medTEC
BIOLAB EQUIPMENT

AutoBlot 3000H

Service Manual

October 2005

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CONTENTS

CONTENTS (cont.)

INTRODUCTION

General Description

The AutoBlot 3000H fully automates the Western blot assay. Following the manual addition of test samples, the AutoBlot incubates, washes, and performs subsequent reagent additions as defined by the operator during the programming phase. Dispense and aspiration of fluids is preprogrammed for volumes and time increments. The platform rocks at a constant speed. The 3000H also has a heated platform, magnetic stirrer, and heated bottle plate for hybridizations and stringent washes that require heat. It comes standard with 6 pumps.

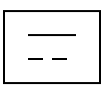
CE The 3000H complies with the essential requirements of the applicable European laws or Directives with respect to safety, health, environment and consumer protection.

Safety

The AutoBlot 3000H is designed for safe operation. However, for your safety and the safety of others, the AutoBlot should be operated as specified in the Guide to Operations. Failure to do so could result in injury to yourself or others, or damage to the equipment. There are various symbols on the unit relating to safety.

 The international CAUTION label on the back of the unit indicates a potentially hazardous situation that could result in injury. You must refer to the Guide to Operations for instructions on the proper use and operation of the AutoBlot.

 The international HOT SURFACE label on the heated platform bottle heater block indicates surfaces that are hot to the touch.

 The black DIRECT CURRENT symbol printed on the serial number label indicates the unit runs on DC power.

Cautionary Note: If a motor locks up while the AutoBlot is running, an alarm sounds and an error message displays. **There is no danger to the operator.** Refer to the Troubleshooting section for suggestions on corrective action.

General Safety Note: When working with any electrical components, use proper grounding procedures. Do not use extension cords. Using extension cords may compromise the safety of the operator or technician. If working on parts within the enclosure of the AutoBlot, first disconnect the power supply. **NOTE: ESD PROTECTION REQUIRED.**

Normal Environmental Conditions

The AutoBlot 3000H is designed to be safe under the following environmental conditions.

- Indoor use.
- Altitude up to 2000m.
- Temperature 5°C to 40°C.
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°.
- MAINS supply voltage fluctuations up to ±10% of nominal voltage.
- Transient overvoltages typically present on the MAINS supply.
- Applicable RATED POLLUTION 2 degree.
- Category II installation.

Decontamination

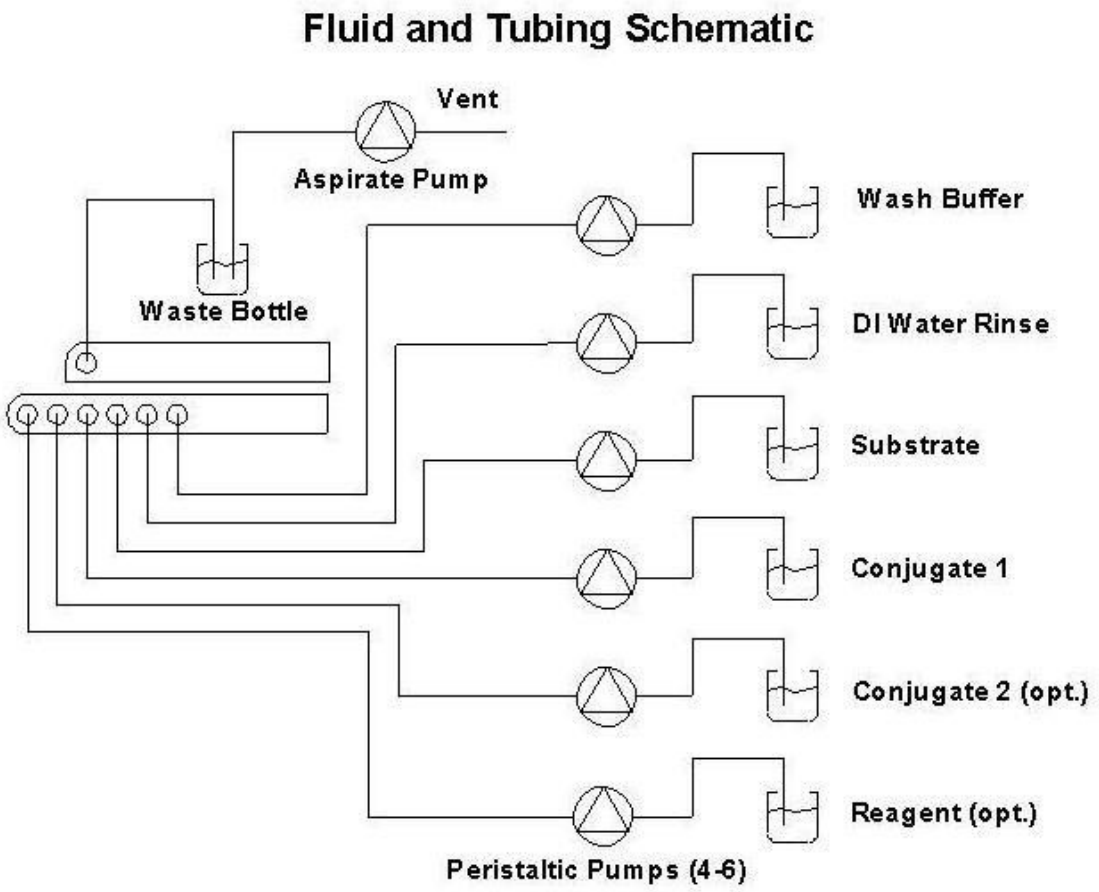
When an instrument comes in for servicing, it may be contaminated with chemical or biological hazards. ***Always decontaminate the instrument before servicing.***

Tool Requirements

- Phillips screw driver
- Wire cutters, standard electrical
- Allen wrenches – 1/16" and 5/64"
- Level
- Tie wrap gun
- Electrical ground strap
- IDC connector
- Loctite™ 222MS Threadlocker and Loctite™ 4471 Prism
- Syringe
- Air Pressure Gauge
- ESD Protective Wrist Strap

AutoBlot 3000H Technical Specifications

Dimensions	22 in x 18 in x 7.5 in. 559 mm x 457 mm x 191 mm
Weight	35 lbs (15.9 kg)
Capacity	20 strips
Power	100-240V, 50 or 60Hz, 3.2amp max
Firmware Updates	PC download
Reagent Bottles	500ml (qty 1) 250ml (qty 2) 100ml (qty 1) 50ml conical bottle (qty 2)
Reagents	Standard: 6
Waste Bottle	1L
Dispense Volume Range	0.5ml-3.0ml in 0.1ml increments accuracy ±10%
Incubation Time	up to 24 hours for all incubation periods in increments of 1 minute
Number of Programmable Steps per assay	15 steps
Max Relative Humidity	90%
Platform Temperature	30° C to 60° C (± 1.0° C)
3000H-specific specs	Heated platform, magnetic stirrer, heated bottle plate

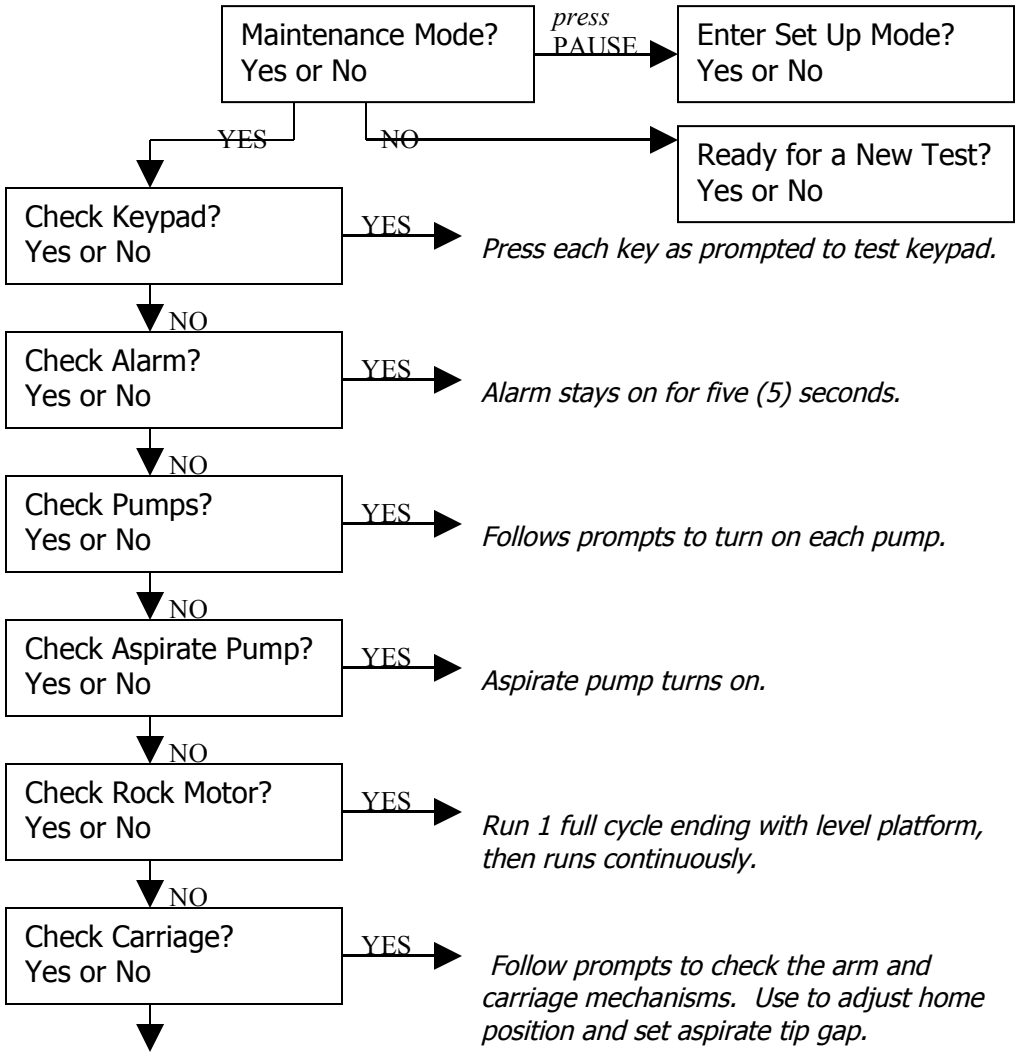

Fluid and Tubing Schematic
Vent
Aspirate Pump
Waste Bottle
Wash Buffer
DI Water Rinse
Substrate
Conjugate 1
Conjugate 2 (opt.)
Reagent (opt.)
Peristaltic Pumps (4-6)

FIRMWARE MAINTENANCE ROUTINES

Maintenance Mode

For most service procedures, you will use the *Maintenance Mode* routines. In *Maintenance Mode* you can check the keypad, the pumps, the rock motor, the alarm, and the carriage mechanism. These routines are also useful when diagnosing equipment malfunctions.

