off and un-plug the power cord from the grounded three-prong power outlet.

4.6 Leveling

Tools required: Level (not supplied) and small open end wrench (supplied in tool kit).

For proper operation, the SR8-Plus Dissolution Test Station must be level. Most laboratory benches are level, so minimal adjustment may be necessary.

Each of the four feet on the SR8-Plus is adjustable. Place the level on the base plate as shown in Figure 4-8. Check the level, both left to right and front to back. If necessary, raise any of the feet, using the open-end wrench, turning in a clockwise direction. Make sure all feet are contacting the bench when finished.

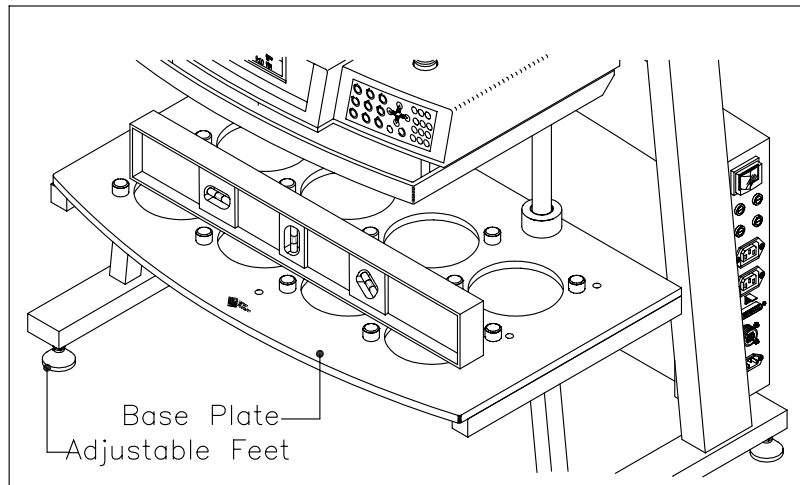


Figure 4-8: Leveling

4.7 Bath Installation

1. Position the bath support on the lab bench so that it is touching the back of the SR8-Plus frame and is centered left to right. The open gap should be towards the front. (see Figure 4-9)

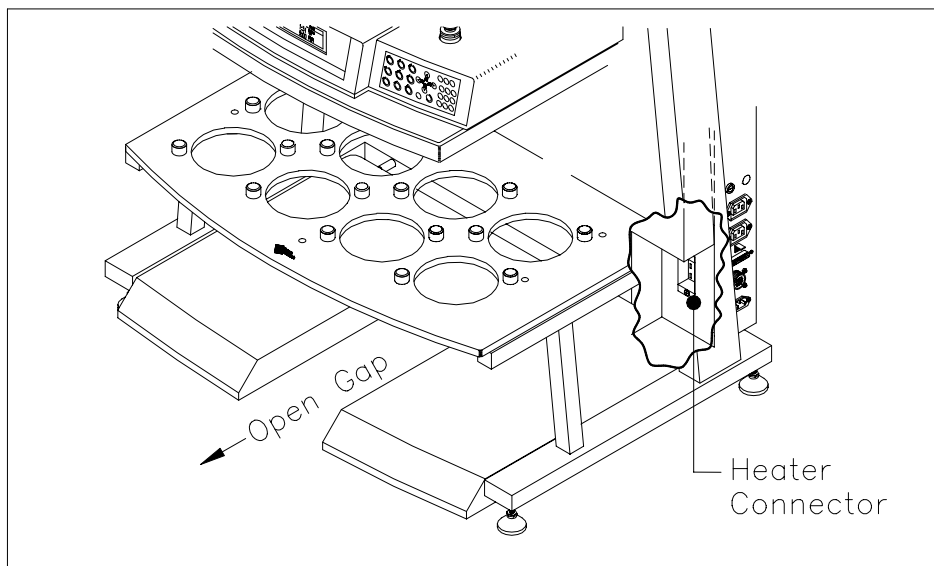


Figure 4-9: Positioning the Bath Support

2. With the heater toward the back, slide in the bath on top of the bath support. (see Figure 4-10)

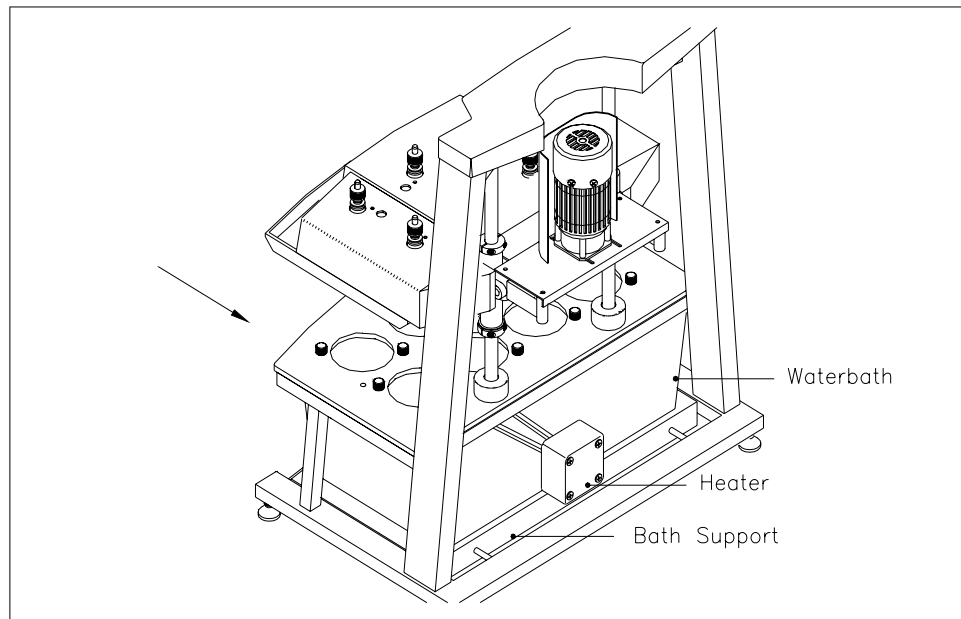


Figure 4-10: Positioning the Bath

3. Plug the heater cable into the connector labeled “Heater” on the right-hand side of the SR8-Plus Controller. (see Figure 4-9)
4. Position the bath so that it is touching the back of the SR8-Plus frame and is centered in the frame from left to right.
5. Route the cable from the bath level sensor under the frame on the left-hand side of the system.
6. Plug the bath level sensor into the connector labeled “LEVEL SENSOR”, located on the left hand side of the SR8-Plus Controller.
7. Fill the bath half full (approximately 5 gallons) of water (DI or better).

NOTE: Do not use copper sulfate as an algaeecide.

8. Install the vessel centering rings in each of the vessel openings in the base plate. Push rings down into each hole until it snaps in. (Use of these rings ensures that the vessels are centered so that they meet regulatory requirements). (see Figure 4-11)
9. The vessel positions are on the base plate. Insert the number of vessels normally used in the vessel centering rings, starting with Position 1. Turn the clamp knobs over the lip of the vessel to hold each vessel in place. (see Figure 4-11)

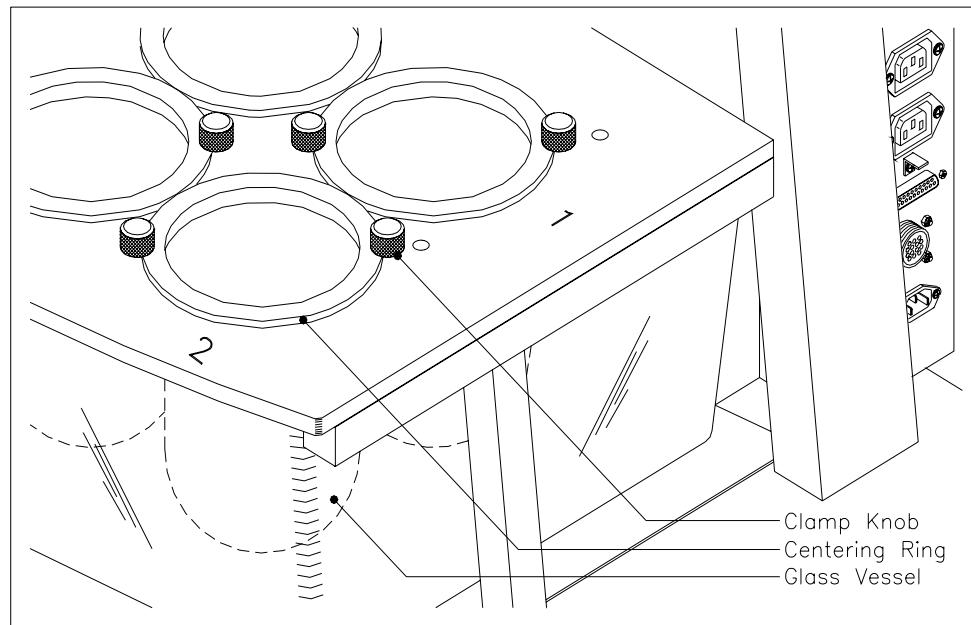


Figure 4-11: Positioning the Vessels

10. Use DI (or better) water to fill the bath to the desired level. (This level is usually at least to the 900 mL mark on the vessels.)
11. Install the Circulating Water Pump. (see Figure 4-12)
 - a) Install the circulating water pump into the bath through the Vessel #1 hole. Place it as low in the bath as possible without the case of the pump touching the bath wall.
 - b) Center the circulating water pump between Vessels 1 & 2 and press the pump's feet to the inside of the bath wall. The outlet of the pump should be pointing towards the heater and the power cord should be pointing up.
 - c) Pull the bath out away from the dissolution station enough to where the end of the power cord can be routed out and over the top back portion of the bath. When finished, the cord should be coming out over the back right corner of the bath within the groove.
 - d) Make sure the power cord is not in anyway pinched or pressed by the bath or the frame.
 - e) Plug the circulating water pump into the power outlet labeled "AIR PUMP" on the right hand side of the SR8-Plus Controller.
 - f) The only maintenance for the circulating water pump is to ensure that the waterbath is reasonably clean.

NOTE: The circulating water pump is 115V and must be plugged into the "AIR PUMP" power outlet on the SR8-Plus Controller.

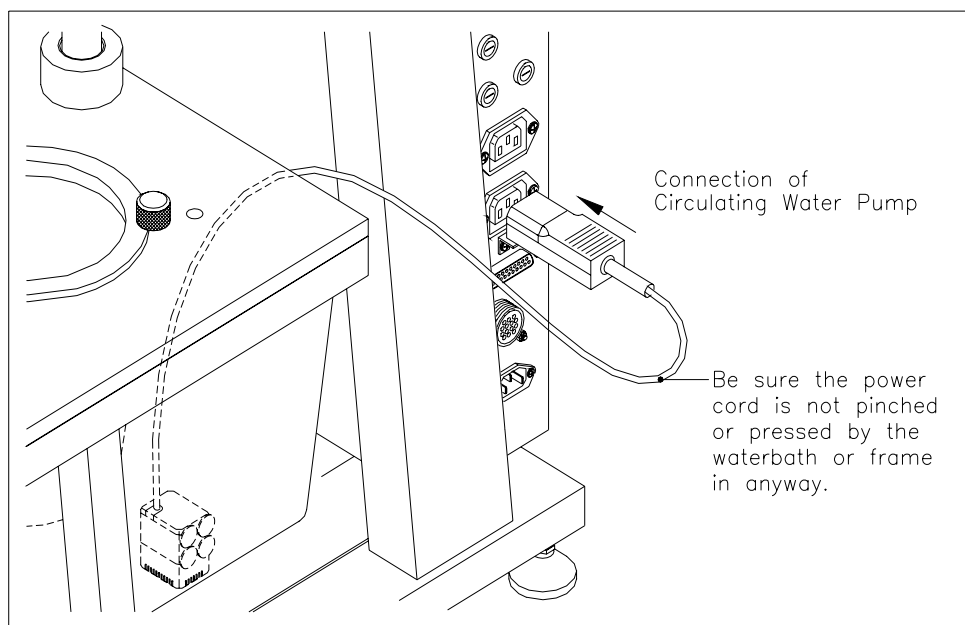


Figure 4-12: Circulating Water Pump Connection

12. Install the temperature probe(s). (see Figure 4-13)

NOTE: The system is designed to operate with either one or two temperature probes. One is supplied with the system, the other is optional. Probe 1 is designed to be placed in the bath. Probe 2 can be placed in Vessel 7 or 8 if they are not used for testing, or at the opposite end of the bath.