To enter *Maintenance Mode*, press and hold the PAUSE key while turning on the instrument.



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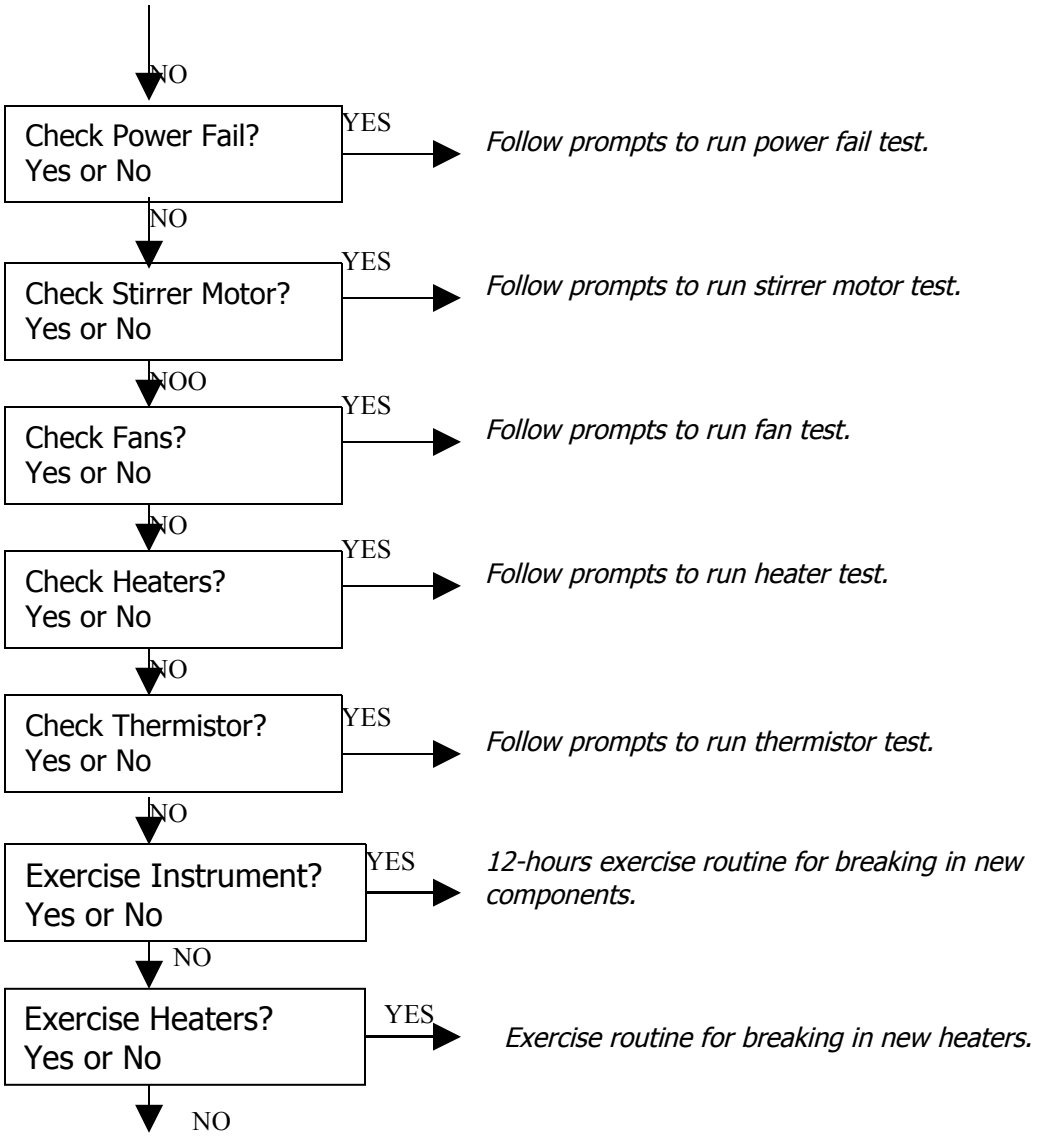
CONTINUED FROM *"CHECK CARRIAGE?"*

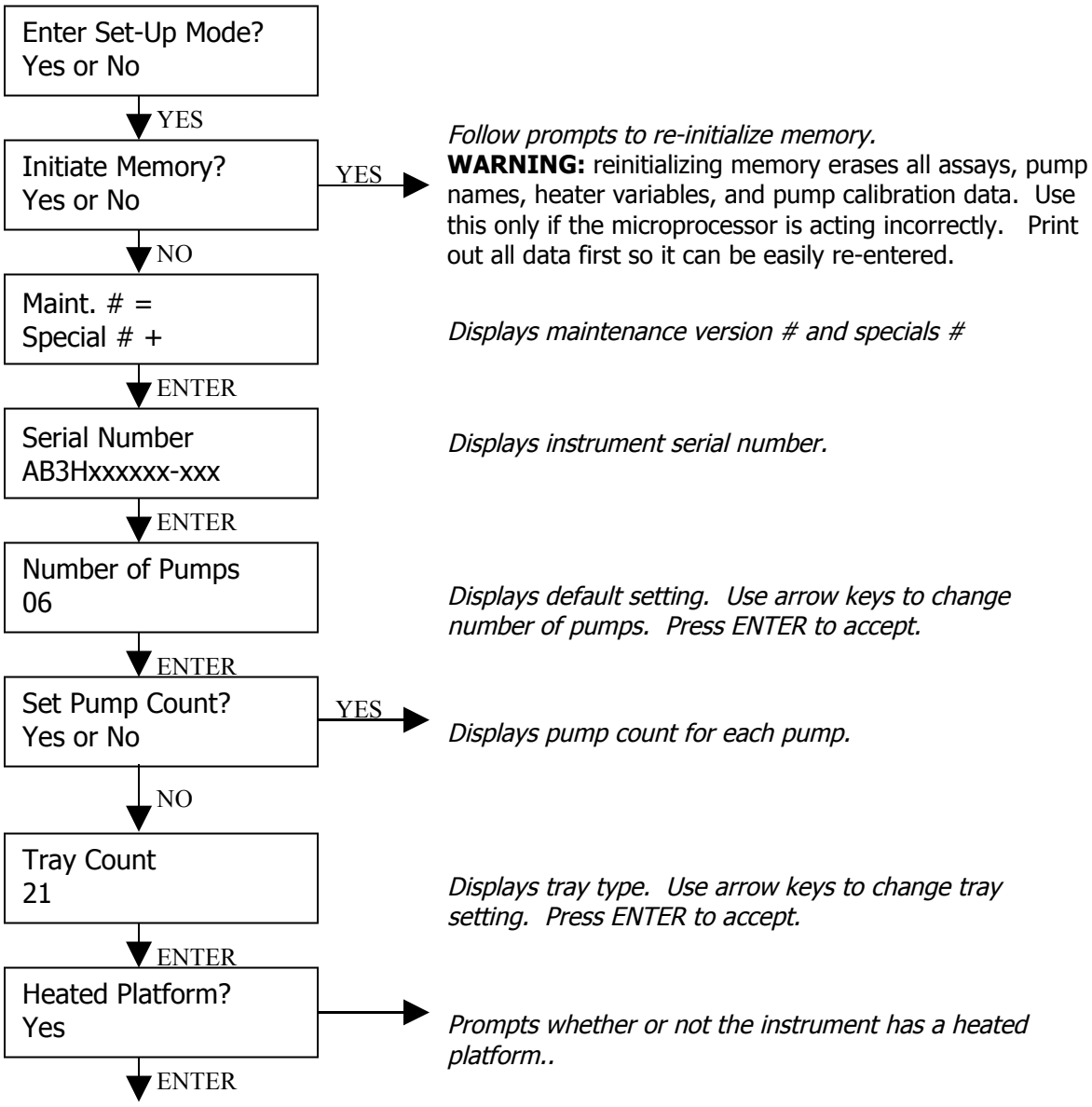


Return to Maintenance Mode?

Set Up Mode

The *Set-Up Mode* routine is used to reset memory, to change the number of pumps or tray setup, and set the pump count (how many counts it takes to dispense 2 ml).

Access *Set-Up Mode* by pressing PAUSE at the *Maintenance Mode?* prompt.



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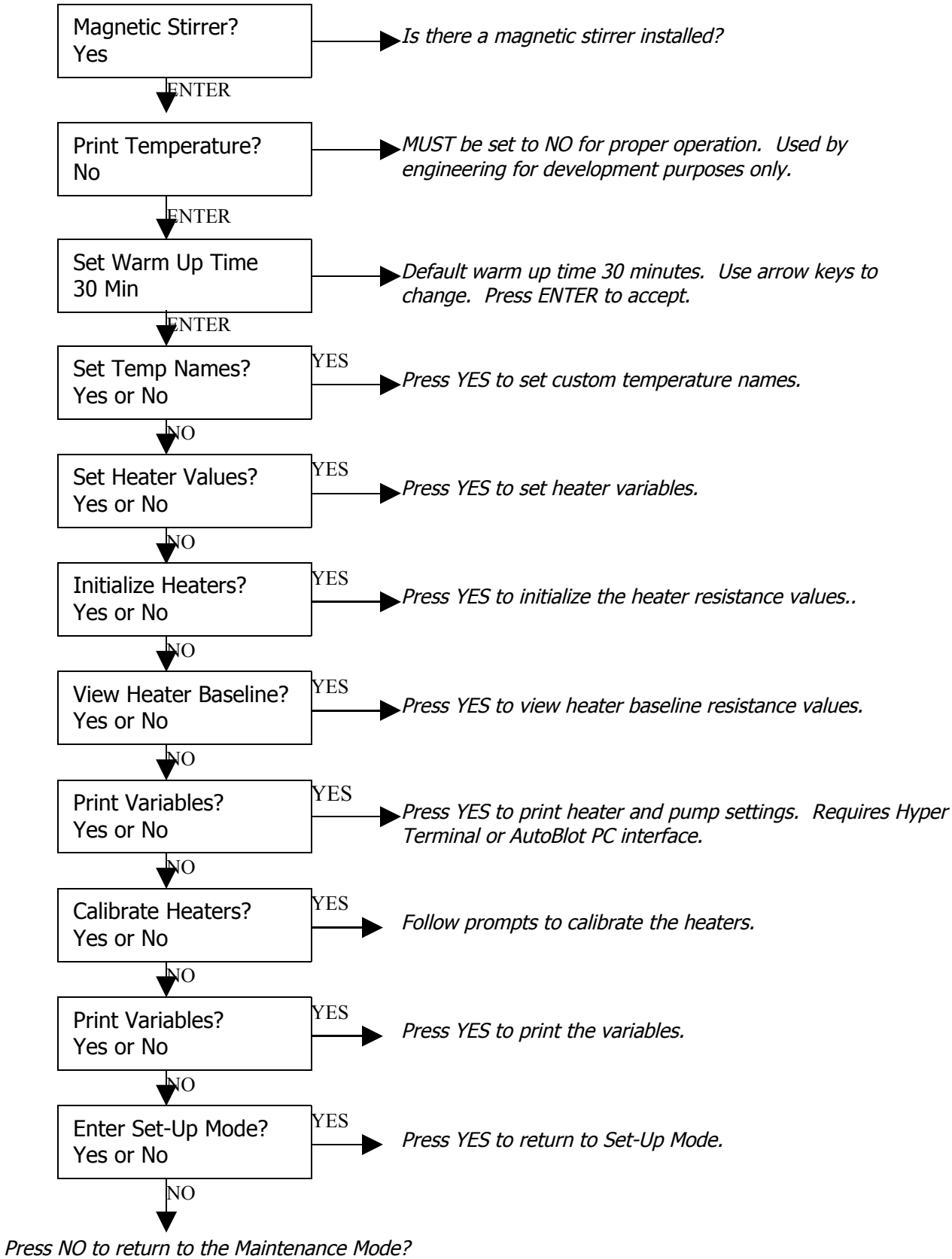
Firmware Maintenance Routines – Set Up Mode

CONTINUED FROM *"HEATED PLATFORM?"*



HARDWARE SERVICE

The following hardware service operations are the more commons ones that you might encounter with the AutoBlot. If the instrument requires service beyond the scope of this manual, call the Technical Service Department at MedTec for assistance. **NOTE: ESD PROTECTION IS REQUIRED when working on the AutoBlot.**

Photo 1

Opening the Enclosure

1. Disconnect the power source.
2. Tape the aspirate cover closed.
3. Tilt the instrument to the side (DO NOT tilt the instrument to the back or you will bend the pump plate.)
4. Remove the six enclosure screws on the bottom of the enclosure.

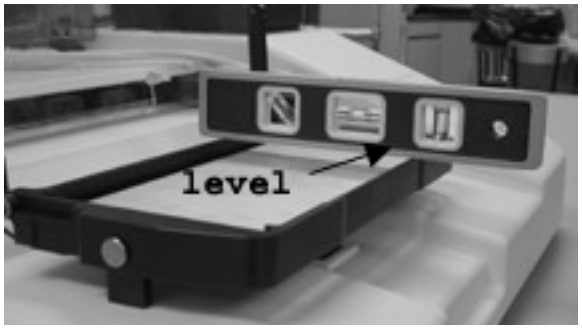


Photo 2

Checking the Platform Level

1. Place the AutoBlot on a flat, level surface. Use a level to confirm the surface is level.
2. Press and hold the PAUSE key while turning on the instrument in order to enter *Maintenance Mode.*
3. Advance through prompts, pressing NO to each until you reach *Check Rock Motor? Yes or No.* Press YES.
4. Place a level on the platform. Crosscheck the level from two separate reference points (photo 2).
5. If the platform is not level, remove the bottom cover of the enclosure.
6. Loosen the two (2) screws holding the rock motor to the base plate.
7. Move the motor until the platform is level. Tighten the screws, using Loctite™ 222 on threads. Replace enclosure bottom cover.

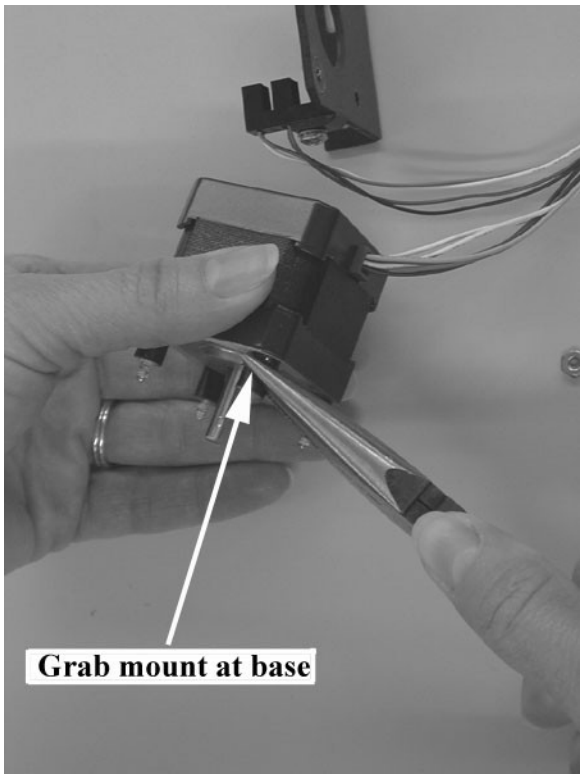


Photo 3

Replacing the Rock Motor Isolation Mount

NOTE: DO NOT use too much force when tightening the isolation mounts. They break easily.

1. Remove the rock motor by loosening the two (2) screws that hold it to the base plate.
2. Loosen the set screws on the pin drive.
3. Carefully remove the nuts on the rock motor.
4. Lift the rock motor bracket, pin drive, and sensor as one unit.
5. Use pliers to grab the isolation mount next to the rock motor. Unscrew the mount (photo 3)
6. Replace all four (4) isolation mounts since they will be damaged after unscrewing the nuts that have Loctite on them.
7. Put Loctite™ 222 or equivalent on the end of the new isolation mount. Finger-tighten into the rock motor until there is no clearance between the motor and the rubber mount. Do not force or twist the rubber mount. It breaks easily.
8. Replace the bracket, pin drive, and sensor. Replace the nuts. Use Loctite™ 222 or equivalent and finger tighten. DO NOT use lockwashers, as they may cause the isolation mounts to twist and break.

Photo 4

Cleaning Obstructions from the Aspirate Pump and Tubing

NOTE: It is very rare for an instrument to have an aspirate pump that requires rebuilding or replacing. Loss of aspiration problems are usually due to an obstruction of the flapper valves. The pump is easy to clean, in the field, with no disassembly, by using the following procedure.

1. Disconnect the suction tubing from the waste bottle.
2. Run the *Check Aspirate Pump* routine in Maintenance Mode. With the pump on, use a syringe to inject 1-2 ml of water into the pump through the suction (aspiration) tube. Repeat until at least 10 ml of DIH20 has been sucked from a beaker. Water should cycle through the tubing and clear any obstructions in the tubing or the pump (photo 4). Be sure to place a paper towel at the vent located next to the suction tube.

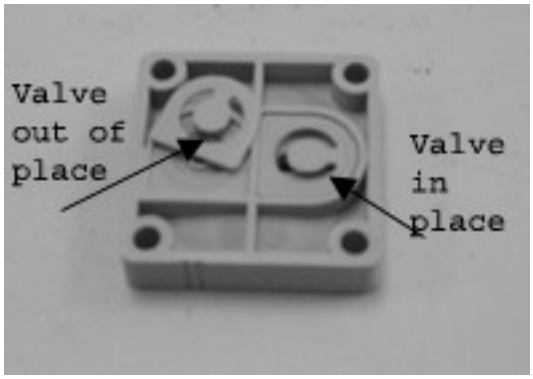


Photo 5

Photo 6

Disassembling the Aspirate Pump

1. Open the enclosure.
2. Remove the screws on top of the aspirate pump. This reveals a small diaphragm. Be sure to note the position of all of the seals and flappers. They must be reinstalled exactly as originally assembled in order to work properly (photo 5).
3. Visually inspect the diaphragm for any obstructions. Wash with alcohol.
4. Check the flapper valves for contamination. Wash with isopropyl alcohol.
5. Once any obstruction is cleared, reassemble the aspirate pump. NOTE: Make sure the flapper valves are in their original position and the piston is at the bottom of the stroke. If the piston is not at the bottom of stroke, the diaphragm may be stretched too much and will not work properly (photo 6).
6. Reinstall the aspirate pump. Verify suction using the *Check Aspirate Pump* routine in *Maintenance Mode*
7. If the diaphragm is damaged, it is best to replace the entire pump.

Photo 7

Replacing the Dispense Pump

1. Make sure the instrument is off and the power supply is disconnected.
2. Remove the bottom cover of the instrument.
3. Undo the two (2) screws holding the pump to the back panel.
4. Disconnect the pump connector to the circuit board.
5. Install the new pump using original screws and Loctite™ 222.

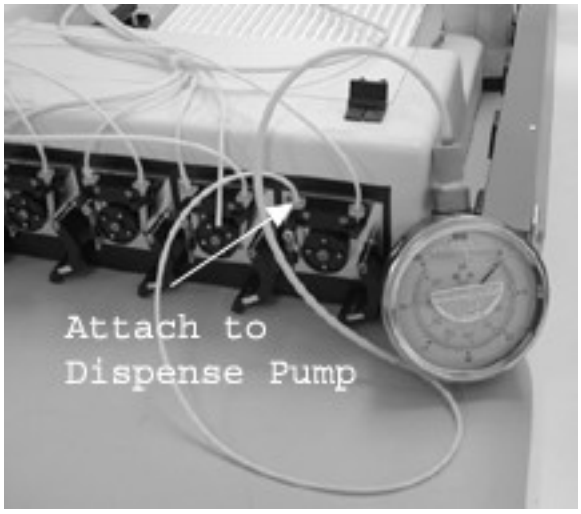


Photo 8

Photo 9

Tensioning the Pump Pressure Pad

Pressure pads are tensioned at the factory. They should not be adjusted unless the tensioning mechanism has come loose.

Tensioning with an Air Pressure Gauge (preferred method):

1. Attach the gauge to the output of the pump tubing using whatever fittings and tubing are available (photo 8).
2. Turn on the pump and adjust to 2 bars of pressure. Only air should be pumped through the system for this adjustment. DO NOT use water. This may damage the gauge.
3. Tighten the set screw to retain adjustment.

Tensioning without an Air Pressure Gauge

1. Loosen the pump pressure pad set screw (photo 9).
2. Slightly loosen the tension screw.
3. Run the pump manually – in Maintenance Mode go *Check Pumps?* and press YES.
4. With the pump running, tighten the tension screw until liquid comes out of the tubing.
5. Increase the tension by two (2) more complete turns of the tension screw.
6. Tighten the set screw.