- a) Plug the temperature probe(s) into the connector(s) labeled “TEMP PROBES” on the left hand side of the SR8-Plus Controller. The first probe must be plugged into connector “1”, and the optional second probe must be plugged into connector “2”.
- b) For Probe 1, route the cable around the side of the bath and place the temperature probe into the bath, using one of the two holes indicated in Figure 13. Push the temperature probe into the bath as far as it will go.
- c) For Probe 2, route the cable behind the bath and place the temperature probe into either Vessel 7 or 8. Secure the probe so that it remains in the vessel.

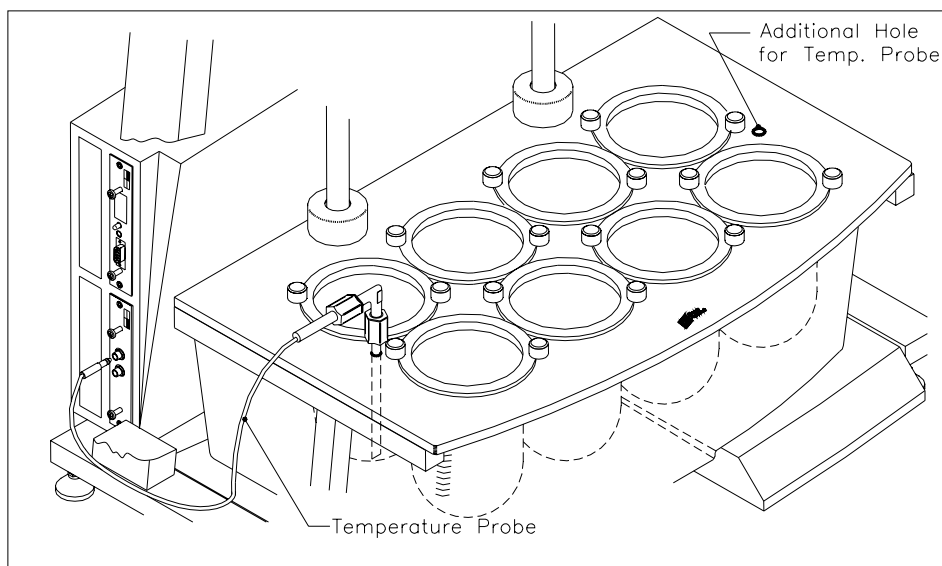


Figure 4-13: Temperature Probe Installation

4.8 Printer Installation

The printer may be installed in one of two configurations: Standard or Daisy-chained. Standard is the more common configuration where each SR8-Plus installed is connected to its own printer. In the Daisy-chained configuration, several SR8-Plus Dissolution Test Stations are connected to a single printer.

NOTE: Refer to the operating instructions provided with the printer for information on paper and ribbon installation.

Standard Configuration

1. Plug the printer into the power outlet labeled "PRINTER" on the right hand side of the SR8-Plus Controller.

NOTE: The printer is 115V and must be plugged into the printer power outlet on the SR8-Plus Controller. The printer should be placed away from the test area to keep it from being damaged by liquid.

2. Plug the cable connected to the printer into the port connector labeled "COMM PORT 3" on the left hand side of the SR8-Plus Controller.






Daisychained Configuration

1. Plug the printer into the power outlet labeled “PRINTER” on the right hand side of the last SR8-Plus in the chain.

NOTE: The Printer is 115V and must be plugged into the printer power outlet on the SR8-Plus Controller.

2. Plug a communications cable from “COMM PORT 2” of the first unit in the chain to “COMM PORT 1” of the next unit and repeat this procedure for the number of units daisy-chained. At the last unit in the chain plug the cable connected to the printer into the port connector labeled “COMM PORT 3” on the left hand side of the SR8-Plus Controller.

3. On the last unit in the chain (the one connected to the printer), press  [Preferences], select [1] DEVICE SETUP, and use [1] to select the “PRINTER: Yes” option. On all other units in the chain select the “PRINTER: Remote” option.

DEVICE SETUP:	
1 PRINTER	:Remote
2 TEMP PROBES	:1
3 SAMPLER	:AutoPlus
4 SAMPLING PROBE	:E-Probe
 	

4. The units in the chain that have their printers set to “Remote” will send the data out of their “COMM PORT 2” and into “COMM PORT 1” of the next unit. The printer at the end of the chain with printer option set to “Yes” will send the data into “COMM PORT 3” and into the printer.

4.9 System Check



Caution: Plug the power cord into the grounded three prong power outlet.

Achtung: Stecken Sie den Stecker in die Dreier-Basis-Steckdose.

Attention: Brancher le fil conducteur de courant à la prise de terre.

Precaución: La unidad debe conectarse a un toma corriente que tenga conexión de tierra (de tres terminales).

1. Turn on the power switch, located on the right hand side of the SR8-Plus Controller.
2. The “Power On” status on the front panel should illuminate. A title screen appears for 5 seconds and then the Main screen is displayed.



3. Verify that the heater is working properly. Press [SET TEMPERATURE].



Use the [↑] and [↓] arrow keys to highlight 37.0, and press [ENTER]. The “Heater On” status light should illuminate.

4. The heater should raise the bath temperature to close to 37°C within 30 minutes and equilibrate at 37° in one hour. The temperature can be monitored on the status screen.
5. Run a diagnostics test and verify that all the tests pass.

NOTE: If any test fails or if the bath does not heat, contact Hanson Research Technical Support at (800) 821-8165 or (818) 882-7266.

4.10 Setting Adjustable Stops

1. Raise the drive head to its highest position.
2. Use a hex wrench (supplied in the supply kit) to loosen the Adjustable Stops. Set the stops to where there is 38mm (1.5”) of distance between the Adjustable Stop and the support that is on top of the base. The width of all height spacers is 38mm; an easy way to set this distance is to use the height spacer on its side and place it between the stop and the support. Set one of the Adjustable Stops this way. Tighten this stop to lock in position. Lower drive head so that it touches this stop and then lift the second Adjustable Stop so that it touches the drive and lock into place.

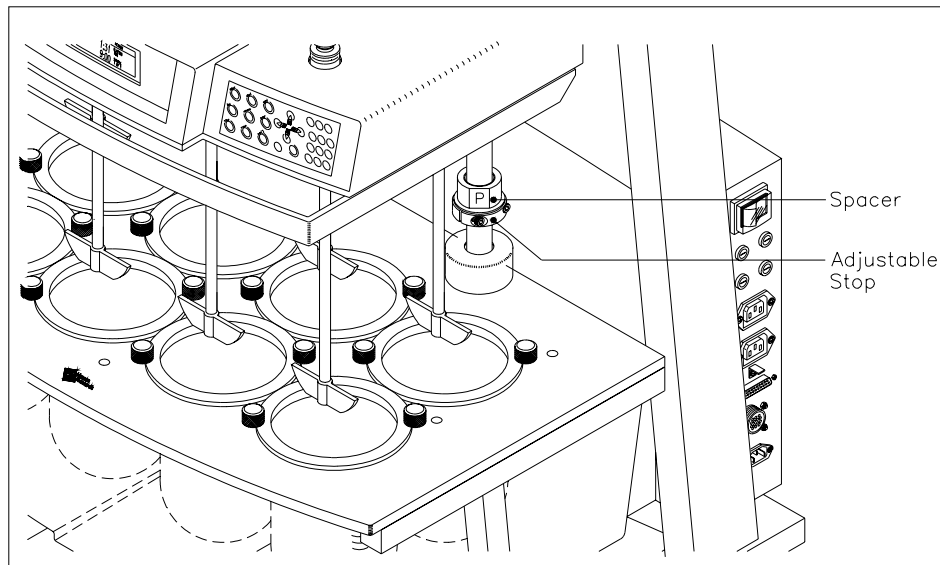


Figure 4-14: Setting Adjustable Stops



4.11 Installation of Paddles and Baskets

1. Verify that the drive head is at its highest position.
3. If the spindles are turning, press [SET SPEED], highlight “0” or input “0”, and press [ENTER]. The spindles will stop turning.
4. Reach under the drive head and loosen the chuck which secures the shaft of each paddle or basket. Insert each shaft through the chuck, so that it is protruding out the top of the drive head. (see Figure 4-15)

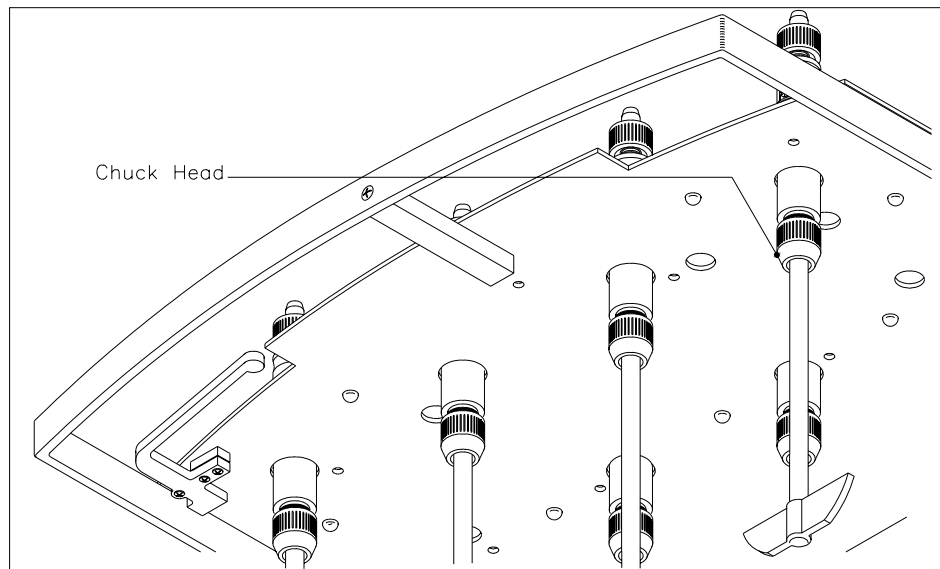


Figure 4-15: Paddle/Basket Shaft Installation

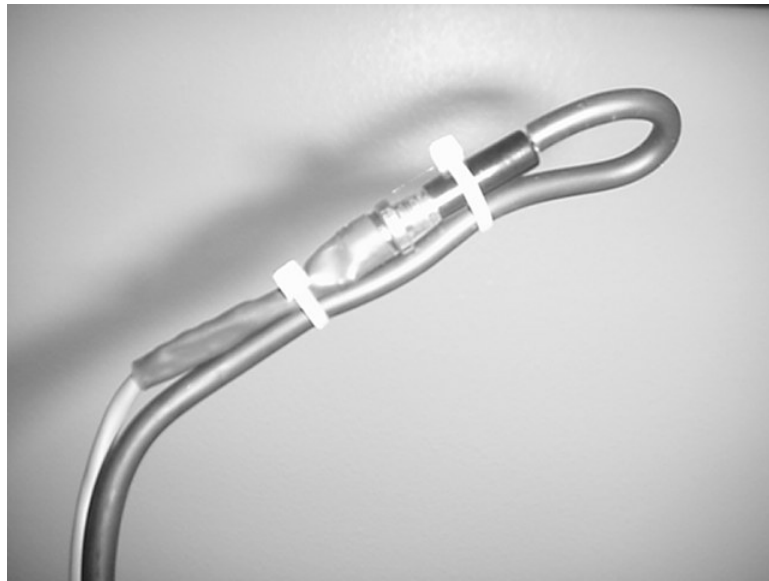
5. Verify that each of the vessels is empty.
 6. Verify that there are no spacers installed on the guide rods. (see Figure 4-14)
 7. Lower the drive head to its lowest position.
- NOTE:** If a different operating position is desired, see 4.10 *Setting Adjustable Stops*.
8. Push each shaft down until the paddle or basket touches the bottom of the vessel. Tighten the chuck to secure the shaft in place.
 9. Raise the drive head.
 10. Clip the height setting spacers above the stops on the guide rods. If using paddles, use the spacer labeled “P”. If using baskets, use the spacer labeled “B”. This meets the USP specification for spacing.



4.12 Connecting the E-Probe

NOTE: The E-Probe power cord is the smaller of the two power cords supplied. Do not switch these two power cords; always use the heavier, main power cord for control.

1. Connect the power supply (black rectangular box, with plug) into the round connector coming out with tubing and the other connectors on the right side of the SR8-Plus.
2. Loop cable around and clamp with cable tie. The power supply may become unplugged if this is not done.