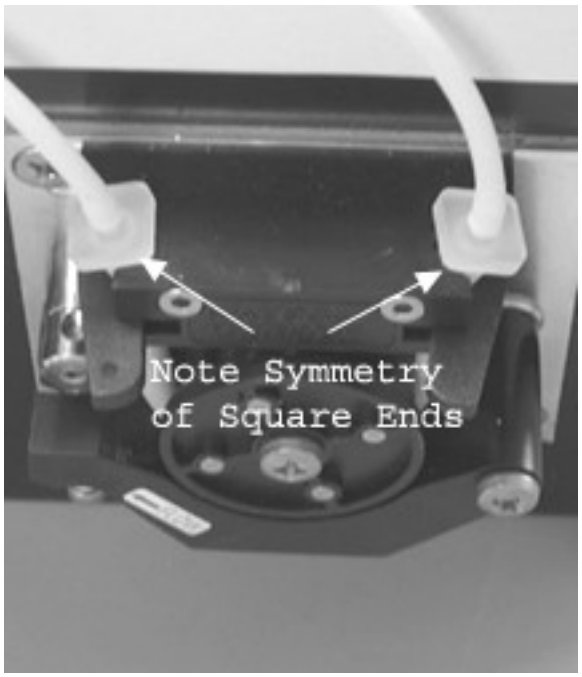


Photo 10

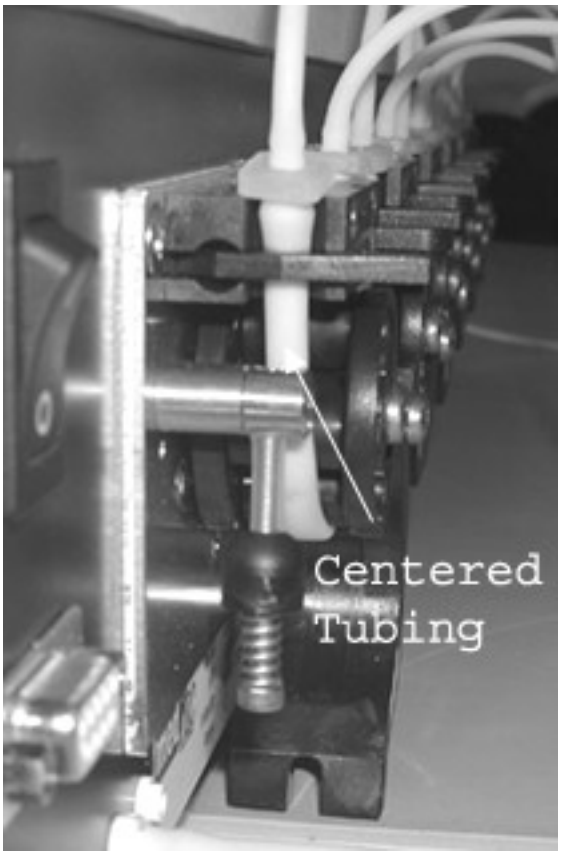


Photo 11

Replacing Dispense Pump Tubing

Important: Tubing replacement kits can be purchased directly from the manufacturer. Proper tube lengths and installation are critical for proper instrument performance. Using tubing that has not been purchased from the manufacturer negates instrument warranty.

1. Remove and discard the tubing you want replaced.
2. The new pump tubing must not be twisted so make sure the fittings are symmetrical. If the tubing is twisted, the pump will not work properly (photo 10).
3. Exercise the new tubing as described in the Maintenance section of the Guide to Operation.
4. After exercising the tubing, make sure the tubing is in the center of the rotor. If the tubing is too long, it will move towards the edge of the rotor and the rotor will wear a hole in the tubing at the point of contact. If the tubing is too close to the edge, trim 1-2 mm from one end and reinstall with the exact same orientation as it was exercised in (photo 11).

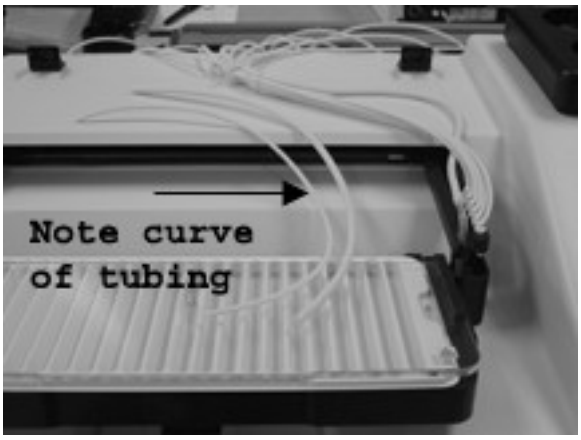


Photo 12

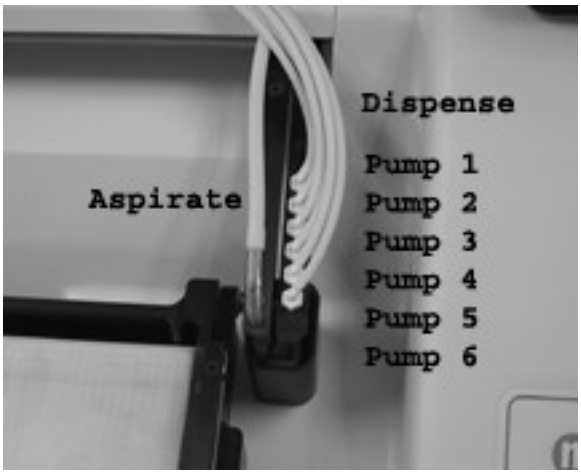


Photo 13

Replacing Bottle and Arm Tubing

1. Use only the tubing replacement kits provided by the manufacturer. **Do not attempt** to change tubing without these kits. Compare the length of each tube that you replace with the length of the new tube you are installing. These lengths are critical in order for the arm mechanism to operate smoothly.
2. Note carefully where all tubes are located before removing any of the tubes.
3. Note the natural curve of the tubing by laying a piece of tubing over across your hand. Using this natural curve as a guide, lay the tubing across the top of the instrument with the tubing curving as shown in photo 12. This curve must be laid out properly in order for the aspirate/dispense arm to move across the tray smoothly.
4. Attaching the tubing for Pump 1 to the dispense tip furthest to the back of the dispense arm (Photo 13).

Photo 14

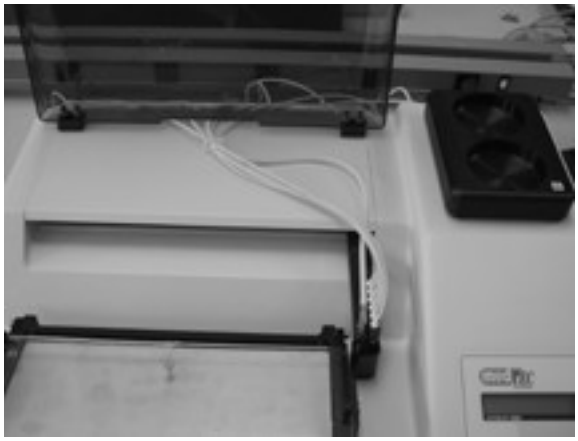


Photo 15

5. Slide the nylon flat washer over the end of the tubing so that it is on the front of the tubing clip (photo 14).
6. Attach the other end of the tubing to the Pump 1 (Wash) at the back of the instrument. Note the direction of the pump flow to ensure proper connection.
7. Continue this procedure with the remaining tubes.
8. Connect the aspirate tubing to the aspirate arm and guide through the washers to the back of the instrument. (Photo 15).

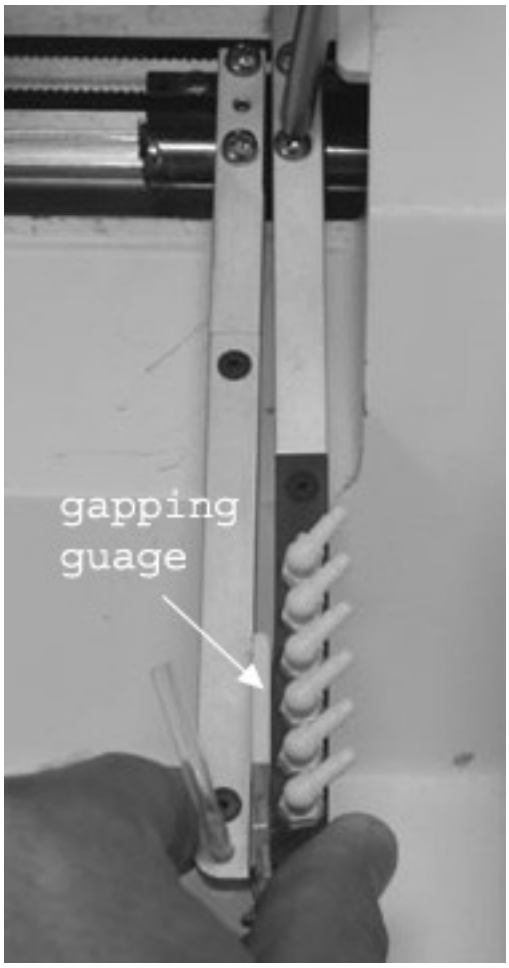


Photo 16

Setting the Gap between the Aspirate and Dispense Arms

Important: The aspirate arm and aspirate bearing are assembled on a surface plate and should NEVER be disassembled. In order to gap the two arms, loosen and adjust only the dispense arm.

1. Remove the top panel by sliding it forward and out of place.
2. Remove the two (2) dispense arm screws and reapply Loctite™ 222.
3. Reassemble the arm and loosely tighten the two dispense arm screws.
4. Place a gapping gauge between the arms. The gap should be 3mm (photo 16).
5. While squeezing the gauge between the two arms, tighten the screws on the dispense arm.
6. Replace the top panel by sliding it back in place.

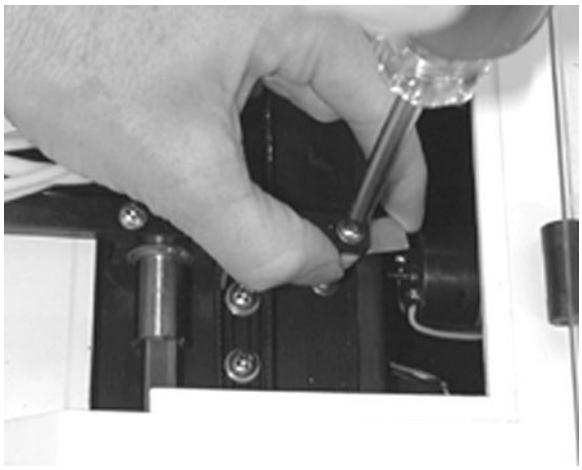


Photo 17

Adjusting the Dispense Arm Flag

1. Lift the cover lid and remove the top panel.
2. In *Maintenance Mode* access the *Check Carriage Arm* routine and then *"Check First Strip"* prompt.
3. Loosen the screw holding the flag (photo 17). Adjust the flag. Retighten the screw. Go back and forth from the home position to the first strip in order to get the best adjustment with both arms and a tray installed on the platform.

Photo 18

Adjusting the Aspirate Arm Flag

1. Remove the bottom cover of the enclosure. Remove the top panel.
2. Loosen the set screws on the aspirate arm DO NOT loosen the screws on top of the arm (photo 18).
3. Plug the instrument in.
4. Enter *Maintenance Mode* and access the *Check Carriage Arm* routine.
5. At the *Jog Aspirate Arm?* prompt, press NO. Press YES at *Check First Strip?* The shaft should rotate within the pulley.
6. Lower the aspirate arm so that it is lower than the dispense arm. Lift the aspirate arm until it is just level with the dispense arm.

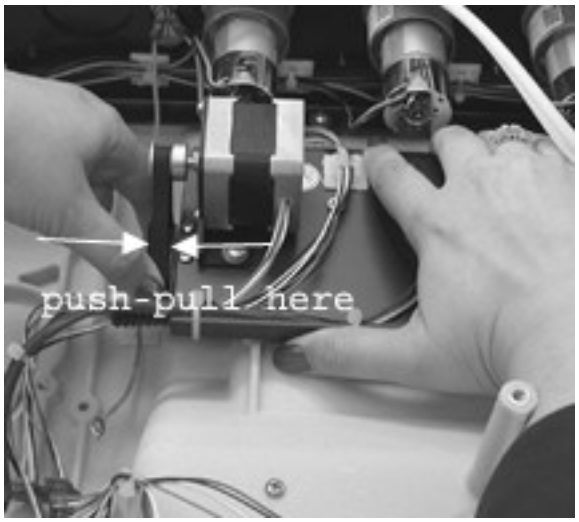


Photo 19

7. With the arms level, tighten the set screws on the aspirate arm.
8. Make sure there is no endplay of the shaft when the large pulley is pushed or pulled (photo 19). If there is any endplay loosen the two (2) set screws on the large pulley located at the end of the shaft. Push the pulley farther onto the shaft and retighten the setscrews. Re-check the endplay again.
9. Adjust the Teflon aspirate tube as necessary. The tube should just touch the bottom of the tray.

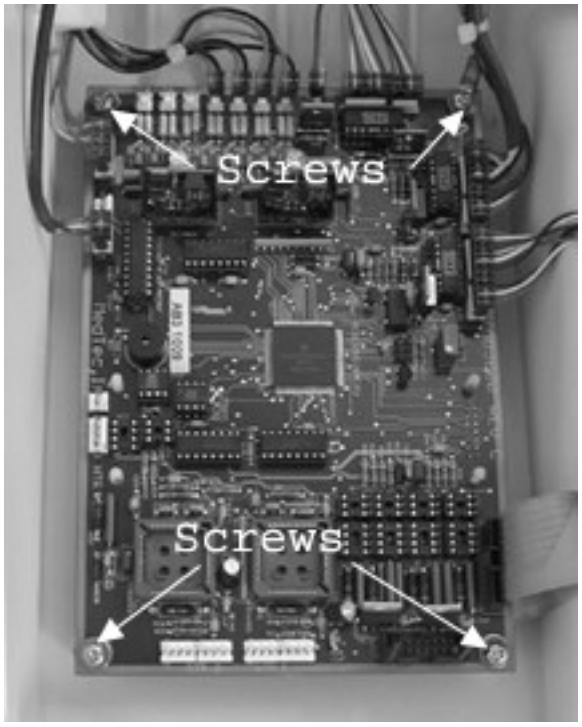


Photo 20

Replacing the Circuit Board

NOTE: ESD PROTECTION REQUIRED

1. Disconnect the power source.
2. Open the enclosure (see page 11).
3. Remove all connectors from the PCB (pump, power, rock motor, and carriage motor), carefully noting the location of each connector.
4. Remove the circuit board by unscrewing the four (4) screws (photo 20) and removing the four (4) countersink lockwashers, four (4) flat washers, and four (4) rubber washers. Discard the lockwashers.
5. Install the new circuit board with new lockwashers. NOTE: the prong of the countersink lockwashers should face the flat washer. Use threadlocker.
6. Attach all connectors.

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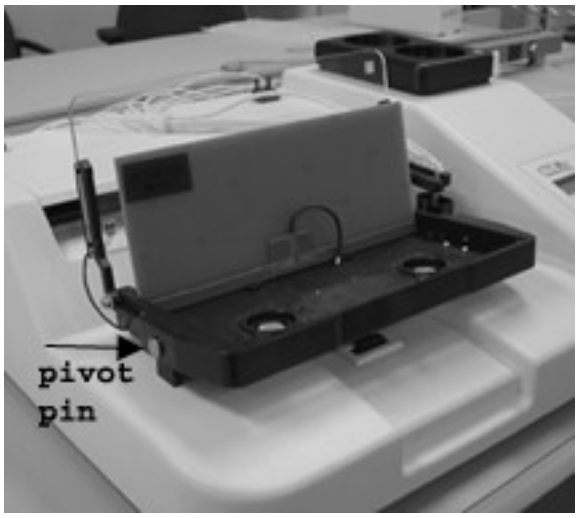

Photo 21

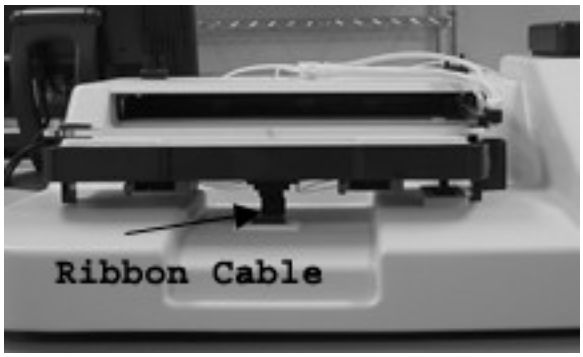

Photo 22

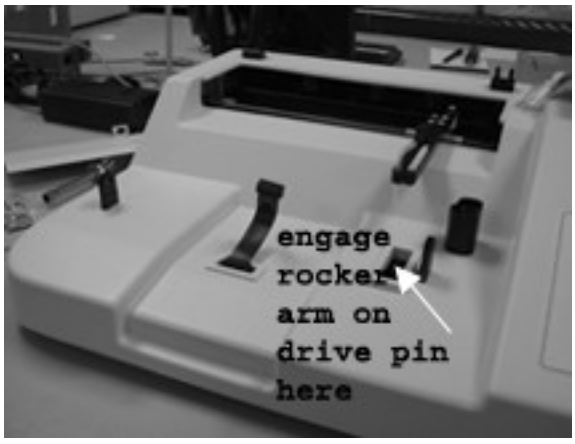

Photo 23

Replacing the Platform Ribbon Cable

In order to ensure the platform heaters are working properly, this ribbon cable should be changed every 12 months. The ribbon cable can be ordered directly from the manufacturer. The ribbon cable is located under the platform.

1. Remove the two (2) platform pivot pins from either side of the platform (photo 21).
2. Lift up the platform.
3. Unplug the ribbon cable (photo 22).
4. Plug in a new ribbon cable.
5. Set the platform back in place. Be sure to engage the rocker arm on the platform with the drive pin on the rock motor (photo 23).
6. Reinsert the pivot pins (lightly grease the pins and slightly rotate to push in).

Photo 24

Calibrating the Pumps

The Pump Calibration Routine is used to adjust the "on" time of each pump. This allows for differences in how the tubing was installed in the pump, pump wear over time, and manufacturing tolerances. It is best to recheck the calibration annually or whenever pump tubing is replaced.

1. Press NO at *Enter Edit Mode?*
2. Press NO at *Check Heaters?*
3. Press YES at *Enter Calibration Mode?*
4. If the tubing is new, exercise the tubing for proper break-in. Press YES at *Calibrate Pumps?*
5. Prime the pumps before calibrating them (the AutoBlot will prompt you to do this before the routine begins). NOTE: Before the pumps are calibrated, make sure the pressure pads have been locked for at least one (1) hour in order to approximate real-life operating conditions.
6. Disconnect the pump 1 tube from the dispense arm and place it in a 50ml graduated cylinder. Begin dispensing. The unit prompts you to enter the amount actually dispensed. The unit then makes calibrations and the routine will continue until exactly 40ml's is dispensed (photo 24).
7. Press ENTER to complete the calibration routine.
8. Continue with all remaining pumps.

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Calibrating the Heaters

1. Turn the instrument on.
2. Press NO at *Ready for a New Test?*
3. Press NO at *Enter Edit Mode?*
4. Press NO at *Check Heaters?*
5. Pres YES at *Enter Calibration Mode?*
6. Press NO at *Calibrate Pumps?*
7. Press YES at *Calibrate Heaters?*
8. Fill the small hybridization bottle half full and place it on the bottle heating pad. Place the dispense tube in the bottle.
9. Follow the prompts, prime Pump 6 only and begin the pre-warm process.

TROUBLESHOOTING GUIDE

TROUBLESHOOTING GUIDE

In the event you are experiencing problems with your AutoBlot, refer to the following table for troubleshooting assistance. If you cannot find the solution to the problem using this guide, please call the MedTec Technical Service Department.

Problem	Possible Cause	Solution
Unit not dispensing.	1. Tubing not at bottom of bottle. 2. Bottles are empty. 3. Pump pressure pads not locked.	1. Push tubing to bottom of bottle. 2. Fill bottles. 3. Lock pump pressure pads.
Unit not aspirating.	1. Waste bottle not sealed properly. 2. Aspiration pump clogged.	1. Make sure waste bottle fittings are in place and lid is screwed on securely. 2. Disconnect the tube from the waste bottle that goes through the back panel. Fill a syringe with approx 2ml of DI water and force the water into the tube.
Unit does not come on when ON/Off switch is used.	1. Instrument is not plugged in at wall or at the back of the unit.	1. Check the power cord and power supply to insure that all connections are in place.
Splashing during dispense cycle.	1. Clogged dispense tube or nozzle.	1. Change out the nozzle. If problem persists, then change out the tubing.
Carriage Steps Lost Error	1. Tubing too tight or kinked	1. Install new tubing. 2. Check to make sure there is nothing blocking the movement of the carriage mechanism. 3. Wipe clean the long brass carriage shaft and regrease with a lightweight white grease.

Problem	Possible Cause	Solution
Rock Motor Steps Error	1. Rock motor fails to rock platform correctly	1. If platform is rocking – check to make sure nothing is impeding the movement of the rocker mechanism.
Arm Steps Lost Error	1. Arm mechanism lost steps during the assay.	1. Check to make sure there is nothing blocking the movement of the arm mechanism. 2. Check the gap between the aspirate tip and the white tray while in Maintenance Mode, *Check Carriage, Check First Strip.* There must be 1-2 mm of freeplay when the arm is lifted from the tray.