3. Connect the power cord into the side of the power supply. Connect the other end of the power cord into a grounded outlet.

4.13 Adjusting Sample Probes

The tip of the sampling probe should be midway between the top of the media and the top of the paddle or basket.

To adjust E-Probe sampling probes:

1. Make sure probe is at the top of the stroke. If you are not sure, home probes. (see Section 5.17--System Configuration Parameters: E-Probe Setup)
2. Have the SR8-Plus mechanical settings adjusted and ready to start the test.
3. Select the Protocol to run and with the “Drop Dose and Press Run” window shown, press the down arrow to lower the probe by the stroke amount for that protocol.
4. Loosen the thumb-screw on the upper coupler and slide the sampling tube up or down to achieve the correct sampling position and tighten the thumb-screw to lock the sampling probe in place.



5. Press the up arrow to return the sampling probes to the home position.

NOTE: The probe will only move if a stroke value has been entered into the protocol. Always set the stroke to 45mm unless there is a requirement to stroke a different amount.

4.14 Adjusting Digital Temperature Probes

The tip of the Digital Temperature Probes should be adjusted to the tip of the sampling probe or its filter.










To adjust Digital Temperature Probes:

1. Make sure that the E-Probes are at the top of their stroke. If you are not sure, home probes. (see Section 5.17--System Configuration Parameters: E-Probe Setup)
2. Have the SR8-Plus mechanical settings adjusted and ready to start the test.
3. The Digital Temperature Probe is designed to clip onto the sampling probe. Move the Digital Temperature Probes up or down so that the tip of the Digital Temperature Probe is at the same level as the tip of the sampling probe or sampling filter.



5 Operation and Programming

5.1 Keypad Description

Key	Key Name	Use
	Run	The first press of this key allows the user to select a stored protocol. The second press of this key starts the selected protocol.
	Speed	This key allows the user to manually set the speed. This key is not functional when a protocol is running.
	Temperature	This key allows the user to manually set the temperature and to view the Digital Temperature Probe screen (when Digital Temperature Probes are installed).
	Edit/View Protocol	This key is used to select the parameters for a new protocol. This key is also used to edit/view the parameters of a stored protocol. A password may be required to change parameters.
	Preferences	This key is used to access a series of options that are secondary to the normal operation of the system. These include: contrast adjustment for the LCD display, heater shutdown option at the end of a test, validation and calibration options, security and user options, diagnostics, and system configuration.
	Print Options	This key is used to access print options. These include: print status, print protocol, print header and print last test.
	Stop	This key is used to abort a test in progress. Press twice to abort test. If this key is pressed when there is no test in progress, the system is placed in the standby mode.
	Clock	This key is used to access the clock and alarm options. These include: clock options, preheat wakeup alarm, sampling alarm, user alarms, calibration alarm, alarm acknowledgment and start manual timer. This key is also used to access revision information when available.
	Help	This key is used to access the help screens for the system.



5.2 Indicator Lights

- Power On** This light indicates power is supplied to the system.
- Heater On** This light indicates the system is heating the waterbath. Whenever the waterbath target temperature is increased, this light remains illuminated. As the bath nears target temperature, the light begins turning on and off, with the on time diminishing to only a few seconds per minute to maintain temperature once the target temperature is reached.
- Stand By** This light indicates the system is in stand-by mode. This light blinks whenever the wakeup alarm has been activated in the stand-by mode.
- Diagnostics** An energized light indicates the system detects a fault, which is fatal to its use.
- Timer Alert** An energized light indicates an alarm has been activated. This light turns off automatically whenever the alarm is acknowledged.

5.3 Screen Icons

These icons are located on many system screens. Their purposes are:

- Clock** Press to view the current revision for that setting.
- Printer** Press to print the current screen information.
- Lock Open** Indicates that the security system is enabled and that a manager is logged on.
- Lock Closed** Indicates that the security system is enabled and that an operator is logged on.
- NOTE:** If no locks appear on any of the screens, this is an indication that the security system is turned off.

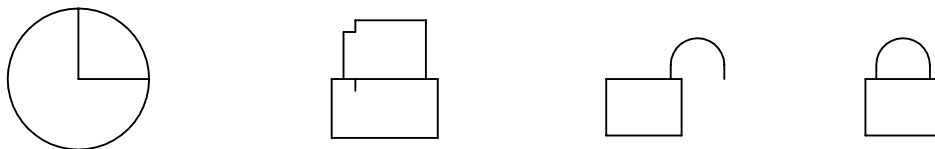


Figure 5-1: Screen Icons



5.4 Main Screen

Whenever the system is powered up, a Title screen is displayed for a few seconds and then the Main screen is displayed, as shown in Figure 5-2.

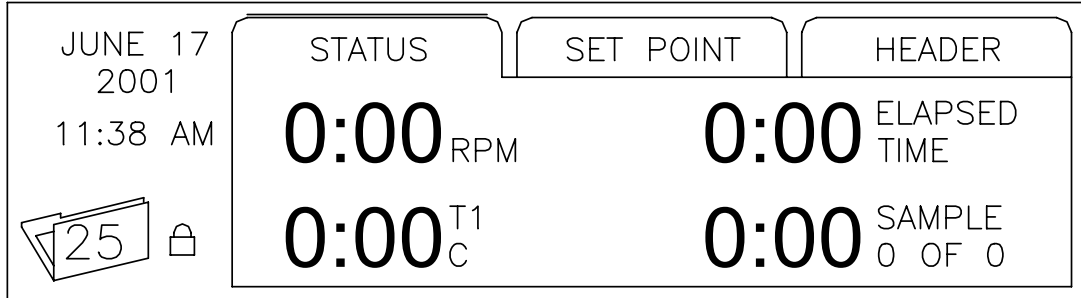



Figure 5-2: Main Screen

Notice that there are three tabs on the Main screen: Status, Set Point, and Header. These are the three screens that comprise the Main screen. In the Figure, the Status screen is displayed. Press [→] and/or [←] to display the other screens. The Status screen is normally displayed when the system is operating. In most cases, if one of the Main screens is not displayed, it can be displayed by pressing [ESC] one or more times.

5.5 Use of Scrolls

The user selects the desired input to operating parameters using a scroll. An example of a scroll is shown in Figure 5-3. This can be displayed by pressing  [SET SPEED]

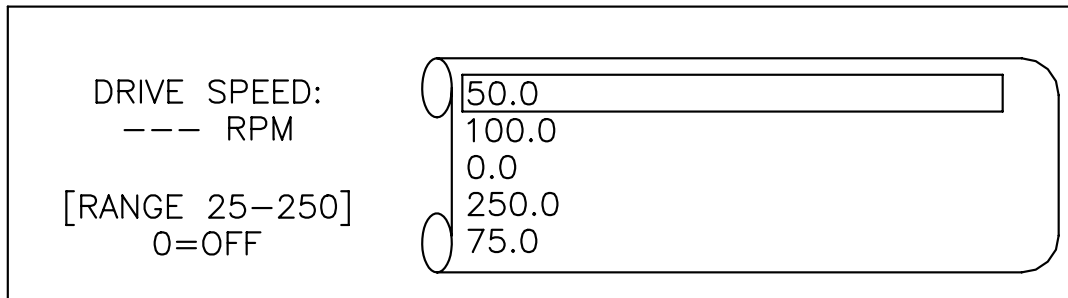


Figure 5-3: Example Scroll

If the desired input for the parameter is displayed in the scroll, press [↑] and/or [↓] to highlight it and press [ENTER]. The scroll holds 5 inputs. Each time an input is selected, it is placed at the top of the scroll. Pressing [ENTER] again will set or implement this value. In the case above the speed will go to 50RPM.



If the desired input is not displayed, key in the input and press [ENTER]. The input is placed at the top of the scroll and highlighted. If the scroll had been full with 5 inputs, the input at the bottom of the scroll is deleted and the new input is placed at the top of the scroll. Press [ENTER] to accept the highlighted input.

Press [CLR] to delete the highlighted input, if necessary.

Some parameters, such as the drive speed, require numeric input. Other parameters, such as the operator's name, require alphabetic input. Input of alphabetical characters is described later in this section.

5.6 Input of Alphabetical Characters

An example of a screen which requires an input of alphabetical characters is shown in Figure 5-4. To display this screen, with the Status screen displayed, press [→], [→] to display the Header screen. Then press [0] to display the "Operator Name" input screen. If the desired operator's name is highlighted on the scroll, it can be selected as described above.

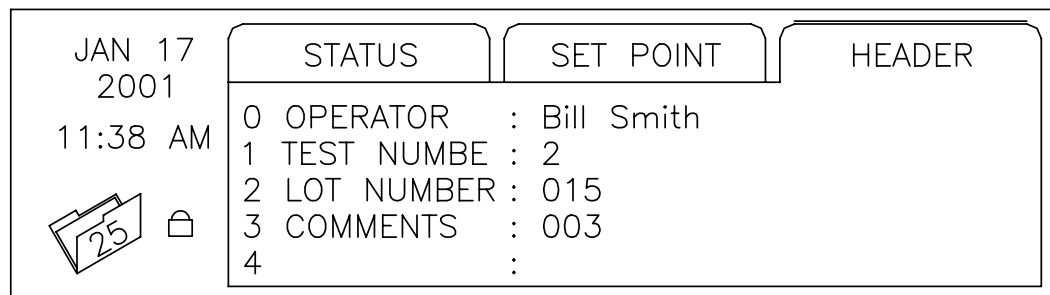





Figure 5-4: Header Screen

To input a new operator's name:










- Note that the operating keys also include the letters of the alphabet. For example,  [RUN] has "abc" attached.
- Successive presses of the key display the letters sequentially. For example, pressing  [RUN] one time displays an "a". Pressing it a second time displays a "b". Pressing it a third time displays a "c". Continuing to press [RUN] will take letters to the uppercase format and then back to lowercase.
- When the desired letter is displayed, press [→] to move to the next character. Pressing [→] again leaves a space. Pressing [←] allows any character to be overwritten. Pressing [ESC] or [CLR] deletes the entire input.

NOTE: It is not necessary to press [→] to move to the next character, unless the next letter uses the same key. This is more clearly explained in the following example.





4. The third character on  [HELP] allows a choice of 22 special characters to be input. These characters are displayed in the pop-up window. Use [→] or [←] to highlight the desired character, then press [ENTER] to place the character in the input string.

As an example, input the operator's name "Bill Smith".

1. Press  [RUN] five times to display a "B".
2. Press  [SET TEMPERATURE] three times to display an "i".
3. Press  [EDIT/VIEW PROTOCOL] three times to display an "l".
4. Press [→] to move to the next space.
5. Press  [EDIT/VIEW PROTOCOL] three times to display an "l".
6. Press [→] twice to leave a space.
7. Press  [STOP] four times to display an "S".
8. Press  [PREFERENCES] to display an "m".
9. Press  [SET TEMPERATURE] three times to display an "i".
10. Press  [STOP] two times to display a "t".
11. Press  [SET TEMPERATURE] two times to display an "h".
12. Press [ENTER] to place "Bill Smith" at the top of the scroll.
13. Press [ENTER] to accept the highlighted input.



5.7 Manual / Quick Operation

The SR8-Plus is designed to perform dissolution testing using a series of dissolution parameters stored in a protocol. Under certain conditions, it is desirable to have manual control of the speed and temperature. Use  [SET SPEED] and  [SET TEMPERATURE] to manually adjust these parameters when a protocol is not running, or before starting the manual timer.

5.8 Print Options

The Print Options Menu provides the user with the four choices described below. The menu also shows the status of the system printer.

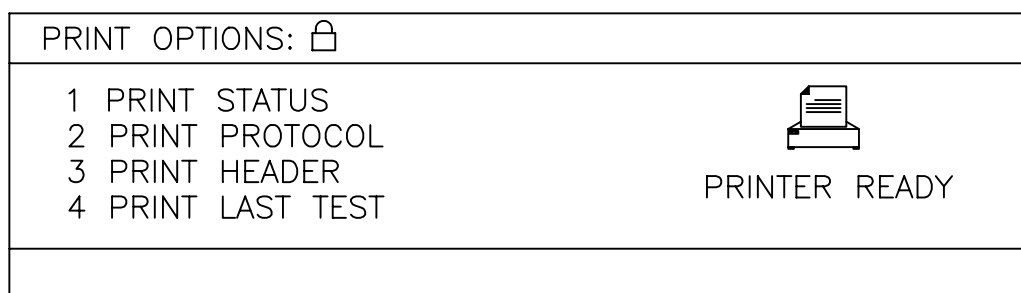


Figure 5-5: Print Options Screen

Print Status

Pressing [1] allows the user to print the current status (speed, temperature and elapsed time) at any time.

Print Protocol

1. Press [2] to select “Print Protocol”. The Select Protocol screen is displayed.
2. Highlight the desired protocol and press [ENTER]. The protocol parameters are printed.
3. When printing is complete, press [ESC].

Print Header

Press [3] to select “Print Header”. The title is printed.

Print Last Test

Press [4] to select “Print Last Test”. The test that was last completed is stored in the system buffer; each time a test is started this buffer is over-written.




5.9 System Options


The SR8-Plus System has a number of parameters that can be input by the user as part of the installation procedure. Under normal operating conditions, these parameters are not changed, although they can be at any time.

5.10 Adjusting the Contrast

To adjust the contrast on the LCD display:

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [1] to select "Adjust Contrast". The Adjust Contrast screen is displayed. Press [←] to make the display darker; press [→] to make the display brighter.
3. When the contrast is set to the desirable contrast, press [ENTER] to return to the System Options screen.

5.11 Heater Shutdown

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [2] to change "Heater Stays On" to "Heater Shutdown".
3. Press [ESC] to return to the System Options screen.

NOTE: The heater will shutdown after this test only. If the test is stopped, the "Heater Shutdown" will return to "Heater Stays On". This feature may be changed during a test.

5.12 Validation

With the System Options screen displayed, press [3] to display the System Validation Menu screen.

1. Press [1] to log vessel temperatures with probe T1. Follow the directions on the screen to record or print each vessel temperature. It is best to wait at least 30 seconds between readings.
2. Press [2] to log serial numbers. There are multiple screens to enter serial numbers for vessels, paddles, basket shafts, baskets and the SR8-Plus system components. If the system is equipped with Digital Temperature Probes, a screen with their serial numbers will be displayed. The Digital Temperature Probe serial numbers are not changeable.



3. Press [3] to view the maintenance log. The information on this screen tells the user or service person when the components of the system were calibrated and the operating time of the belt, motor, and heater. This information should only be modified if service has been done to the unit. If the system is equipped with Digital Temperature Probes, a screen with their calibration information will be displayed.

5.13 Calibration

With the System Options screen displayed, press [4] to display the System Calibration Menu screen. Calibration of the system is explained in Section 8—Maintenance and Calibration.

5.14 Security

When the security system is enabled, only personnel previously entered into the system by a manager may log on and access operational functions. This feature is highly recommended and, once in place, all personnel are required to log on to operate the unit. There may be up to 25 users programmed into the unit, and there are two levels of users:


Manager (open lock) Complete access to all functions settings and operation of the unit.

Operator (closed lock) Limited access and may not modify settings or protocols, but can start pre-programmed protocols. The operator may also view and print protocols and system settings.

When changes are made by a manager, a revision log is kept indicating when the change was made, and by whom. The revision log may be displayed by pressing the clock key when the small clock icon appears at the bottom of the screen.

NOTE: The security system may be disabled, although there will be no protection of important system settings and protocols.

Setting Up and Starting the Security System

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [5] "Security".
3. Highlight "Manager" and press [ENTER].
4. Follow the directions at the bottom of the screen to enter a password.
5. Highlight "Manager" again and press [ENTER].
6. Re-enter your password and press [ENTER] and again [ENTER]. You are now at the Manager Menu.
7. Press [1] to enable the password protection. Press [4] to change the password timeout (default is 5 minutes).



8. Press [2] to add a user, press [1] to add a manager, enter your name and press [ENTER]. Press [ESC] and again [ESC] to get to the Password screen. Highlight your name (or the name you just entered) and follow the instructions to input your password. [ESC] to return to the Main Menu.
9. Press [STOP] and again [STOP] to log off. Press [PREFERENCES], and you are now required to log on. Highlight your name (or the name you entered in Step 8 and press [ENTER]; enter your password and press [ENTER]. You have now logged on.

NOTE: Enable password and set time and date (see more in this section) before changing any system settings or creating protocols; this will ensure that the revision dates for these areas are correct.


5.15 Adding, Changing or Removing Users

1. When you are classified as a manager you may add managers or operators, and you may change an operator to a manager or a manager to an operator. To log into the Manager Menu from the Main Menu, press [PREFERENCES], [5] "Security", and then highlight your name and enter your password and press [ENTER] and again [ENTER] to view the Manager Menu.
2. At the Manager Menu select "Add A New User" to add a manager or operator.
3. At the Manager Menu select "Modify/Delete A User" to remove or change someone in the list of users.

5.16 Diagnostics

It is recommended to run diagnostics at the beginning of each day's work or if there has been a change or a problem with the equipment. Diagnostics is explained in more detail in Section 7—Troubleshooting.

5.17 System Configuration Parameters

With the Main screen displayed, press  [PREFERENCES] to display the System Options screen. To set the system configuration parameters, press [7] to display the System Configuration screen.



SYSTEM CONFIGURATION: 	
1 DEVICE SETUP	5 RS232 SETUP
2 SYSTEM ID	6 EPROBE SETUP
3 EDIT TITLES	
4 LANGUAGE: English	
	

Figure 5-6: System Configuration Screen



Device Setup

1. At the System Configuration screen press [1] to select "Device Setup". The Device Setup screen is displayed.
2. Press the number for each of the accessories to display the installation status of each accessory. The system checks for these accessories when the Diagnostic tests are performed and at the beginning of each test. A failure is indicated if any of the indicated accessories are not found. Make sure the display shows only the accessories that are connected to the system.
3. Press [2] to select "USP Tolerances On" or "USP Tolerances Off".

NOTE: When USP tolerances are on, the user can only start a test when all USP-specified parameters are within USP tolerances. Parameters that fall out of these tolerances during a test are printed stating nature of error and time error occurred. When USP tolerances are off, tests can be started with the temperature not up to the setting.

System ID

1. At the System Configuration screen press [2] to select "System ID". The System ID screen is displayed.
2. Input the System ID. This is printed with the status information. It can be used to identify which dissolution system is being used, if the laboratory has more than one system. This is also used for identification when the system is operated remotely.

Edit Titles

Press [3] to select "Edit Titles". The Title Configuration screen is displayed, showing the choices that are available. To configure these titles;

1. Select the type of title that is to be changed--company, header or protocol. The company name includes two lines of information which are printed at the start of each test. These two lines are suggested to be the company and department names. The Header Titles will appear and be printed at the start of a test. The Protocol Titles are located in protocols and printed at the start of each test.
2. Select the corresponding number associated with the title(s) that are to be changed. Enter in the new title.

NOTE: Blank title areas are not printed.

Language Selection

Press [4] to select "Languages".

NOTE: English is the default language. Consult the factory for a list of currently available language choices.



RS-232 Setup

Press [5] to select and view the “RS232 Setup” screen.

The RS232 parameters are the following:

1. Baud Rate— Determines the transmission/reception speed of data between the SR8-Plus and the external computer. The available baud rates are 1200, 2400, 4800 and 9600*.
2. Data Bits— An integer indicating the number of data bits to be used in transmitting each single character. The available options are 7 or 8* characters.
3. Parity— Indicates the type of parity checking that is used during communications. The available options are ODD, EVEN and NONE*.
4. Command Echo— When this parameter is ON*, the SR8-Plus returns (or echoes back) the System ID of the unit (truncated to 6 characters) followed by the command number once it is successfully implemented. When the parameter is OFF, no response is sent back to the external device whether command implementation was successful or not.

NOTE: The parameters selected here are for external computer handshakes and do not affect SR8 Plus communications with the system printer which always remain at the factory default settings* of 9600 (Baud Rate), None (Parity), 8 (Data Bits), 1 (Stop Bits) and On (Command Echo).

E-Probe Setup


The E-Probe Setup allows the user to operate the probes. If it has not been selected from the accessories screen, it will not show up in the System Configuration screen. Pressing [1] will home the probes. Always make sure to select the correct stroke value. Press the up or down arrows to check probe operation and to make probe adjustments.



5.18 Timer / Alarm Operation


Date and Time

To set the system time and date:

1. With the Main screen displayed, press  [CLOCK] to display the System Alarm/Timers screen.
2. Press [5] to display the "Clock Options".
 - [1] to change the time format from 12 to 24 and back.
 - [2] to allow change to the displayed time.
 - [3] to change the date format, continue to press to review all date formats.
 - [4] to allow change to the displayed date.

Preheat Wakeup Time

The preheat wakeup time option allows the user to program the SR8-Plus to turn on the heater to a designated temperature at a designated time on a designated day, so that the bath temperature is equilibrated when the user is ready to use the system. The most typical use of this option is for the heater to be turned on approximately 1 hour before starting time in the morning. To set the preheat wakeup time:


1. With the Main screen displayed, press  [CLOCK] to display the System Alarm/Timers screen.
2. Press [1] to select "Preheat Wakeup". The Preheat Wakeup Time screen is displayed.
3. Input the time, date, recurrence and temperature. Follow each input with [ENTER].

NOTE: Past date and time cannot be entered for any alarm.




Sampling Alarm

This alarm is used to alert the user when a sample is to be taken from the vessels, as determined by the sampling interval set in the protocol. To set the parameters for the sampling alarm:

1. With the Main screen displayed, press  [CLOCK] to display the System Alarm/Timers screen.
2. Press [2] to select "Sampling Alarm". The Sampling Alarm screen is displayed.
3. Press [1] to turn the alarm on or off. The alarm is both audible and is indicated by the "Timer Alert" status light on the display.
4. Set the pre-notification time. This sets the amount of time that the user is alerted, before the sample needs to be taken. The range is 0-9:59 (Hours:Minutes)

User Alarms

The system includes three undesignated alarms that the user can set to be alerted for an important event. Examples of user alarms include: change the bath water, add algaecide, change the pH, or change the media. To set the user alarms:

1. With the Main screen displayed, press  [CLOCK] to display the System Alarm/Timers screen.
2. Press [3] to select "User Alarms". The User Alarm screen is displayed.
3. Press [1] to display the desired alarm number (three alarms are available).
4. Input the date, time, recurrence and a reminder of what the alarm is. Follow each input with [ENTER].

When the date and time are reached, the user is alerted of the alarm by an audible sound, a pop-up window on the screen, and illumination of the "Timer Alert" status light on the display.


Recurrence

After setting alarms or preheat wakeup as previously described, the user may incorporate a recurrence. Follow the instructions on the display to disable (which will only do the alarm once), or Mon-Fri, Mon-Sat, Everyday, or with Everyday showing, the user can program the number of days for the recurrence to take place, (range 1-1827 days).



Calibration Alarm

The calibration alarm is used to alert the user when the calibration must be done to validate the system. To set the calibration alarm:

1. With the Main screen displayed, press  [CLOCK] to display the System Alarm/Timers screen.
2. Press [4] to select "Calibration Alarm". The Calibration Alarm screen is displayed.
3. Input the date, time and recurrence for the next calibration. Follow each input with [ENTER].


When the date and time are reached, the user is alerted of the alarm by an audible sound, a pop-up window on the screen, and illumination of the "Timer Alert" status light on the display.

Canceling an Alarm

An alarm that has been set, but has not become due, can be canceled by displaying the input screen and pressing [CLR].

Acknowledging an Alarm

When an alarm is triggered, the "Timer Alert" status light is illuminated and a warning window is displayed momentarily. The window is displayed again every few seconds and the audible beep is sounded until the alarm is acknowledged. To acknowledge the alarm:

1. Press  [CLOCK]. The alarm pop-up window is displayed one last time.
2. Press any key to acknowledge the alarm and turn the "Timer Alert" light off.
3. Press [ESC] to return to the Main screen.


NOTE: This does not apply to Sampling Alarms.



5.19 Selecting Creating and Viewing Protocol Parameters

NOTE: Password access may be required to modify protocol parameters.