SERVICE AND WARRANTY

Warranty Period

The AutoBlot 3000H is covered for one (1) year under warranty, excluding negligence. Should you have any problems with your instrument, contact the Customer Service Department for assistance.

Preventive Maintenance Checkups

In order to keep your AutoBlot in top working condition, it is recommended that it receive a Preventive Maintenance (PM) Checkup once a year. During a PM checkup, new tubing is installed, the pumps are cleaned and recalibrated, the instrument is lubricated and cleaned, and the software is upgraded to the latest version (as required). In addition, a performance test is run to ensure peak functionality of the unit.

All PM's and Service must be performed by a MedTec trained Service Technician to maintain warranty coverage.

FIELD REPLACEMENT PARTS

Ordering Parts

Parts can be ordered through the MedTec Customer Service Department. Customer Service is available Monday through Friday 8 am – 5 pm US Eastern Standard Time.

Telephone: USA 919.241.1400

Fax: USA 919.241.1420

Postal Address:
P.O. Box 16578
Chapel Hill, NC 27516-6578

Email: customerservice@medtecbiolab.com

Returning Defective Parts

Customer service is important to us. In order for MedTec to continue to provide you with high-quality service, we must have any defective parts returned for evaluation. Please contact our Customer Service Department for an RMA# and include the following information with any parts being returned:

1. The model and serial number of the instrument the part came from,
2. The date the part was removed,
3. A description of the problem or symptoms exhibited (if you cannot find a problem, describe what the user reported and specify “CND – Can Not Duplicate”),
4. The catalog number of the part being returned,
5. Your name and other identification information.

Parts should be returned to the MedTec facility:

MedTec, Inc.
600 Meadowland Drive
Hillsborough, NC 27278
USA

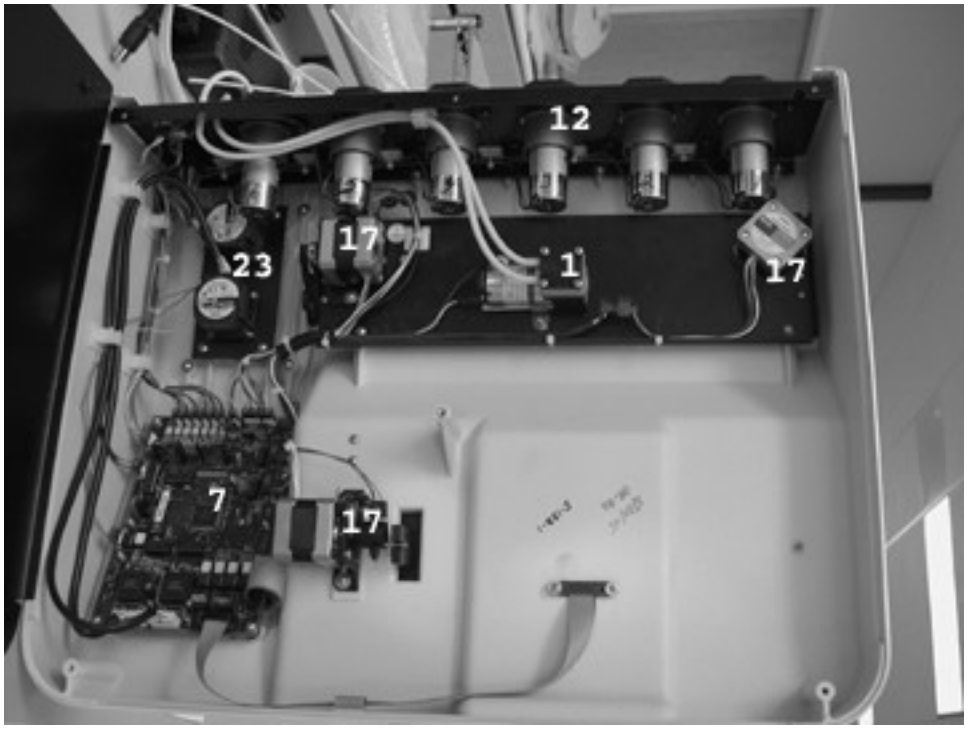
Service Parts

Identifier	Catalog #	Description
n/a	MT07604	AutoBlot 3000H Service Manual
n/a	MT07603	AutoBlot 3000H Guide to Operation
	MT07104	AutoBlot 3000H PM Kit
1	MT01031	Aspirate Pump
2	MT01101	Aspirate Shield
7	MT01102	Circuit Board
8	MT01103	Hinges
9	MT01104	Keypad and Graphics
10	MT01105	L Sensor
11	MT01030	On/Off Switch
12	MT01011	Peristaltic Pump (Dispense)
13	MT01106	Power Cord
14	MT01107	Power Inlet Harness
17	MT01029	Stepping Motor
18	MT01108	Timing Belt, long
19	MT01109	Timing Belt, short
20	MT01114	Platform Ribbon Cable
21	MT01126	Platform Heater Assembly
22	MT01125	Shield Assembly
23	MT01127	Bottle Heater
24	MT01128	Stirrer Motor
25	MT05200	Temperature AutoBlot
n/a	MT01110	Assorted washers, screws, nuts, spacers
n/a	MT01111	Assorted tools
n/a	MT01132	Loctite™ 222MS Threadlocker
n/a	MT01133	Loctite™ 4471 Prism

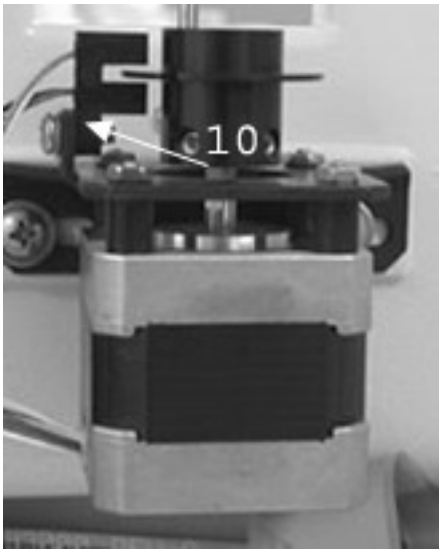
General Spare Parts

Identifier	Catalog #	Description
3	MT01008	Bottle, 1000 ml
4	MT01009	Bottle, 500 ml
5	MT01010	Bottle, 250 ml
6	MT01098	Bottle, 125 ml
28	MT01081	Bottle, 50 ml
16	MT01116	Bottle Stand
15	MT01099	Power Supply, heated unit
26	MT01096	Complete Tubing Kit (pump and bottle)
28	MT01129	Heater Sleeve, short
29	MT01130	Heater Sleeve, tall
30	MT01131	Heater Sleeve Insulator
n/a	MT07700	Shipping Box
n/a	MT07500	20-strip trays, 10 cm (AutoBlot 3000H)

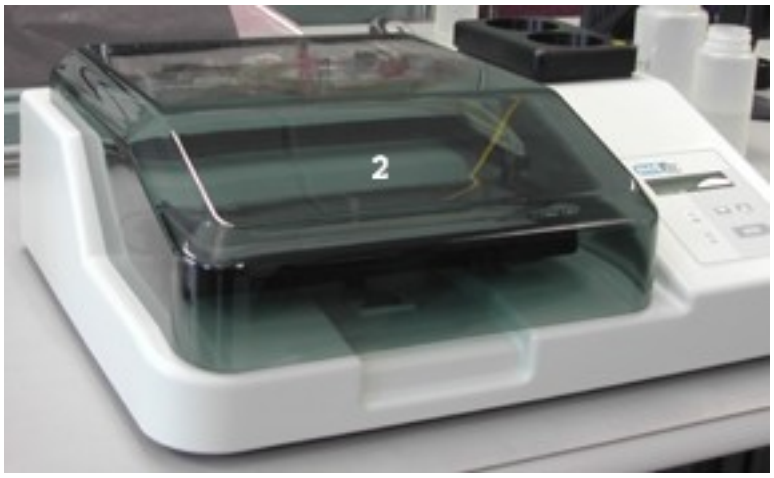
Field Replacement Parts



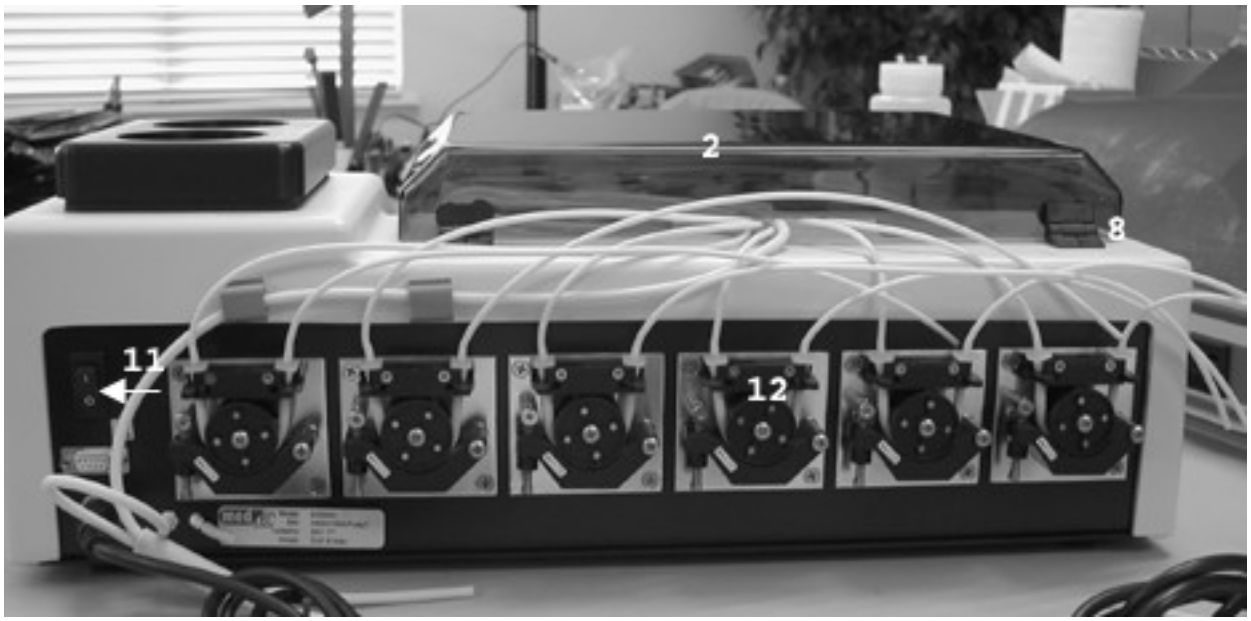
Inside Enclosure: #1 Aspirate Pump, #7 Circuit Board, #12 Peristaltic Pump (Dispense), #17 Stepping Motor, #23 Stirrer Motor