To create a new protocol:

1. With the Main screen displayed, press  [EDIT/VIEW PROTOCOL] to display the Edit Protocol screen. (see Figure 5-7)

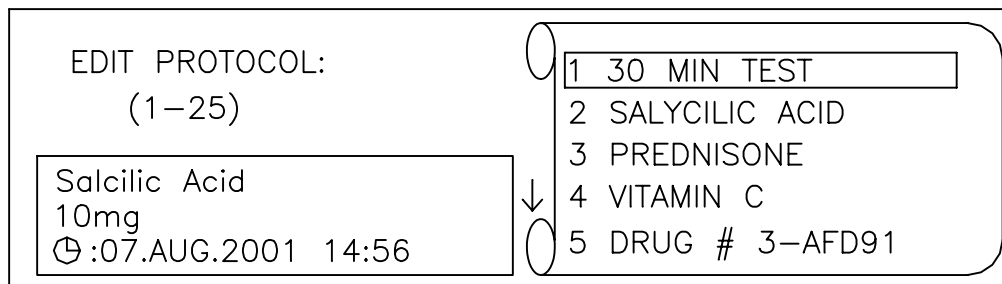


Figure 5-7: Edit Protocol Screen

2. Input a protocol number which is not displayed on the scroll and press [ENTER]. The Operation Parameters screen is displayed. Notice that the selected protocol number is displayed in the folder on the left-hand corner of the screen, along with an open or closed lock if the password protection is enabled.

A series of input screens are displayed. Select the number on each screen to input the desired parameters and move to the next screen by pressing [ENTER].

NOTE: You can move between parameter input screens by pressing [→] and [←].

5.20 Entering Protocol Parameters

The parameters are input in the following order:

1. **Drive Speed** - Input the drive speed. Range: 0, 25-250RPM
2. **Bath Temperature** - Input the bath temperature. Range: 0, 30-40°C
3. **Test Length** - Input the total time for the test, but not including the optional infinity test. Range: 0-999:59 (Hours:Minutes)
4. **Print Interval** - This allows the status conditions (elapsed time, system I.D., speed, and temperature) to be printed at the designated interval during the test. Range: 0-99:59 (Hours:Minutes) or at sample time. If the SR8-Plus has Digital Temperature Probes, these probes will take the temperature of each vessel, which will then be printed.



5. **Stagger Extension Time** - This parameter extends the total test length (Parameter 3, above) by the value specified to accommodate staggered sampling. It reflects the total time required to accomplish sampling of the group of vessels and *not* the offset time between the individual vessels.
6. **Infinity Test Length** - If an infinity test is required, input the amount of time for running the infinity portion of the test. If an infinity time is programmed, a speed selection will become available. The speed selection allows the user to program a speed at which the infinity test is to be run. If an infinity test is not required, input the time as 0:00. Range: 0:00 to 9:59 (Hours:Minutes)
7. **# Sampling Events** - This sets the number of times that the system will alert the user to collect samples. Range: 0-40 sampling points. This is also the time used by the print interval when the printing is set to "at sample time".
8. **Sampling times** - This screen is used to specify the time when each of the samplings is to be taken. The input is different on this screen. Notice that the screen displays all sample times with the current sample time highlighted. Input the time for the first reading and press [ENTER]. Repeat for each time point. Range: 00:00 to 999:59 (Hours:Minutes)
9. **Protocol Labels** - These 20-character inputs are displayed on the Protocol Labels screen. Select the corresponding number to edit, enter, or change any of these protocol labels.

NOTE: Protocol titles may be changed to the desired topic. (see more in this section)

10. **E-Probe Usage** – This sets how the E-Probe will operate during a test. If this feature has not been selected from the accessories screen, it will not show up in the protocol. Press [1] to toggle between the different settings. Always make sure to select the correct stroke value.

Disabled = No operation

Default = External control (AutoPlus will operate)

Custom = Customize the operation of the E-Probe

NOTE: The protocol must have inputs greater than zero for speed, temperature, and test length, or it cannot be stored and run by the system. The input to the other parameters is optional.

11. **Digital Probe Options** –

Enable / Disable sets the SR8-Plus to use or not use the Digital Temperature Probes. Probe may remain mounted if not in use.


Vessel Goal Temp is the temperature value that will be used to determine that the actual temperature is within the USP specifications of +/- 0.5°C. This feature will only report a fault if USP tolerances are turned on. If USP tolerances are turned on, all vessel temperatures must be within specification before a test can be started. The vessel goal temperature is evaluated at the start of a test, at the print interval, and at the end of the test.



5.21 Editing a Protocol


NOTE: Password access may be required to modify protocol parameters (open lock). If changes are made to a protocol with password protection enabled, the revision of that protocol will be updated.

To edit the parameters of an existing protocol:

1. With the Main screen displayed, press  [EDIT/VIEW PROTOCOL] to display the Edit Protocol screen.
2. Use [↑] and/or [↓] to highlight the desired protocol and press [ENTER].
3. As you step through the protocol screens, select the number on each screen to change the desired parameters and move to the next screen by pressing [ENTER].
4. When the desired parameter(s) have been changed, press [ESC] and again [ESC] to return to the Main screen.

5.22 Viewing Protocol Parameters

To view protocol parameters:

1. With the Main screen displayed, press  [EDIT/VIEW PROTOCOLS] to display the Edit Protocol screen.
2. Use [↑] and/or [↓] to highlight the desired protocol and press [ENTER].
3. The Operation Parameters screen is displayed. Press [ENTER] to step through each of the Protocol screens to view each entry.

5.23 Running A Test

The user may run a test either by simply starting a protocol stored in memory, or using the manual timer. The first option is an automated approach that should be used to start frequently used procedures. Starting a protocol has the following advantages:

1. Ensures that the critical test parameters are selected correctly every time and cannot be changed by the operator (when Security is enabled);
2. Enables the user to monitor USP tolerances during the test;
3. Automatically prints pertinent test data at the beginning of the test;
4. Automatically prints Hi/Low/Avg speed and temperature at the end of the test;
5. Allows the user to program sampling alarms;



- Allows easy programming for staggered sampling; infinity test(s), and automatic heater shutdown after the test ends.

The second function is a manual approach better suited for R&D investigations or protocol development. Using the Manual Timer has the following advantages:

- A quick test can be run without programming any protocol parameters;
- Speed and temperature parameters can be changed at any time during the test and can be performed by either a manager or user;
- The user retains the use of an elapsed timer and automatic print intervals.

5.24 Starting a Protocol

The SR8-Plus is designed to perform dissolution tests using a set of parameters stored in a protocol.

- Press  [RUN]. The Select Protocol screen is displayed. (see Figure 5-8)

SELECT PROTOCOL: (1-25)	1 30 MIN TEST 2 SALYCILIC ACID 3 PREDNISONE 4 VITAMIN C 5 DRUG # 3-AFD91
Product: Salcilic Acid Dosage: 10mg Rev: Nov.21.2000 14:56	

Figure 5-8: Select Protocol Screen

- Highlight the desired protocol or enter the protocol number and press [ENTER]. The Header screen is displayed, as shown in Figure 5-9. Select the number of the title to which you wish to add a label. Enter, or select from the scroll, the label information required. Use the arrow keys to move to the next page of Header information, and press [ENTER] when done. The Header information is printed at the start of the test.

VERIFY HEADER INFORMATION:	
0 USER NAME	: MANAGER
1 TEST NO.	: ABC
2 LOT NO.	: 123
3 COMMENTS	: 10/05
4	
← Continue	↕ Page

Figure 5-9: Select Protocol Screen



The system is now in the setup mode. The system adjusts temperature as determined by the protocol. The bath temperature can be monitored on the Status screen; notice that the probe number is displayed adjacent to the temperature. Press [1] or [2] to display the temperature from that temperature probe, if installed.

3. Press [→] to display the Set Point screen, as shown.

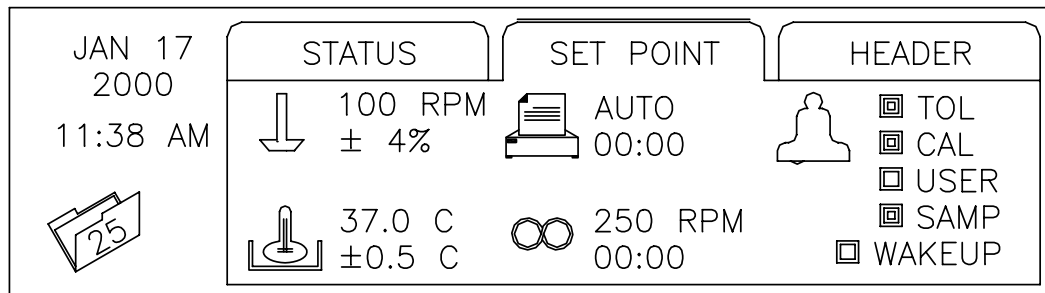


Figure 5-10: Set Point Screen

The Set Point screen displays the target speed and allowed tolerance, the target temperature and allowed tolerance, the timing interval for Auto Print, and the time and speed for the infinity test. The Set Point screen also indicates which of the alarms has been set.

If any parameter is incorrect, press  [STOP] and again [STOP] to abort test. Correct parameter(s) and run protocol. (see Step 1)

4. Press [→] to display the Header screen, as shown.

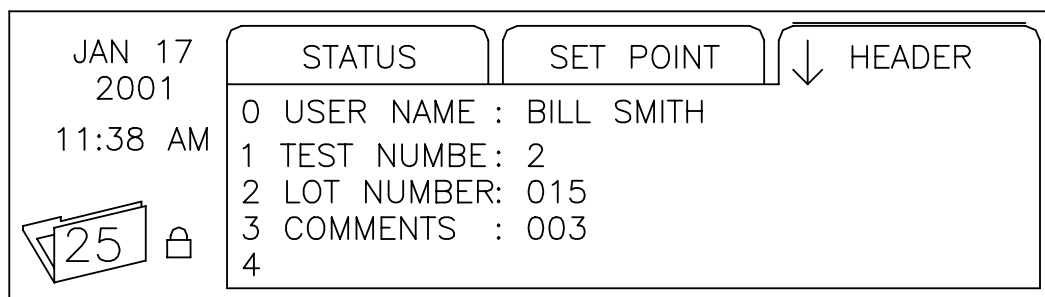


Figure 5-11: Header Screen

5. This header information, along with the two lines input for company and department, is printed with the protocol parameters at the start of the test.
6. Press [→] to display the Status screen. When the temperature is within tolerance, a pop-up screen appears displaying “Drop Dosage and Press [RUN] “ to start test. If the USP tolerance has been set to on and Digital Temperature Probes are used, all vessel temperatures must be within tolerance before the test can be started. The E-Probes will automatically drop the Digital Temperature Probes into the vessel to check each vessel’s temperature.



Press  [RUN].






If Auto Print was selected, the status conditions are printed at the interval specified in the protocol.

The number of samples, and the remaining time until the next sampling, is displayed on the Status screen. If the sampling alarm is turned on, when each sampling interval is reached, an audible alarm will sound, a warning window will display momentarily, and the "Timer Alert" will illuminate.

When the test is complete, the system checks for an infinity test. If an infinity test is selected in the protocol, the infinity test is performed.

When the protocol is complete, the drive motor is stopped automatically. Temperature control remains on, unless "Heater Shutdown" was selected in the System Configuration Menu.

5.25 Starting the Manual Timer

1. Press  [SET TEMPERATURE], and input the desired temperature. Wait until vessel temperature is within the required tolerance of the set temperature.
2. Press  [SET SPEED], and input the desired drive speed. This step may be delayed until the start of the timer, if so desired.
3. When ready to start the manual test, press  [CLOCK].
4. Select option [6] "Start Timer", and the Manual Timer Setup Screen appears.
5. Select an automatic print interval. Either OFF, 5, 15, 30, or 60 minutes can be selected. Make sure that the printer is on-line and has enough paper.
6. When ready to start the timer, press  [CLOCK]. The test will run uninterrupted.
7. Press  [STOP] to reset the manual timer and stop the test.




5.26 System Shutdown and Start Up

When a protocol is complete, the drive motor is stopped automatically and temperature control remains on the waterbath. This allows the waterbath to remain at a constant temperature, so the system is ready to start the next test.

If the dissolution test will not be completed until everyone has gone home for the day, the user can have the heater turn off automatically at the end of the test by selecting "Heater Shutdown" on the Preferences screen.


The user can program the heater to turn on at a designated time so that the waterbath is equilibrated to the desired temperature when the user is ready to start testing. (see 5.18 Timer/Alarm Operation: Preheat Wakeup Time)

5.27 Stand By Mode

The user can place the system in the stand by mode by pressing  [STOP]. Pressing any key brings the system out of the stand by mode. When the system is in stand by, the motor is turned off, the heater is turned off, and the display is darkened. Placing the system in stand by when not in use will increase the life of the motor components, heater and display.

5.28 Serial Number Log

The Serial Number Log is used to keep track of the serial numbers of the Vessels, Paddles, Basket Shafts and Baskets, as well as a System Serial Number Log. The function can be used to input the serial number data or simply to view and/or print a reference of the position of the accessories. To perform this function:

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [3] to select "Validation".
3. Press [2], the "Serial Number Log" screen is displayed.





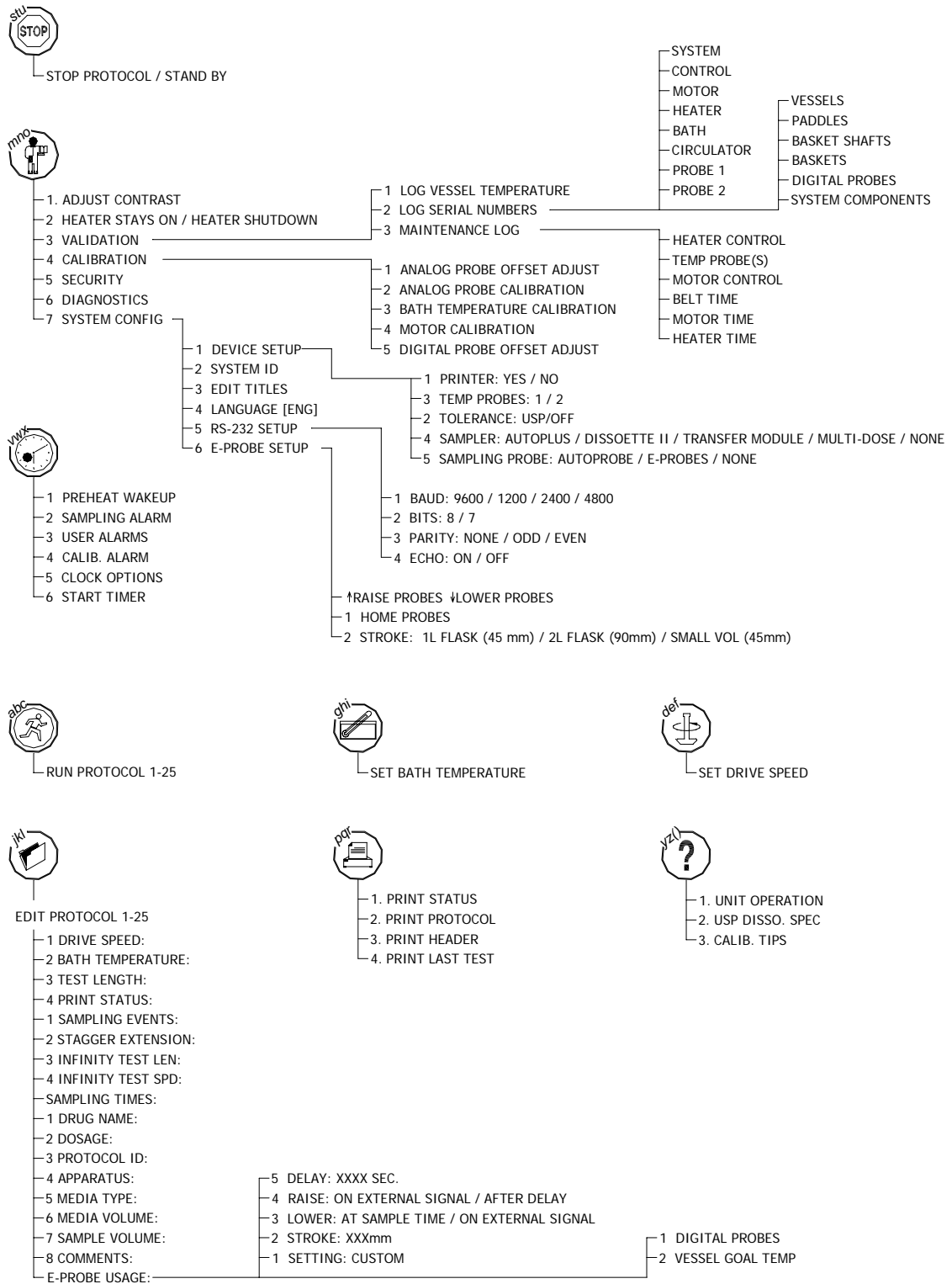
SERIAL NUMBER LOG: 		System Components	
1	SYSTEM	:	
2	CONTROL	:	
3	MOTOR	:	
4	HEATER	:	
		↕ Page	↔ Set

Figure 5-12: Serial Number Log Screen

4. Use the [←] [→] and [↓][↑] keys to navigate through the Vessels, Paddles, Basket Shafts, Baskets and System Serial Number input pages. Pressing the corresponding numeric keys gets you into the edit mode; this allows you to input data into the current field. Digital Temperature Probe serial numbers are automatically placed into their corresponding fields and are not editable.
5. Press  [PRINT OPTION] to print the serial numbers and shaft positions currently on the screen.
6. Press [ENTER] to accept the changes and exit the edit mode. Press [ESC] to undo current entry and exit edit mode. Press [ESC] again to return to the Validation Menu.



5.29 Software Flow Chart





6 Running A Test

6.1 Setting Up

1. SR8-Plus

- a) Verify that all liquid and communications connections are connected per the installation requirements. (see Section 4—Installation)
- b) Run Diagnostics to ensure all connections and setup are complete and ready to go. This will also ensure printer is operating correctly.
- c) Install vessels and lock down with clamp knobs.
- d) Install paddles or baskets. Make depth adjustments to meet specifications. (see Section 4—Installation)
- e) Fill vessels with desired media and cover.
- f) Select a protocol to run. (see Section 5—Operation and Programming).

2. Sampling Probes

Verify that all liquid connections are connected per the installation requirements (see Section 4—Installation). Verify that the probes are adjusted to the correct sampling depth and that the correct number is placed in the correct position. Verify that the specified filter is correctly installed.

3. Printer

Verify that the communications connections are connected per the installation requirements (see Section 4—Installation). Verify that there is adequate paper supply and that the power is on. Both lights should be on and not blinking.

6.2 Starting and Running a Test (*no Digital Temperature Probes*)



NOTE: See Section 5 for programming and operational capabilities.

1. Press [RUN] on the SR8-Plus and select a pre-programmed protocol and press [ENTER]. If the SR8-Plus is connected to an AutoPlus, the AutoPlus will start the same protocol number as the SR8-Plus(s) automatically.
2. Ensure drive is in the proper operating position.
3. When all parameters are ready, drop the dosage into dissolution vessels.
4. Press [RUN] to start the test.
5. Cover vessels if desired.



6.3 Vessel Temperature Log *(no Digital Temperature Probes)*

The vessel temperature log is used to verify the accuracy of the temperature inside of the vessels. This validation is always performed with Temperature Probe 1. This procedure is not required when the SR8-Plus is equipped with Digital Temperature Probes. To perform this function:

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [3] to select "Validation".
3. Press [1] to display the "Vessel Temperature Log" screen.
4. Use arrows to display the desired vessel. To log bath temperature use the arrow key to move between the first and eighth vessel.
5. Place Temperature Probe 1 into the indicated vessel or the bath. Watch the display until the temperature reading is stable, approximately 20 to 30 seconds.
6. Press  [PRINT OPTIONS]. The date, time, vessel number and the actual vessel temperature is printed.
7. Repeat Step 6 for each of the vessels and the bath.

6.4 Starting and Running a Test *(with Digital Temperature Probes and E-Probes)*

NOTE: See Section 5 for programming and operational capabilities.

1. Press [RUN] on the SR8-Plus and select a pre-programmed protocol and press [ENTER]. If the SR8-Plus is connected to an AutoPlus, the AutoPlus will start the same protocol number as the SR8-Plus(s) automatically.
2. If USP tolerance is on, the E-Probes will lower allowing the Digital Temperature Probes to verify that the vessel temperature is within the required operating temperature. The Digital Temperature Probes will stay in this position until that requirement is met or the test is aborted.
3. When all parameters are ready, the probes will raise and the screen will say "drop dose and press run".
4. Drop the dosage or lower baskets and press [RUN] to start the test. At the start of the test the Digital Temperature Probes will be lowered by the E-Probes and print the starting temperature.
5. Cover vessels.



6.5 During the Test

1. The SR8-Plus will count down to each sampling time point. The display will show elapsed time, the bath temperature, and spindle speed.
2. The SR8-Plus will also send important information to the validation printer for a hard-copy test report of the process if a printer is available and programmed to do so.

6.6 After the Test

When the test is complete the SR8-Plus will print (if a printer is available) the performance summary which includes: Minimum, Maximum and Average for the speed and temperature(s).

The SR8-Plus will automatically stop the spindles.

The heater will shutdown if programmed to do so.



7 Troubleshooting

7.1 Contacting Hanson Research Corporation for Technical Support

To expedite your request for Technical Support, please supply the following information:

1. Model and serial numbers of the instrument(s).
2. System configuration.
3. How long the equipment had worked before the problem occurred and how old the equipment is.
4. Any background information, recent repairs, or parts replaced to date.
5. How the system is being used, what the application is.
6. Detailed information about the problem (what is working and what is not).
7. Detailed troubleshooting steps that have been taken to date.

7.2 Troubleshooting Table

Problem	Possible Causes	Recommended Action
The display is dark.	<p>The system is in stand by. (Both the "Power On" and "Stand By" status lights are illuminated)</p> <p>The system is not plugged in or turned on. (The "Power On" light is off and the CPU light is off.)</p> <p>The controller cable is disconnected from the drive head. (The "Power On" light is off and the CPU light is on or blinking.)</p> <p>The controller is not operational. (The "Power On" light is illuminated and the CPU light is not on or blinking).</p>	<p>Press any key to exit the stand by mode.</p> <p>Verify that the power cord is attached to the back of the controller and that the power switch is turned on.</p> <p>Connect the controller cable to the back of the drive head.</p> <p>Change the fuses in the controller, as directed in Section 8.13. If the CPU light still does not come on, contact Hanson service representative.</p>
Excessive vibration in the system.	<p>The belts are damaged.</p> <p>The belts are not adjusted properly.</p> <p>Not all feet on bench.</p>	<p>Change belts as directed in Section 8.11.</p> <p>Adjust belts as directed in Section 8.11.</p> <p>Adjust feet so that all are on the bench and unit is level.</p>

**7.2 Troubleshooting Table** *(continued)*

Problem	Possible Causes	Recommended Action
System protocols and settings are lost or become corrupt. NOTE: this may also happen when upgrading software.	Lithium battery needs replacement.	Replace main board assembly p/n 73-100-310.
CPU or RAM/ROM Diagnostic tests failed.	Component failure.	Contact Hanson service representative for repairs.
Motor Diagnostic test failed.	Motor plug not properly connected to controller.	Check motor plug connection.
	Motor calibration required.	Run calibration test.
Heater Diagnostic test failed.	Heater plug not properly connected to controller.	Check heater plug connection.
	Bath water level low.	Check bath water level
	Bad fuse/fuse holder.	Check and replace fuse/fuse holder.
	Defective heater.	Check and replace heater.
Printer not working.	Printer RS232 cable connection.	Check that cable is connected to bottom of printer and to COMM PORT 3 on controller.
	Printer is off-line.	Press [SEL] on printer. Check printer paper.
	Printer is disabled.	Go to System Accessories and enable printer.
	No power.	Make sure printer is turned ON and plugged into outlet on controller.
	Printer is bad.	Contact HRC service representative for repairs.

Printer Settings and Test Pattern

Hold SEL/LF buttons, turn power on, wait for printing to start and release buttons. Printer will print its settings.

Hold LF button, turn power on, wait for printing to start and release button. Printer will print its test pattern.




7.2 Troubleshooting Table *(continued)*

Problem	Possible Causes	Recommended Action
T1 or T2 temperature probe not working or probe error.	Probe disconnected. System accessories set to two probes and only one hooked up. Bath temperature below 18°C.	Check probe connection to controller. Connect second probe or change system accessories setup. Wait for temperature to rise above 18°C.
Temperature displays approximately 40.3 and does not change.	Probe connector is partially inserted into controller.	Check probe connection to controller.
One or more Digital Temperature Probes do not appear in the temperature screen.	Probe disconnected. System configuration set to less a number of probes than are being used. Bad probe.	Check probe connection to controller. Check Device Setup and select the correct number of probes. Replace probe.
Digital Temperature Probe screen does not show up.	System not configured correctly.	Check Device Setup and select Digital Temperature Probes.