#10 L-Sensor on Stepping Motor

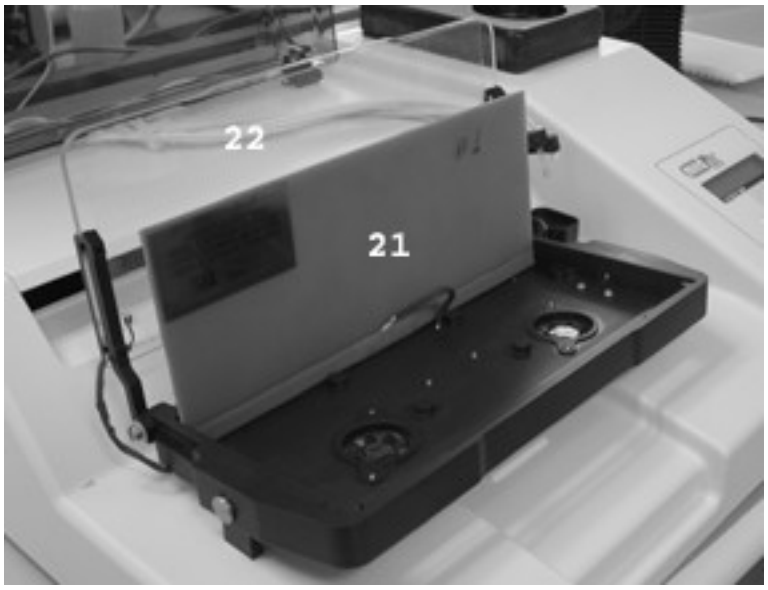


#2 Aspirate Shield

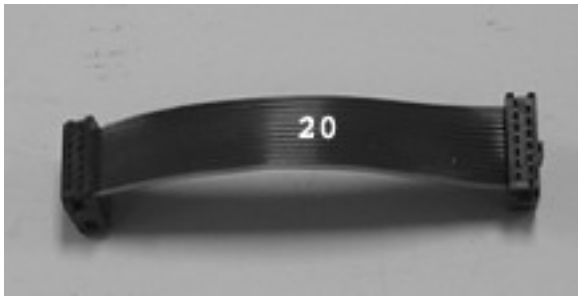


#2 Aspirate Shield, #8 Hinge, #11 On/Off Switch, #12 Dispense Pump

Field Replacement Parts

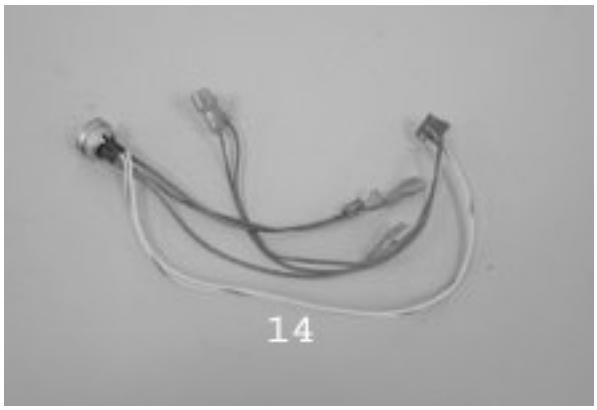


#21 Platform Heater Assembly, #22 Condensate Shield Assembly

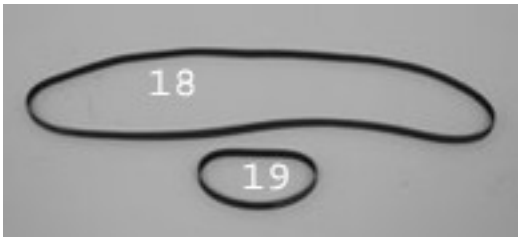


#20 Platform Ribbon Cable

#23 Bottle Heater

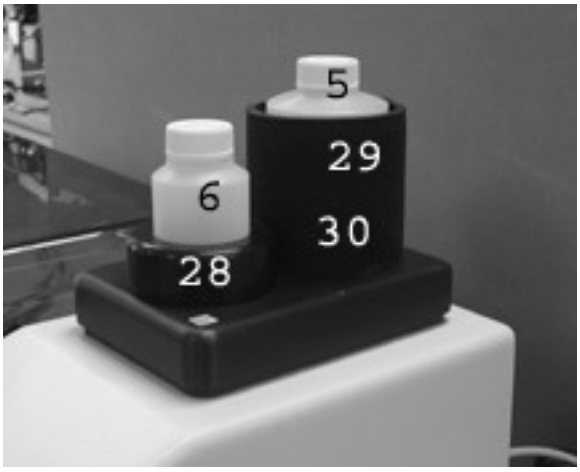


#14 Power Inlet Harness

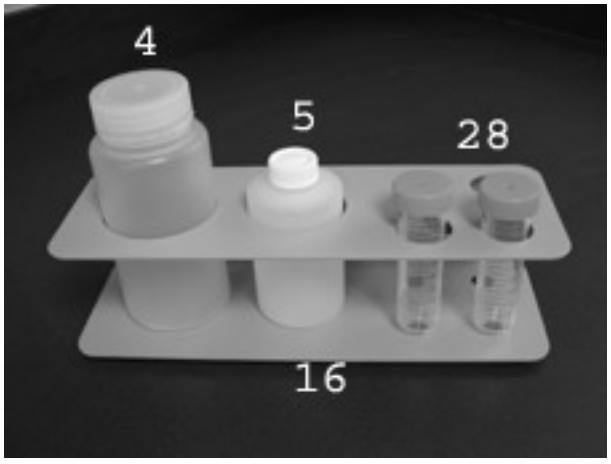


#18, #19 Timing Belts

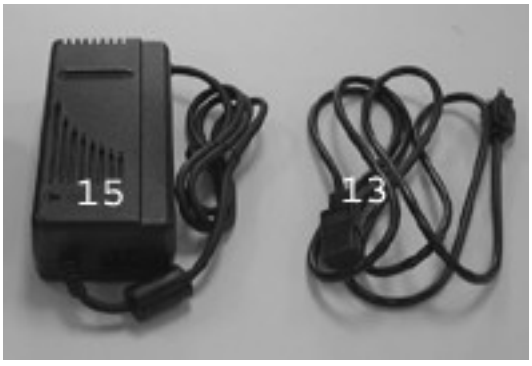
#3 1L Waste Bottle



#6 125ml bottle, #5 250ml bottle
#28 Heater Sleeve, short, #29 Heater Sleeve, tall
#30 Heater Sleeve insulator



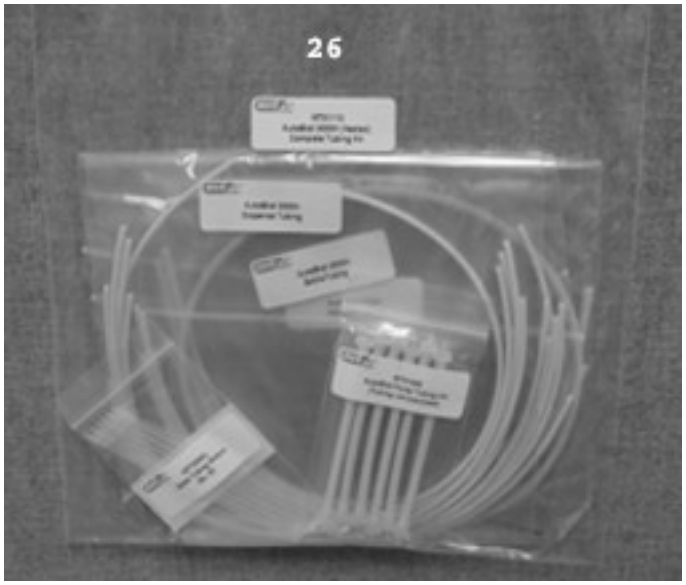
#16 Bottle Stand with Bottles
#4-500ml, #5-250ml, #28-50ml



#15 Power Supply, #13 Power Cord

Field Replacement Parts

#25 TempTracker 5-Channel Calibration Plate



#26 Complete Tubing Kit

Appendix A
AutoBlot 3000H Installation Instructions

AutoBlot 3000H Installation Instructions

1. **Carefully unpack** the instrument and inspect for damage that may have occurred during shipping. Save all packaging in the event the instrument needs to be shipped or moved, or if the unit needs to be stored for a long period of time.
2. **Remove the plastic bag** surrounding the instrument, the shrink wrap around the aspirate shield, the tape holding various pieces in location and the small foam blocks used to keep the arms and shield from shifting during shipment.
3. **Place the AutoBlot** on a level work surface. Plug the power supply into the back of the unit. Connect the power cord to a grounded receptacle.
4. **Attach the two (2) aspirate tubes** to the fittings on the lid of the waste bottle. The tubes are labeled "Connect to Waste Bottle". Either tube can connect to either fitting on the waste bottle lid.
5. **Locate the bottle stand** behind the instrument and place the included bottles into the stand. The largest hole (far left) is for Rinse solution, the next hole is for Substrate Buffer, while the remaining four (4) holes are for Substrate and Conjugate (only 2 of the 4 holes are required). Note that the Substrate hole is slightly larger than the Conjugate hole because most operators will want to wrap the conical bottom bottles with aluminum foil.
6. **Mount the clear plastic straws** on the ends of each tube going from the pump to the bottles. Cut the flexible tubing as short as possible in order to reduce the amount of priming necessary when starting an assay. The fifth and sixth pumps (Hybridization and Stringent Wash) are located on top of the instrument in the heated bottle pad located just behind the keypad. You will need a spare hybridization solution bottle and stringent wash solution bottle in order to cut these tubes properly.
7. **While holding the Pause key down**, turn the AutoBlot on by pressing the ON/OFF switch located on the back of the unit. "0" represents OFF and "I" represents ON. The screen should display "Maintenance Mode, Yes or No". Press Yes to enter Maintenance Mode.
8. **Press YES at *Check Keypad?*** Follow the prompts to check out all the keys on the keypad. When you return to Check Keypad, press No.
9. **Press YES at *Check Alarm?*** The alarm will sound for five (5) seconds. The tone should be clear and stable. Press No to exit Check Alarm.
10. **Press YES at *Check Pumps?*** Go through the series of prompts in order to run each pump. Watch the pump run to be sure that it is running in the correct direction as indicated by the small flow-arrow located on the pump pad. Press No at Check Pumps to exit this routine.