7.3 Diagnostic Tests

The system diagnostic tests include: the microprocessor RAM/ROM test, the motor/encoder test, the floppy disk drive test, the U/I controller test, the clock test, the heater test and the bath water level test. These tests can be performed at any time using the following procedure:

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [6] to perform the system diagnostic tests. The test name is displayed as it is performed. The completion status is added when the test is complete.
3. When all of the tests are completed, the Performing System Diagnostics screen is displayed. If "All Tests Pass" is displayed, press [ESC] to display the Main screen. If there is a "Failre", investigate and correct the problem and repeat diagnostics.



8 Maintenance and Calibration

8.1 Maintenance Schedule

The SR8-Plus should be maintained using the following schedule:

Frequency	Procedure
After each test	Clean up system.
Weekly	Inspect circulating water pump. Inspect bath water.
Monthly	Replace bath water.
Every 6 months	Check temperature calibration. Calibrate the system. Inspect guide rods. Inspect spindle bearings.
Annually	Inspect belts. Inspect idler pulleys.
Every 2 years	Replace belts.

8.2 Clean Up Procedure

Clean up dissolution media whenever it is spilled on the system. At the completion of each test, clean the system with a damp cloth. Do not allow dissolution media to sit on the system.

8.3 Circulating Water Pump

The only maintenance for the Circulating Water Pump is to ensure the water in the bath is reasonably clean. Visually inspect the Circulating Water Pump for build-up of algae or other foreign materials. If necessary, remove circulating water pump and clean with running water.

8.4 Bath Water

Visually inspect the bath water weekly for algae or other foreign material. If algae formation has occurred, change the bath water. To change the bath water:

1. Turn unit off.
2. Ensure there is a drainage system (or suitable container) within 4 feet of the bath.
3. Insert drain hose fitting into bath drain located underneath the bath.
4. After bath has drained, remove drain hose and clean around bath drain if minor water spillage has occurred.
5. Clean bath and fill with clean water (DI or better).

NOTE: Do not fill bath through the drain hose. The system may not handle the water pressure. Do not use copper sulfate as an algicide.




8.5 Temperature Check and Calibration

Temperature Probe Accuracy Check

1. Place temperature probe T1 and T2 adjacent to a certified thermometer in a waterbath of stable temperature at or close to standard test temperature. The SR8-Plus waterbath can, but does not need to be used.
2. Read the temperature for probe T1 displayed on the Status screen. The probe number is displayed on the upper right-hand side of the temperature. Press [1] or [2] to select probe T1 or T2.
3. The temperature on the screen should be within $\pm 0.1^{\circ}\text{C}$ of the thermometer temperature. If the temperature is outside this range, adjust the temperature probe(s). (see Section 8.6—Temperature Probe Offset Adjustment)

8.6 Temperature Probe Offset Adjustment

If the temperature probe(s) are not reading within $\pm 0.1^{\circ}\text{C}$ of the thermometer, the probe reading may be adjusted. To adjust the temperature probe reading:

1. Display Main screen, press  [PREFERENCES] to display the System Options screen.
2. Press [4] to display the Calibration menu.
3. Press [1] to select “Temperature Probe Offset Adjust.”
4. At the information screen Press [ENTER].
5. Press [←] and [→] keys to select the probe T-1 or T-2. Press [↑] and [↓] keys to increase or decrease the probe reading; adjust the reading to be the same as a calibrated thermometer. Press [CLR] to reset the displayed probe.



8.7 Temperature Probe Calibration

This calibration procedure is generally not necessary unless components of the SR8-Plus have been replaced or the firmware has been upgraded. The only time this calibration is required is when the temperature probe is not reading within 0.1°C of a certified thermometer at both 32°C and 37°C . It is important to evaluate this condition correctly before performing this calibration.

The purpose of temperature probe calibration is to change the readout of the T1 and T2 probes to match a certified thermometer as closely as possible. If the temperature probe is not reading within 0.1°C of a certified thermometer, perform the following steps using a calibrated thermometer that reads to 0.00°C (if possible). It is important that a stable temperature is used at both the 32°C and 37°C calibration points. Remember to enter the value of the certified thermometer into the SR8-Plus program—not the temperature probe value.



To calibrate the temperature probe(s):

1. Display Main screen, press  [PREFERENCES] to display the System Options screen.
1. Press [4] to display the Calibration menu.
2. Press [2] to select “Temperature Probe Calibration”.
3. After reading the warning screen, Press [ENTER].
4. Press  [SET TEMPERATURE] to display Temperature Calibration screen. (see Figure 8-1) The bath will heat to about 32°C (approximately 30 minutes).

TEMPERATURE PROBE CALIBRATION: STEP #2
Probe 1: 32.0° 2675 Enter LO Temp: _ _ _ _
Probe 2: 32.0° 2670
The bath is heating to about 32.0 °C.
Once the 4 digit number has stabilized
enter the temperature the thermometer
is reading.

Figure 8-1: Temperature Calibration Screen

5. Place a certified thermometer and all temperature probe(s) adjacent to each other in the waterbath. When the reading has stabilized (approximately 30 minutes), input thermometer temperature reading and press [ENTER].
6. The bath will then go to 37°C (approximately 30 minutes). When the reading has stabilized, input thermometer temperature reading and press [ENTER].
7. Check temperature probe accuracy. (see Section 8.5—Temperature Probe Accuracy Check)

NOTE: If the temperature probes have been calibrated and still do not match the thermometer reading within 0.1°C, see Section 8.6—Temperature Probe Offset Adjust.



8.8 Bath Temperature Calibration

This calibration procedure is generally not necessary unless components of the SR8-Plus have been replaced or the firmware has been upgraded. The only time this calibration is required is when the bath temperature operates more than 0.2°C from the set temperature. It is important to evaluate this condition correctly before performing this calibration.

The purpose of bath temperature calibration is to align the bath temperature to the actual temperature using the T1 temperature probe as the reference temperature. This calibration procedure will ensure that when a temperature is requested (programmed), the bath will go to that temperature. Again bath calibration should only be done if the bath set point and the actual bath temperature have a difference of more than 0.2°C.

Before performing this calibration, perform the Temperature Probe Accuracy Check (see Section 8.5). Next, evaluate the circulating water pump (see Section 8.3). Poor bath circulation may cause the bath set temperature and actual temperature to be different; in this case, replacing the circulating water pump will often solve the problem—not calibrating the bath.

The easiest way to determine if conditions are acceptable to implement bath calibration is to set a temperature (37°C) and then monitor the actual bath temperature. The requirement is that the bath remains at a stable temperature $\pm 0.1^\circ\text{C}$ for one hour, regardless of what the actual temperature is.

This procedure automatically calibrates the bath temperature at 32°C and 37°C. It requires two hours to complete bath temperature calibration.


NOTE: SR8-Plus waterbath must be used for this calibration. Calibrated temperature probes must be used for this calibration.

8. Bath temperature must be $\leq 31^\circ\text{C}$.

9. Display Main screen, press  [PREFERENCES] to display System Options screen.

10. Press [4] to display the Calibration menu.

11. Press [3] to select “Bath Temperature Calibration”.

12. Read instructions on screen, press  [SET TEMP] to start.

13. When calibration is complete, calibration verification is printed.

14. Press [ESC] to display Main screen.



8.9 Guide Rods

The drive head should move smoothly whenever raising or lowering it. Lubricate the guide rods with silicone grease whenever smooth movement is not observed.

8.10 Spindle Bearings

Free rotation of the spindle bearings should be checked every 6 months.

To check the spindle bearings:

1. Turn the motor off by placing the system in stand by or by turning the entire system off.
2. Disengage the clutch by lifting it off the belt pulley and turning 90°. Turn each spindle by hand, as shown in Figure 8-2 and check for irregular rotation or sticking.

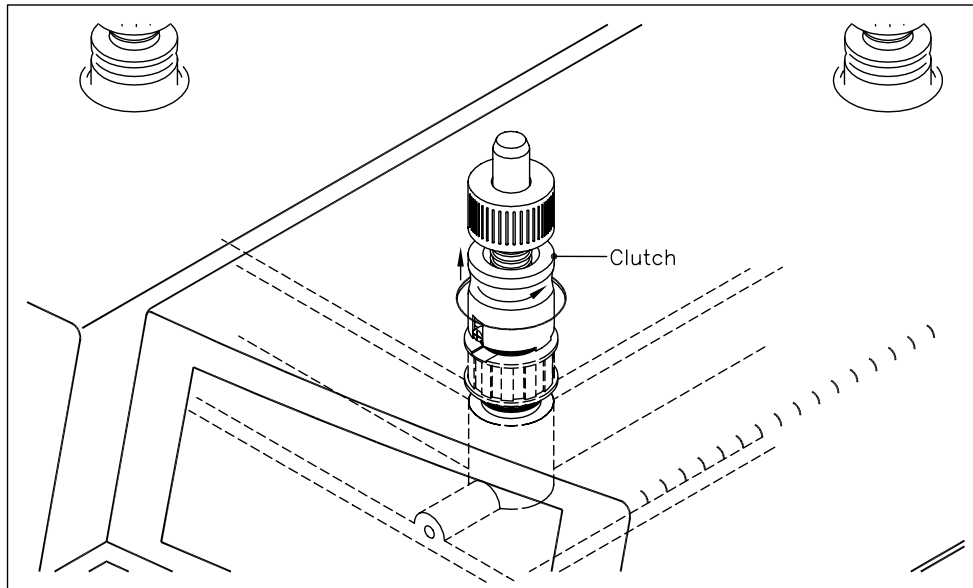


Figure 8-2: Disengaging the Clutch

3. Each spindle should turn freely with no binding or tight spots. If there is a problem, contact Hanson Research.

NOTE: Only use lithium grease to lubricate the spindle bearings.

4. After checking each spindle bearing, engage the clutch and turn the system back on.



8.11 Belts

The SR8-Plus has 3 belts which should be checked every 6 months for proper adjustment and excessive wear. An incorrectly adjusted belt can cause the system to vibrate. Excessive belt wear can be caused by a faulty spindle or idler bearings.

As a preventative measure, the belts should be changed at least every 6 months.

To check the belts:

1. Manually adjust the motor speed to 0.0RPM (stopped) and turn power off.
2. Remove cover. (see Figure 8-3)
3. Visually inspect each of the belts for wear. If any of the belts show signs of excessive wear, the belt should be replaced. Free movement of the spindles and idler pulleys should be verified using the instructions in this section.
4. Manually adjust the motor speed to 100RPM.
5. Visually verify that each of the belts move smoothly and without vibration. If vibration is observed, the belt should be adjusted or replaced to remove the vibration.
6. Replace the cover.

To remove drive head cover, see Figure 8-3.

1. Verify that the drive head is at its highest position.
2. Reach under the drive head and remove the 5 white caps. Locate and remove the screws under these caps.
3. Carefully lift the cover. Disconnect the cable routed to connector J1 of the display board. Remove the screw securing the system ground wires and remove wires.
4. To replace the cover, follow the above instructions in reverse order.

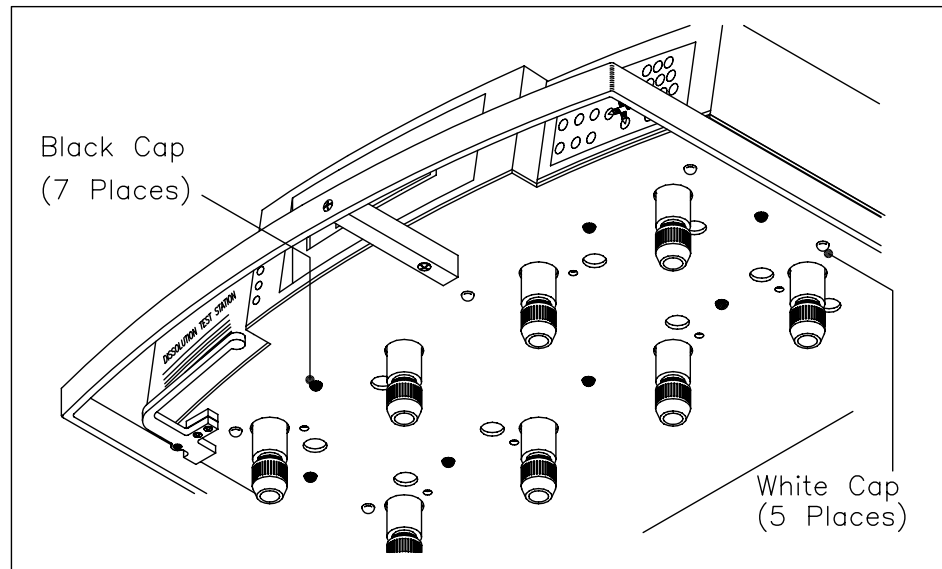


Figure 8-3: Cover Removal

To adjust the belts, see Figure 8-4:

1. Program the motor speed to 0.0RPM (stopped) and turn power switch to the off position.
2. Remove cover. (see Figure 8-3)
3. For motor belt adjustment; loosen motor idler pulley and slide forward to tighten belt. Tighten idler pulley. Push against motor belt with a finger at point marked "A" to check adjustment (belt should move from 2 to 5mm).
4. For drive belt adjustment; loosen drive idler pulley and slide forward to tighten belt. Tighten idler pulley. Push against drive belt with a finger at point marked "B" to check adjustment (belt should move from 6 to 10mm). Repeat for second drive belt.
5. Replace cover.

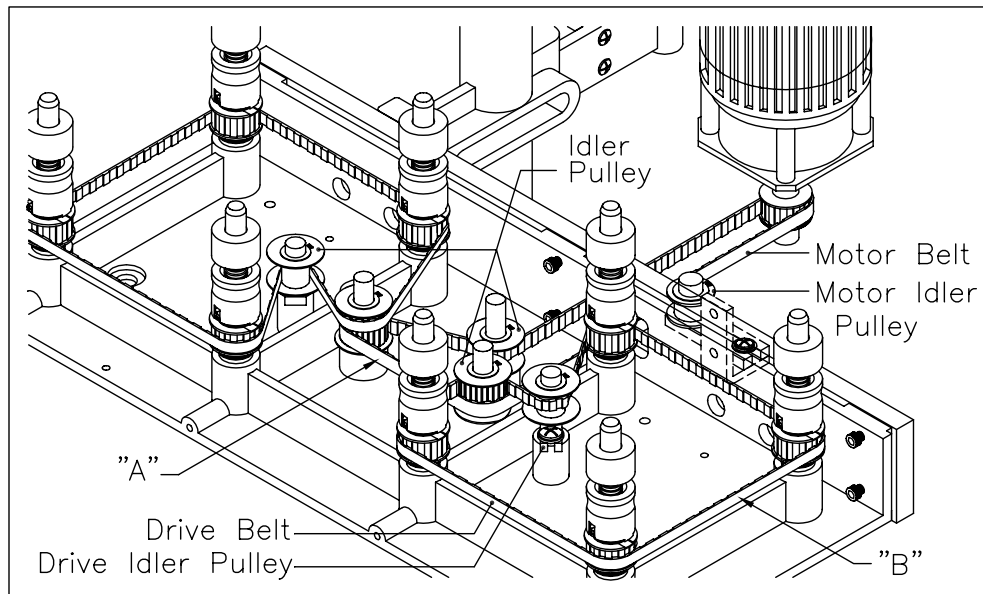


Figure 8-4: Belt Adjustment

To replace belts:

1. Manually adjust the motor speed to 0.0RPM (stopped).
2. Remove cover. (see Figure 8-3)
3. Loosen the 3 idler pulleys and remove both the drive belts. (see Figure 8-4)
4. Go to the back of the unit. Loosen the 4 screws that mount the motor bottom closure. Remove the closure by sliding it down and out. (see Figure 8-5)
5. Reach under motor mount plate and loosen the 4 motor mounting screws.
6. Slide motor forward and remove motor belt.
7. Replace motor belt first and adjust. Then Replace drive belts and adjust. See Figure 8-6 for routing configuration.
8. Replace cover.

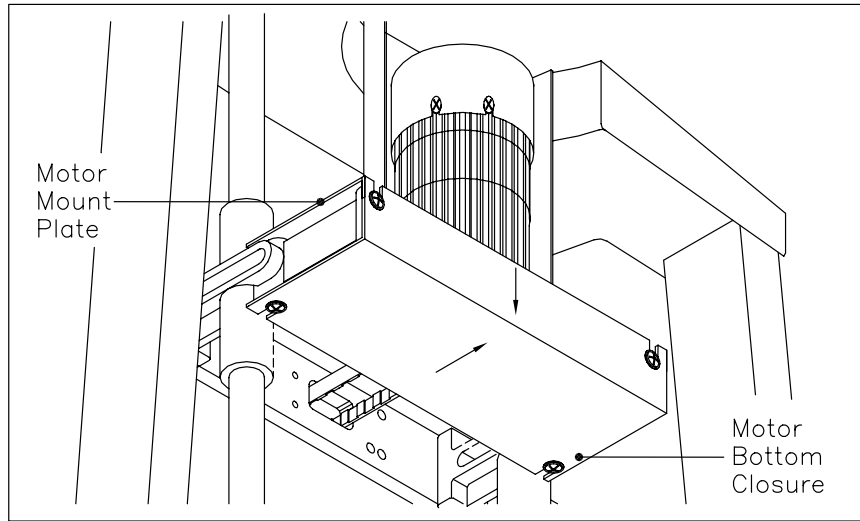


Figure 8-5: Motor Bottom Closure Removal

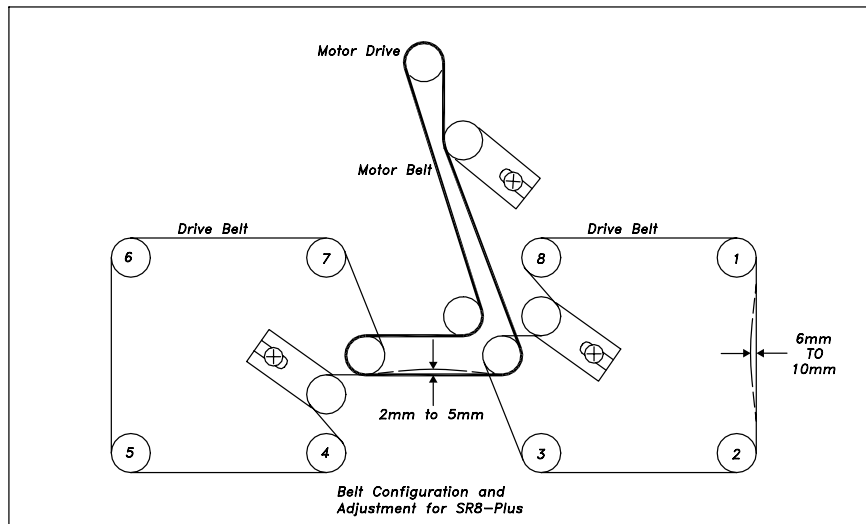


Figure 8-6: Belt Configuration and Adjustment



8.12 Idler Pulleys

The SR8-Plus has 6 idler pulleys, which should be checked when replacing belts for smooth rotation.

To inspect the idler pulleys (use previous instructions in this section for more detail):

1. Manually adjust the motor speed to 0.0RPM (stopped).
2. Remove cover.
3. Remove the 3 belts.
4. Turn each of the idler pulleys indicated by hand to verify that each moves freely and smoothly. If any of the idler pulleys do not rotate smoothly, remove grip ring, inspect bearings and shaft for wear. If bearings are dry, lubricate with grease. If you need help, contact your local service engineer or Hanson Research.
5. Replace the belts.
6. Replace cover.

8.13 Fuse Replacement

The fuses are located below the power switch on the right-hand side of the controller. Each system has four fuses. The amperage is labeled next to the fuse. Notice that the amperage of the fuses is dependent upon the voltage of the system.

NOTE: For continued protection against risk of fire, replace the fuse(s) with same type and current rating. Do not over-tighten the fuse holder.


To check the fuses and replace a defective fuse,

1. For fuse holders with finger grip knobs, push in and slightly turn counter-clockwise to remove the holder.
2. Visual inspection of the fuse is not conclusive; always use an ohm meter to confirm if a fuse is defective.



8.14 Maintenance Log

The Maintenance Log is used to know the last time the Heater, Temperature Probes or Motor were calibrated. As well, the Maintenance Log will tell the user or service person the amount of run time associated with the Belts, Motor, and Heater. The Maintenance Log is for reference information only; the log should only be cleared or changed by a service technician after service has been conducted or one of these components has been replaced.

1. With the Main screen displayed, press  [PREFERENCES] to display the System Options screen.
2. Press [3] to select "Validation".
3. Press [3] to display the "Maintenance Log" screen.

The Maintenance Log may be printed.

Only belt, motor, and heater time may be reset.

8.15 Tablet Calibration

Tablet calibration of the SR8-Plus is accomplished by following the guidelines listed in the USP-NF under Dissolution. This test should be performed after the installation is complete. It is normal to do tablet calibration every 6 months. Use the following checklist when calibration is due.

Check List	Recommended Tolerance
Temperature	$\pm 0.5^{\circ}\text{C}$
Speed	<4%
Vibration	<0.1 mils displacement at vessel
Shaft Centering to Vessel	<1 mm
Shaft Wobble	<1 mm TIR
Paddle Condition	no coating missing, no major dents, rotates <1 mm TIR
Basket Shaft Condition	holds basket correctly, rotates <1 mm TIR
Basket Condition	no major dents, rotates <1 mm TIR
Vessel Condition	very clean, no internal irregularities
Level	within 1° over length of vessel base

NOTE: There are many reasons that a tablet calibration test may fail. The items in the checklist may or may not be the reason for a failed test. Deaeration and vibration are two of the largest contributors to failure.



9 Moving and Storage

9.1 Storage

If the SR8-Plus Dissolution Test Station will not be used for an extended period of time (3 months or more) the power should be turned off and the bath water should be emptied.

9.2 Moving

Before moving the SR8-Plus Dissolution Test Station, it is necessary to empty the water from the waterbath. If the SR8-Plus is being relocated within the same laboratory or building, the system can be moved without any additional packing procedures. If the system is being transported to another location, the locking screws and clamps (removed in Section 4 of this manual) should be replaced. The locking screws and clamps keep the counterweights and drive head from moving. If the packing materials that the system was shipped in were saved, the system should be repackaged to avoid damage in shipment.



10 Service Parts

Below is a list of service parts needed for proper maintenance of the Hanson SR8-Plus.

Belt for Drive Spindles (2 required).....	91-434-012
Belt for Motor	91-434-013
Chuck Retrofit Kit (1 each), with Collet.....	72-800-712
Chuck Retrofit Kit (set of 6), with Collet.....	72-800-713
Drive Spindle Retrofit Kit	73-100-700
Fitting, Drain Hose.....	91-601-211
Vessel Ring.....	73-100-550
Vessel Hole Cover.....	72-800-526
Motor Encoder Disk Sensor	91-214-008
Motor Encoder Disk.....	72-600-546
Water Level Sensor.....	64-705-062

For a full list of SR8-Plus Accessories and Spare Parts, please consult our current catalog.



11 Sales and Support

The SR8-Plus is sold and serviced by a worldwide network of dealers and distributors. If you need additional accessories, replacement parts, or require service information, you may either contact your local agent, or you can contact Hanson Research Corporation at our worldwide headquarters:

Hanson Research Corporation	
Corporate Headquarters	9810 Variel Avenue Chatsworth, CA 91311 USA P: 818.882.7266 or 800.821.8165 (toll free) F: 818.882.9470
Web Site	www.hansonresearch.com
Sales Support	For quotes, literature, and sales assistance in the USA and worldwide, please email: sales@hansonresearch.com .
Customer Support	To place an order, obtain an order's status, or request a return authorization, please email: orders@hansonresearch.com .
Technical Support	For assistance with applications and other technical support and service questions, please email: techsupport@hansonresearch.com .
When contacting Hanson Research, please help us eliminate duplication of effort amongst personnel and departments by directing your inquiry to one department or representative.	



12 General Warranty

Hanson Research Corporation (HRC) products are warranted for one full year including parts and labor. Service contracts and Preventative Maintenance contracts are available for post-warranty support. International dealer warranties may vary. HRC makes no warranty, expressed or implied, for glassware, consumables or products not manufactured by HRC, as evidenced by nameplate on the item or other designation. HRC will give responsible assistance to buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of manufacturer's own warranty. HRC shall be released from any and all obligations under any warranty, either expressed or implied, if the product covered is repaired or modified by other than its own personnel, or made without written authorization of HRC. There are no other warranties, expressed or implied, and HRC shall not be liable under any circumstances for consequential damages.