11. **Press YES at *Check Aspirate Pump?*** The pump should come on and stay on until turned off. Check the aspirate tube coming from the fitting in the back of the instrument and attaching to the waste bottle. Press your finger against the end of this tube. You should feel a strong suction against your skin. Exit the Aspirate Pump routine.
12. **Press YES at *Check Rock Motor?*** Press YES again and the platform should begin rocking. Be sure that it is rocking smoothing and noiselessly. Exit the Rock Motor routine.
13. **Press YES at *Check Carriage?*** Place an AutoBlot 3000H tray onto the platform. Jog the aspirate arm several times then move onto the next prompt and check out the first strip. The aspirate tube and dispense tubes should be fairly well centered over trough one and two. By slightly lifting the aspirate tube you should note a small amount (1/16") of looseness between the tip of the aspirate tube and the bottom of the trough.
14. **Skip the last strip prompt.**
15. **Skip the 10-strip prompt**.
16. **Exit the Check Carriage Routine**.
17. **Press NO at *Check Power Fail*.**
18. **Press YES at *Check Stirrers?*** You will need the two stir bars included with the instrument. Place them in the heated bottle pad and turn on the stirrers. Both stir bars should spin uniformly. Exit the Stirrer routine.
19. **Press YES at *Check Fans?*** Turn the fans on and feel the flow coming from both fans located underneath the platform. Exit the Fan routine.
20. **Press YES at *Check Heaters?***
21. **Press YES at *Run Current Test?*** At each heater prompt allow the instrument to test each heater and display the resistance value. It will compare the new value to the old value and display the percent difference. These should be within around 2% of each other. This is not critical but a good test to make sure the heaters are not disconnected.
22. **Press YES at *Run Opens Test?*** The unit will rock for one minute and test for breaks in the ribbon cable located under the platform.
23. **Press YES at *Check Heater Temp?*** Turn each heater on individually and confirm that the heater is working by touching each heater. This will take approximately 5 minutes for each heater. Exit the Check Heater prompt after all heaters have been checked.

24. **Press YES at *Check Thermistors?*** At the tray temperature prompt, place your fingers over the thermistor used to measure the tray temperature. The temperature should start at room temperature and gradually climb. After pressing Enter, the bottle heater will turn on and the display temperature should increase. This should start slightly above room temperature because you already started warming the bottle pad at the Check Heater prompt.
25. **Turn the instrument off**. All systems are functioning properly.

Appendix B
AutoBlot 3000H Certificate of Decontamination
5100-F01.01.000

Certificate of Decontamination

Customer Information

Name: _____

Facility: _____

Address: _____

_____

Phone: _____ **Fax:** _____

Contact: _____

Date Faxed: _____

Instrument Information

Type: _____ **Serial Number:** _____

Decontamination Information

Decontamination Performed?: ☐ YES ☐ NO ☐ N/A (Not Applicable)

If **NO or N/A**, state reason why decontamination WAS NOT performed.

_____

What chemical, infectious, toxic, or radioactive substances have been in contact with this item?

_____

_____

Authorization

By accepting authorization to return this product, the user assumes all responsibility and liability for biological, chemical, and radiological decontamination and cleaning. MedTec, Inc., reserves the right to refuse delivery of products that do not appear to have been properly decontaminated. If the product was used with radioactive material, the signature of the Radiation Safety Office is required.

By signing below, the user declares that the instrument listed has never been exposed to any hazardous biological material or that is has been decontaminated to remove or deactivate any biological material, chemical, infectious, toxic, or radioactive substance that could be dangerous to Service Personnel.

Signed: _____ _____

Signature Date

_____ _____

Name Title

Appendix C
AutoBlot 3000H Tubing Kit Instructions

Complete Tubing Kit for the AutoBlot 3000H

The Complete Tubing Kit contains pump, dispense, aspirate, and bottle tubing for the AutoBlot 3000. The tubing in these kits is cut to the proper length and marked for proper alignment. **NOTE: Proper tube lengths and installation are critical for proper performance of the arm assembly.** Use only the tubing replacement kits provided by the manufacturer. Do not attempt to change tubing without these kits.

The tubing on your AutoBlot 3000 should be replaced one pump at a time. For each pump you will replace the pump tubing, then the dispense tubing, then the bottle tubing.

Replace the Pump Tubing

The pump tubing is the short length of tubing that wraps around the pump.

Before replacing the pump tubing, remove the aspirate tubing from the aspirate arm (leave the clear Teflon tube in place on the aspirate arm). Pull the aspirate tubing through the nylon washer on top of the instrument, through the nylon clips and remove from the aspirate bottle. Removing the aspirate tubing first gives you more room to work with the other tubing pieces. Do not replace with the new aspirate tubing just yet. It will be replaced last.

Replace the Pump Tubing **one pump at a time, starting with Pump 1.** Disconnect the dispense tubing and the bottle tubing from the Pump 1. Unlock the pump pressure pad, remove the pump tubing and discard.

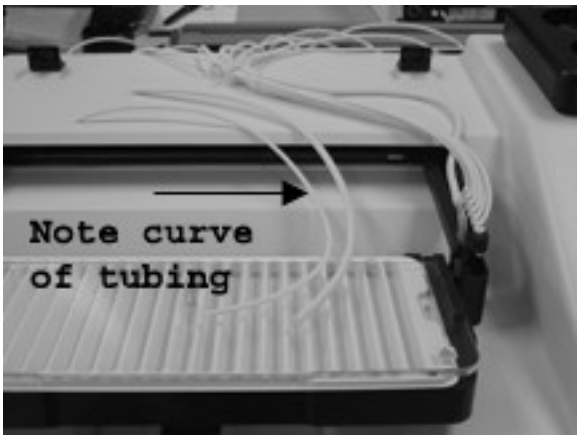
Put on the new pump tubing, making sure it is not twisted and the fittings are symmetrical. If the tubing is twisted, the pump will not work properly.

Replace the Dispense Tubing

Now replace the dispense arm tubing for Pump 1. Make sure you compare the length of each tube that you replace with the length of the new tube you are installing. **These lengths are critical** in order for the arm mechanism to operate smoothly. Note carefully where all tubes are located before removing any of them.

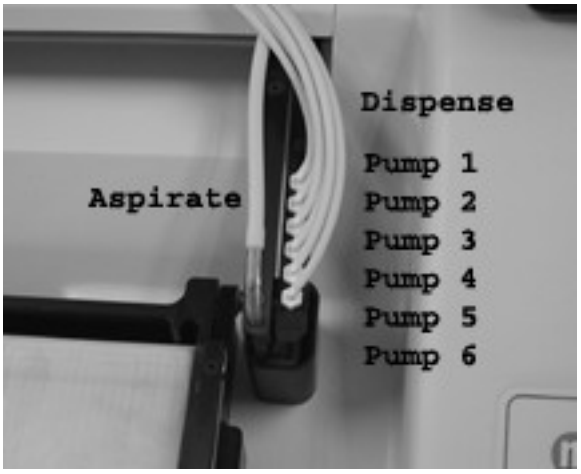
Replace the dispense arm tubing by starting at the dispense arm and working back to the pump. This is critical in order for the tubing to lay correctly and not twist.

Note the natural curve of the tubing by laying a piece of tubing over across your hand. Using this natural curve as a guide, lay the tubing across the top of the instrument with the tubing curving to the right. This curve must be laid out properly in order for the aspirate/dispense arm to move across the tray smoothly.



Attach the tubing for Pump 1 to the dispense tip as shown to the right.

Attach the other end of the dispense tubing to the pump tubing on Pump 1. Note the direction of the pump flow to ensure proper connection.



Replace the Bottle Tubing

Replace the Pump 1 bottle tubing.

NOTE: Included with your kit are clear tubing straws that can be attached to the end of the tubing that goes into the bottles. These straws help the tubing stay down in the bottle and make it easier to insert the tubing into the small bottles. However, they will increase the priming volume slightly so use the straws only as needed. Cut the flexible tubes to the minimum length needed to place the tubing in the bottles. The shorter the tubing, the less volume is required when priming the pumps.

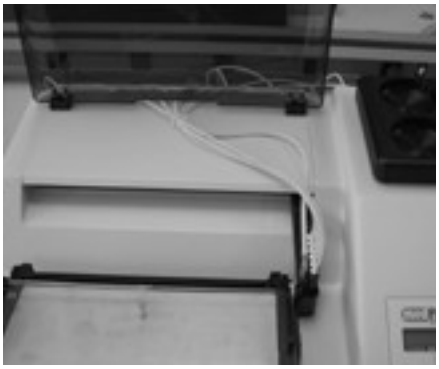
Replace the Tubing for the Remaining Pumps

Replace the pump, dispense and bottle tubing for the remaining pumps, repeating the procedure described above.

Replace the Aspirate Tubing

Connect the aspirate tubing to the aspirate arm and guide through the washers to the back of the instrument.

Feed the aspirate tubing through the nylon clips in the back and attach to the waste bottle.



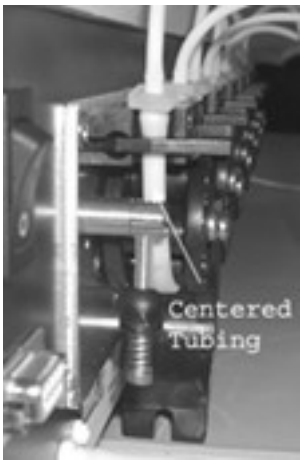
Exercise the Tubing

When new tubing is installed the pump delivery volumes will vary slightly until the tubing has relaxed into its new configuration around the pump rotor. In order to accelerate this process, the instrument has an Exercise Routine that automatically cycles through each pump. This Exercise Routine is accessed through the Pump Calibration Routine as follows:

Press No at *Ready for a New Test?.*
Press NO at *Enter Edit Mode?*
Press YES at *Enter Calibrate Mode?*

Be sure to have the pump pads locked in place and do not use any fluid in the system while exercising the tubing (the aspiration pump is turned off during this routine).

After exercising the tubing, make sure the tubing is in the center of the pump rotor. If the tubing is too long, it will move towards the edge of the rotor and the rotor will wear a hole in the tubing at the point of contact.



Calibrate the pumps

The Pump Calibration Routine is used to adjust the "on" time of each pump. This allows for differences in how the tubing was installed in the pump, pump wear over time, and manufacturing tolerances. It is best to recheck the calibration whenever the pump tubing is replaced.

Prime the pumps before calibrating them (the AutoBlot will prompt you to prime before the calibration begins). **NOTE:** Before the pumps are calibrated, make sure the pressure pads have been locked for at least one (1) hour in order to approximate real-life operating conditions. Disconnect the Pump 1 tubing from the dispense arm and place it in a 50ml graduated cylinder. Begin dispensing. The AutoBlot will prompt you to enter the amount actually dispensed. At that point the system makes calibrations and the routine will continue until exactly 40ml's is dispensed. Press ENTER to complete the calibration routine. Repeat this procedure for each of the pumps.

Attachment 1
AutoBlot 3000H Service QC Checklist
7102-F02.01.000